YELL

GIP Report

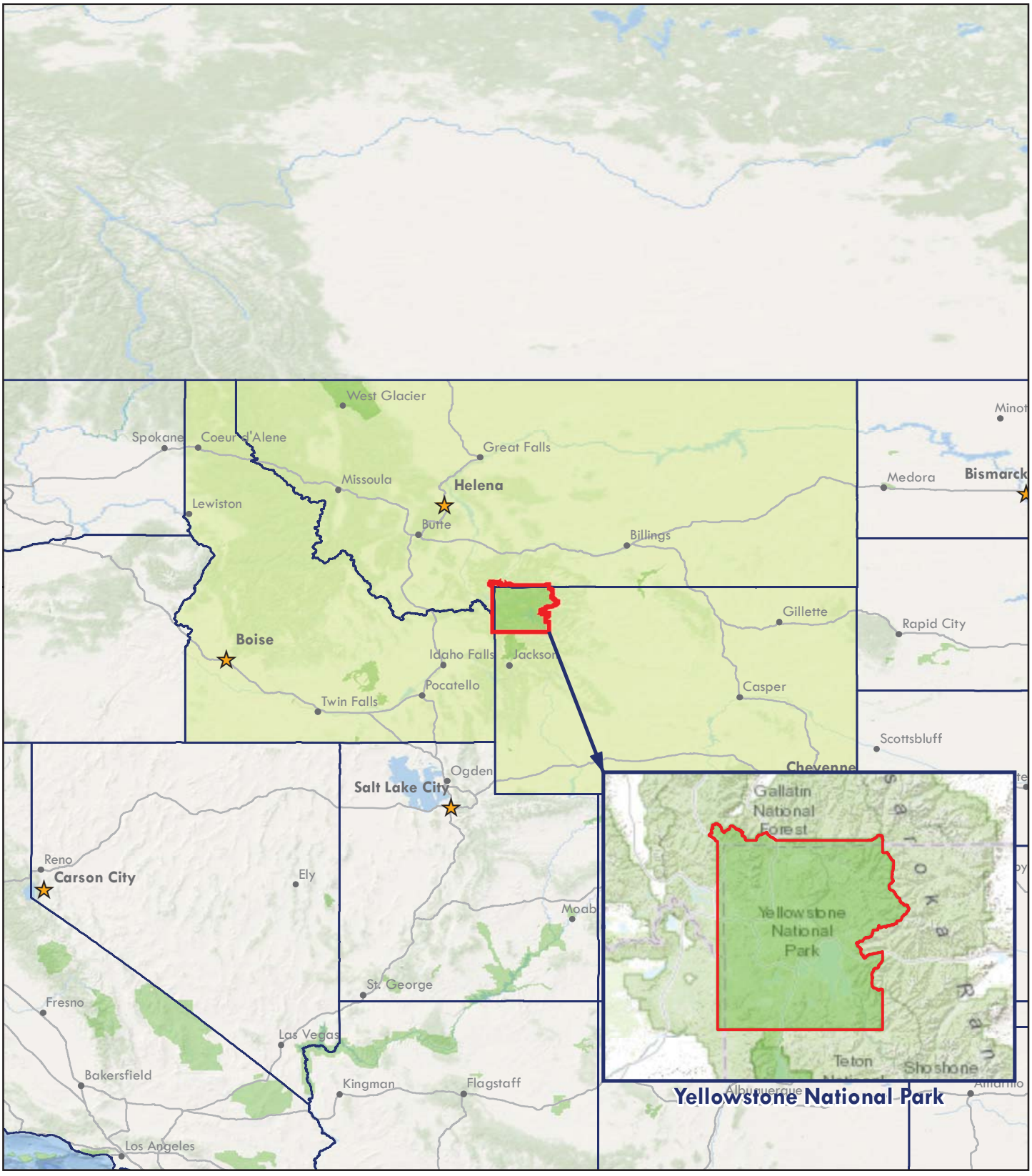
NPS Guardwall/Rail Inventory Program
Yellowstone National Park

Federal Lands Highway
Road Inventory Program

Prepared By:
Federal Highway Administration
Eastern Federal Lands Highway Division
Road Inventory Program (RIP)

Data Collection Date: October 2009
Report Date: December 2015

Yellowstone National Park
in
Idaho, Montana and Wyoming



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Esri, DeLorme, GEBCO, NOAA NGDC, and other contributors

N

Table of Contents

SECTION		PAGE NO.
1.	**INTRODUCTION**	**1 - 1**
2.	**PARK BARRIER LOCATION MAPS** Retaining Barrier Location Maps	**2 - 1**
3.	**TIER 1 - PARK BARRIER OVERVIEW**	**3 - 1**
4.	**TIER 2 - ROUTE BARRIER OVERVIEW**	**4 - 1**
5.	**TIER 3 - BARRIER DETAILS**	**5 - 1**
6.	**APPENDIX A - SUMMARY OF GIP DEFINITIONS**	**A - 1**

Introduction

Yellowstone National Park

Federal Lands Highway
Road Inventory Program

Introduction

In support of the NPS Facility Management Software System (FMSS) asset management program, FHWA- contracted staff completed the Guardwall/Rail Inventory Program (GIP) inspections within selected National Park Service (NPS) units between 2010 and 2011. This inventory provides static information to FMSS regarding barrier characteristics such as height, length and location, as well as dynamic information about the condition of the barrier. In addition, when barrier deficiencies were identified, repair recommendations and estimated costs, suitable for use as FMSS work orders, were generated to bring the barrier back to its "new" condition.

In over 30 parks, numerous crashworthy barriers inspected maybe in poor condition by simply applying a new overlay of asphalt without milling previous layers. In instances such as this, basically the critical element of barrier height decreased as the elevation of the roadway increased. Resulting work orders were drafted to raise w-beam barriers or to remove and reset stone masonry barriers to their original design height.

This inventory provides static information and a condition assessment of each barrier inventoried. In addition, when barrier deficiencies were identified, repair recommendations and estimated costs were drafted to bring the barrier back to its "new" condition.

Drafted work orders have been classified as being either deferred maintenance or capital improvement. This classification is based on the type of work recommended, as defined below.

- *Deferred Maintenance* can be classified as repair or replace in kind. Work done to the barrier does not include any upgrading.
- *Capital Improvement* can be classified as upgrading part of or the entire existing barrier. Typically the upgrade will be from a non-crashworthy to a crashworthy device. Other examples of capital improvements would be the addition of a curb to improve drainage.

Care was taken to maintain the cultural significance of historic barriers located in the NPS. While historic traffic barriers likely would not withstand current crashworthiness performance criteria, they are considered by the NPS to be important resources for the historic and/or cultural value. Historic barriers may be "character defining features" that contribute to the cultural significance of historic roadways. As such, these barriers have resource value in and of themselves which may be somewhat independent from their functionality as barriers as previously defined. The consideration of both the crashworthiness and resource value of historic barriers was a significant challenge for the NPS and the FHWA when designing the GIP, to the point that for historic stone masonry barriers, the barrier height had to be more than 6-in below its design height before any work would be considered to deal with height issues. To preserve historic stone masonry barriers, typical drafted work orders for historic barriers were to remove and reset the barrier to the barrier's original design height on a concrete footer, as compared to replacing it with a similar crashworthy barrier.

This report is organized in a tiered approach from the broad park overview perspective (Tier 1) to a route overview perspective (Tier 2), then down to the details of each barrier (Tier 3). Tier 1 presents park barrier location maps and an overall park-specific summary narrative of the results of the guardwall/rail inventory program. Tier 2 presents route overview maps with associated barrier summary information. Tier 3 presents individual barrier information in a one-page detailed format, including a photograph of each barrier. Appendix A provides a condensed summary of guardwall/rail inventory definitions and assessment categories to assist in reading this report.

Park Barrier Location Maps

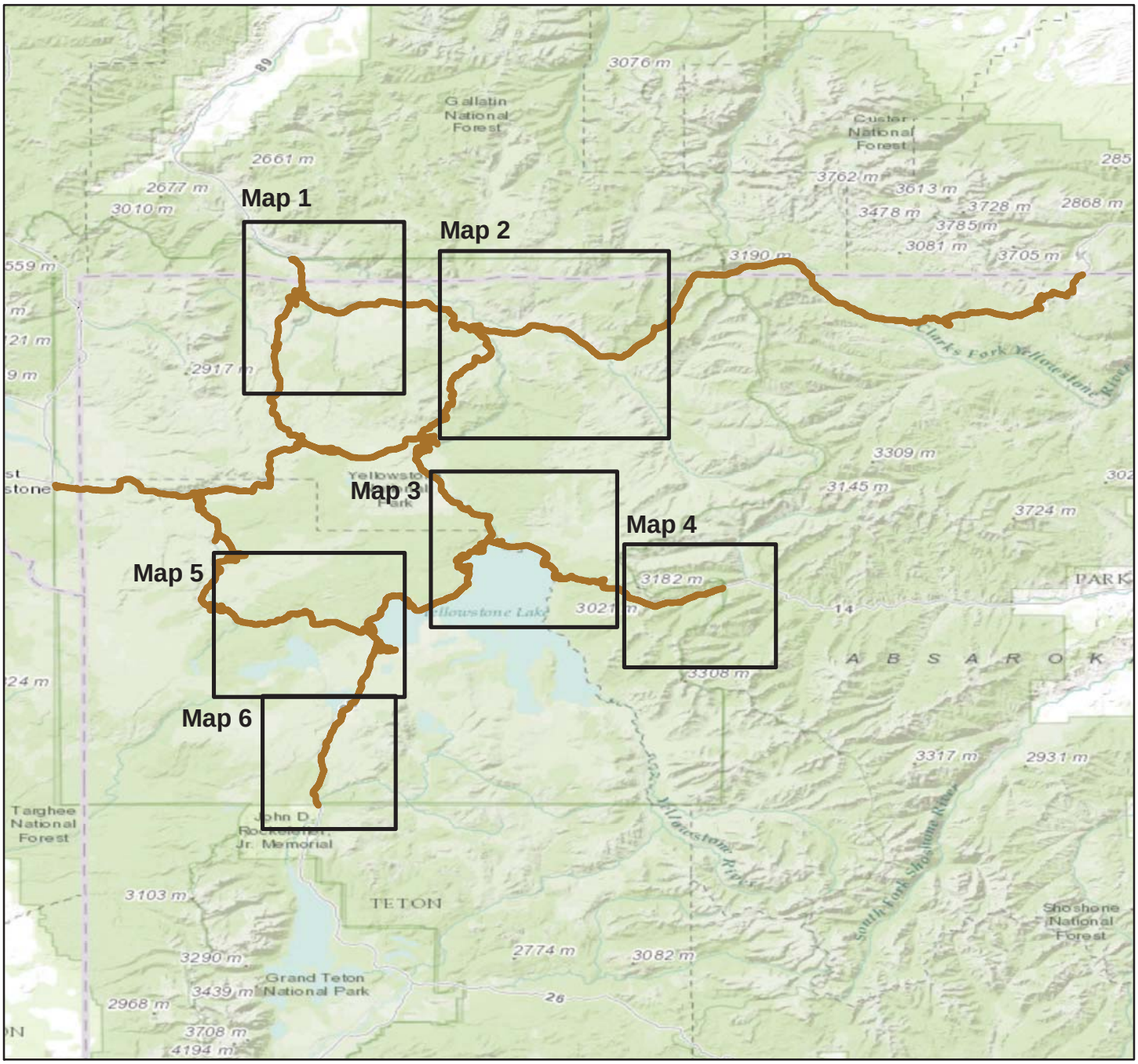
Yellowstone National Park

Federal Lands Highway
Road Inventory Program

Yellowstone National Park

BARRIER LOCATION MAP

Key Map



Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

RIP Collected Routes

Miles

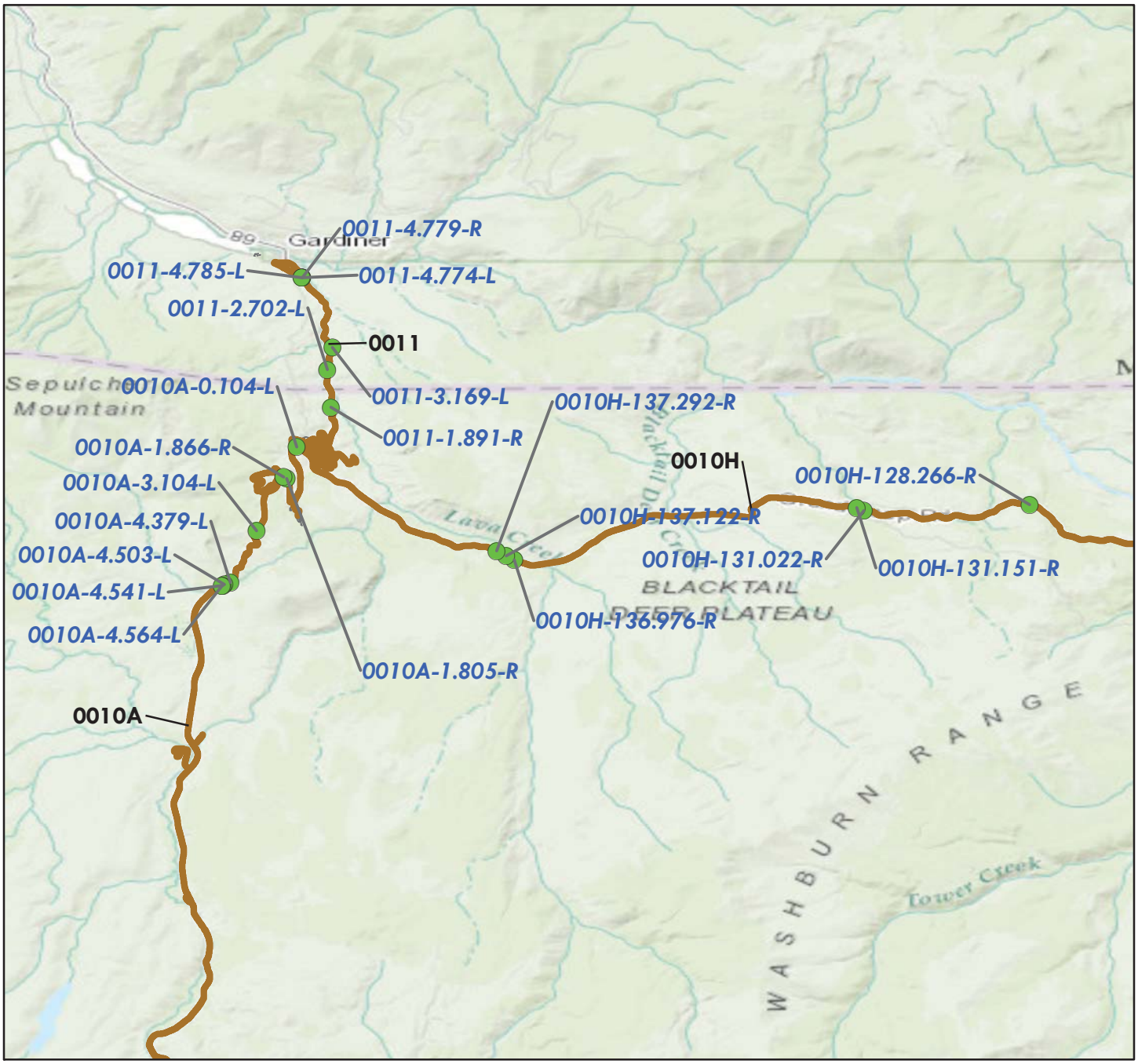
0 10 20

N

Yellowstone National Park

BARRIER LOCATION MAP

Map 1



Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier Locations

RIP Collected Routes

Miles

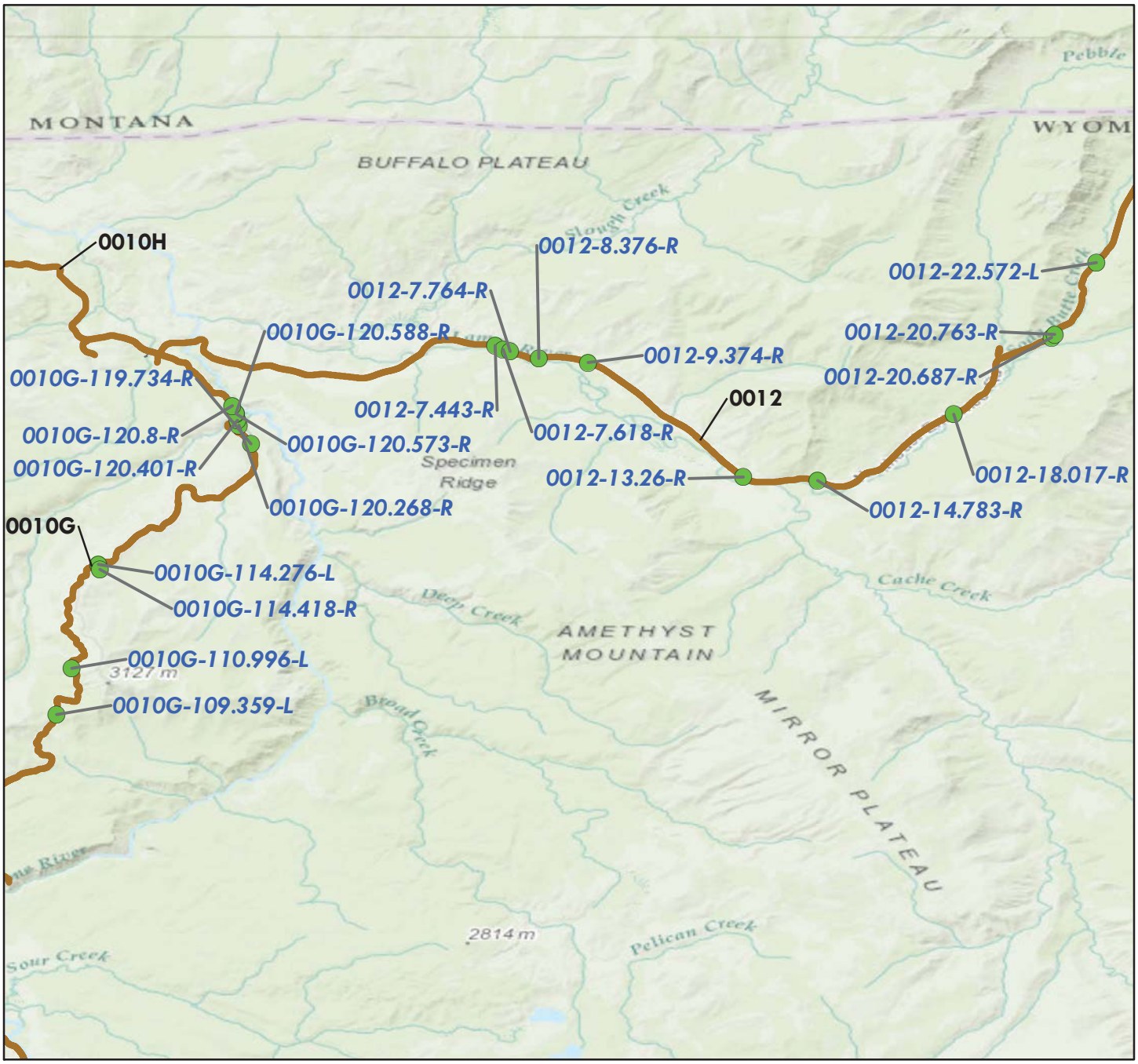
0 2.5 5

N

Yellowstone National Park

BARRIER LOCATION MAP

Map 2



Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier Locations

RIP Collected Routes

Miles

0 2.5 5

N

Yellowstone National Park

BARRIER LOCATION MAP

Map 3

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier Locations

RIP Collected Routes

Miles

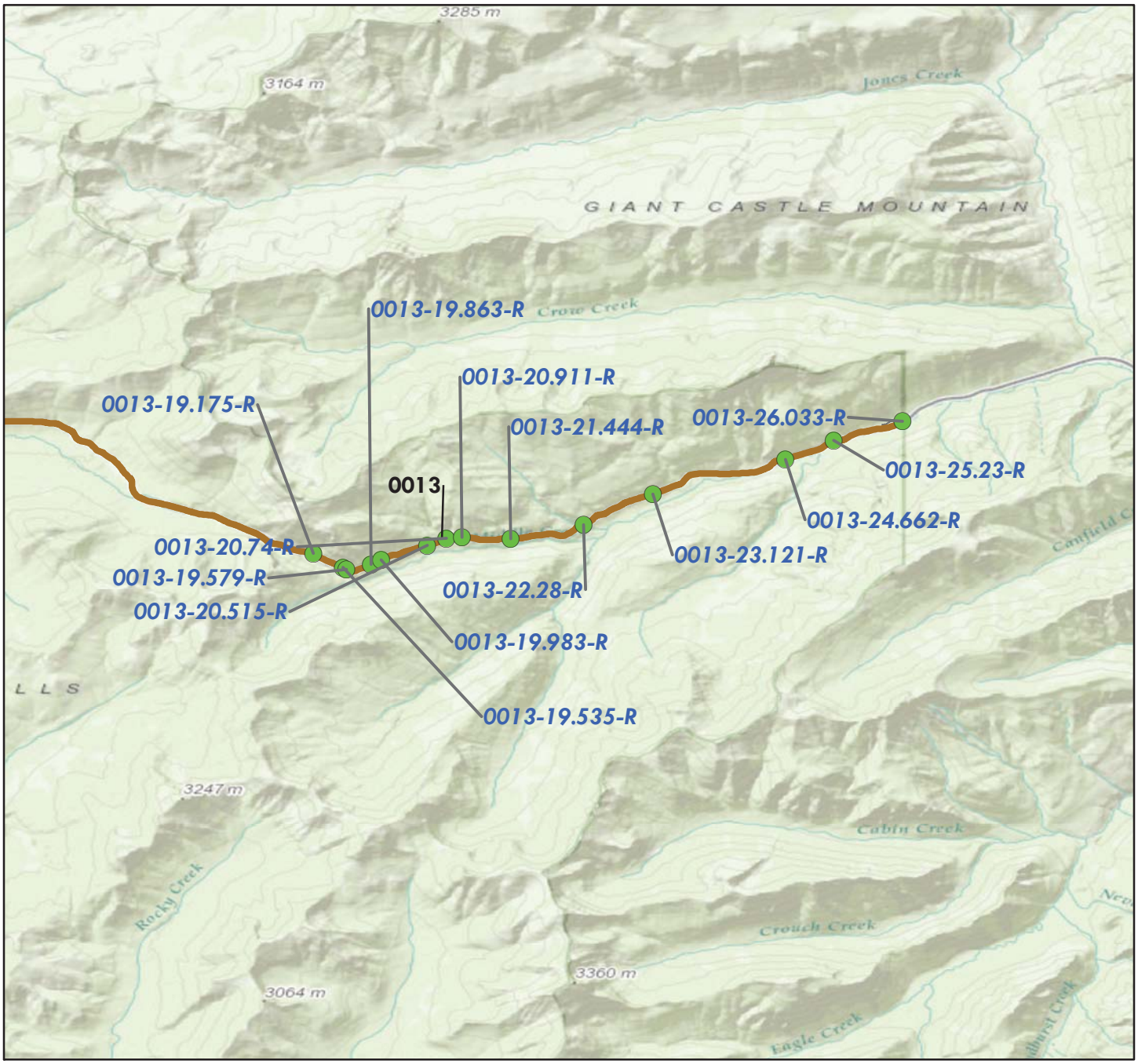
0 3 6

N

Yellowstone National Park

BARRIER LOCATION MAP

Map 4



Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier Locations

RIP Collected Routes

Miles

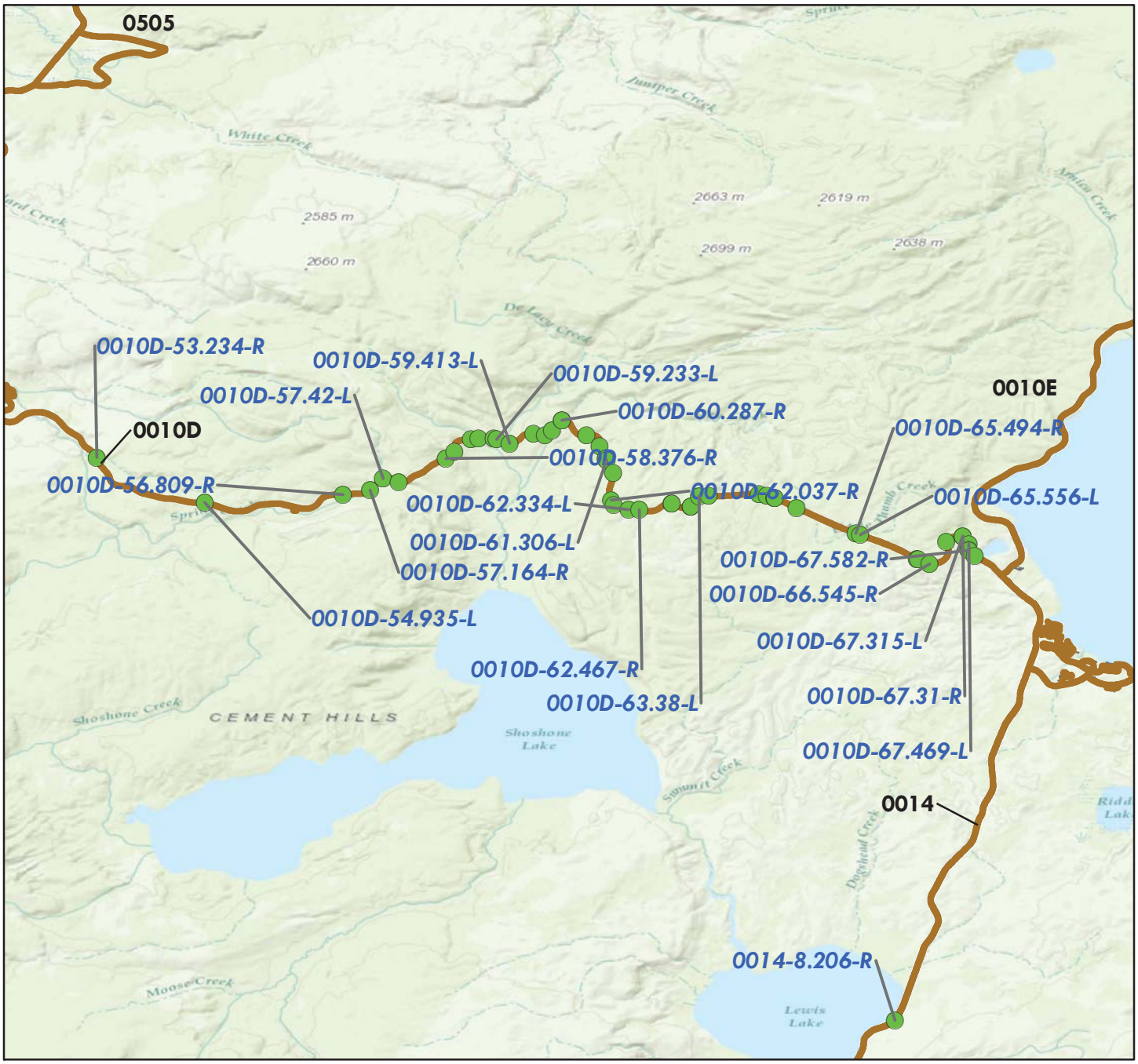
0 2 4

N

Yellowstone National Park

BARRIER LOCATION MAP

Map 5



Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier Locations (Not all labeled)

RIP Collected Routes

Miles

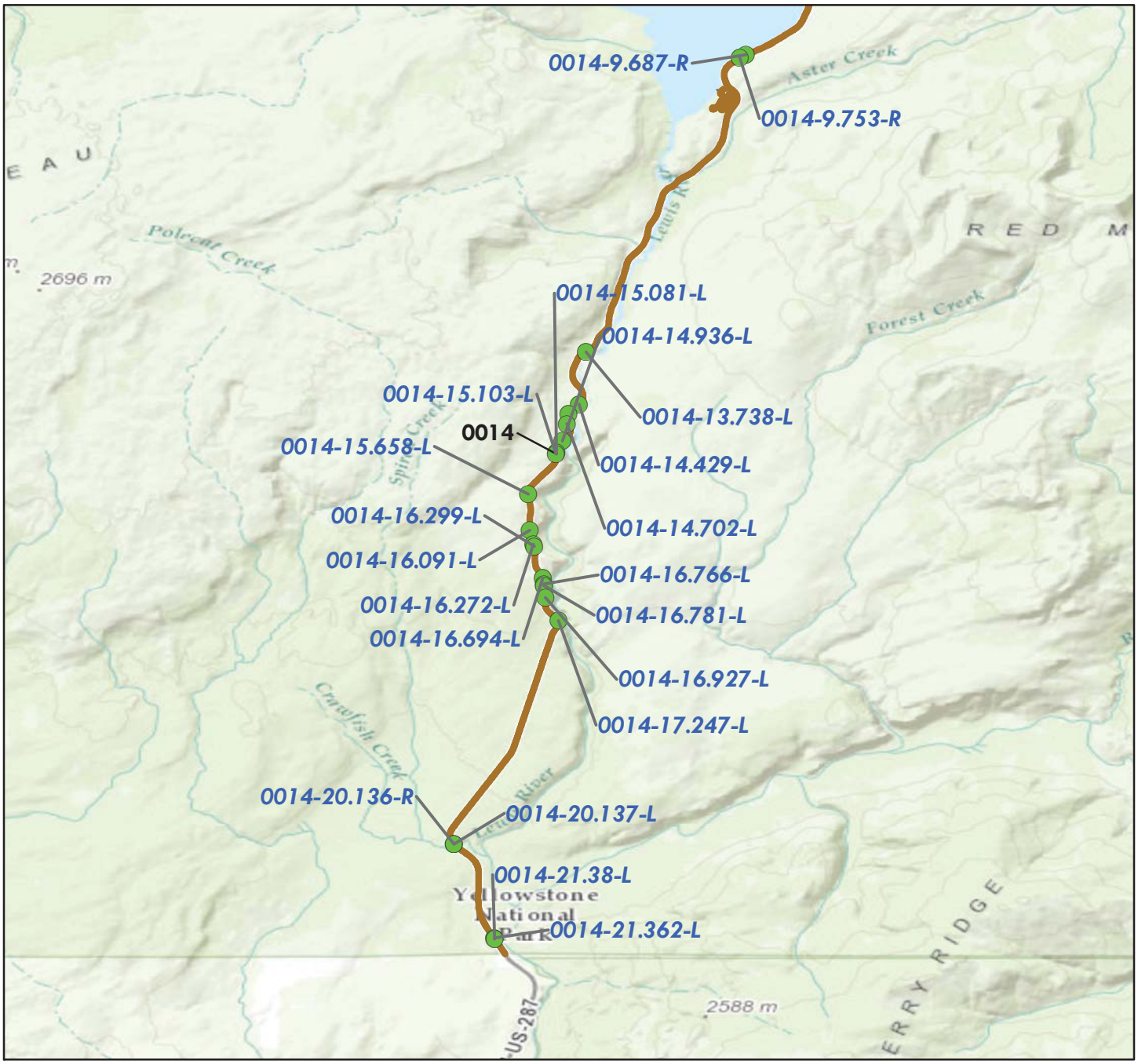
0 2.5 5

N

Yellowstone National Park

BARRIER LOCATION MAP

Map 6



Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier Locations

RIP Collected Routes

Miles

0 1.5 3

N

Tier 1
Park Barrier Overview

Yellowstone National Park

Federal Lands Highway
Road Inventory Program

Parkwide Summary: Yellowstone National Park

Initial barrier inspections were conducted at Yellowstone National Park in 2009, and encompassed all known barriers associated with Park roadways. In general, walls are not included in this assessment, but were inspected for Yellowstone National Park in 2007 under a separate effort as part of the Retaining Wall Inventory Program (WIP). A report for WIP is available under separate cover.

All paved roadways and parking areas listed in the RIP Route Identification Report were inspected for barriers.

The following tables provide an overview of the findings of this inspection and assessment effort. In all, 142 barriers were inventoried on the routes listed below.

Table 1: Number of Barriers by Route

Route Number	Route Name	No. of Barriers
0010A	MAMMOTH TO NORRIS ROAD	8
0010D	OLD FAITHFUL TO WEST THUMB ROAD	50
0010F	FISHING BRIDGE TO CANYON ROAD	1
0010G	CANYON TO TOWER ROAD	10
0010H	TOWER JUNCTION TO MAMMOTH ROAD	6
0011	NORTH ENTRANCE ROAD	6
0012	NORTHEAST ENTRANCE ROAD	11
0013	EAST ENTRANCE ROAD	26
0014	SOUTH ENTRANCE ROAD	23
0904D	GRANT SERVICE STATION PARKING	1

Due to the different GIP assessment criteria of barriers based on their intended use, barriers were classified as being either traffic barriers or non-traffic barriers.

- *Traffic* barriers are physical devices intended to keep vehicles or people from straying into dangerous or off-limits areas. For the purpose of this inventory, a traffic barrier is categorized as roadside hardware placed longitudinally, excluding pedestrian railing and fencing.

- *Non-traffic* barriers provide a physical delineation between public access areas and restricted or protected areas in locations such as a parking lot, viewpoint or turnout. **Non-traffic barriers which inhibit access of vehicles are included in this report; non-traffic barriers which only inhibit access of pedestrians or bicyclists are not included. For the purpose of this inventory, non-traffic barriers are guidewalls and guiderails. Note: rocks, stones, boulders, fences or curbs were excluded from this inventory.**

There are instances in parks where a single barrier can switch between being classified as a traffic barrier and a non-traffic barrier. Such instances typically occur at pullouts, where a traffic barrier along the road will continue through the pullout without interruption. In such instances, the traffic barrier and non-traffic barrier were assessed using different criteria. Due to the different criteria, the GIP database was designed to record the traffic barrier and non-traffic barrier as multiple distinct barriers, even though to the eye, they appear as one barrier. Other instances where a single barrier is split into multiple barriers would be when the barrier is placed continuously along two legs of an intersection, so that one portion of the barrier may be on one road and the remaining portion of the barrier is on a different road.

Table 2: Number of Barriers by Function

Barrier Function	No. of Barriers
NON-TRAFFIC	20
TRAFFIC	122

The following table shows the barrier types that were inventoried and assessed.

Table 3: Number of Barriers by Type

Primary Barrier Type	No. of Barriers
Other: Log Rail On Log Posts	20
W-Beam Strong Post	81
W-Beam Weak Post	1
Other: Log Rail On Stone Posts	1
Stone Masonry Crenellated Without Core Wall	36
Stone Masonry Without Concrete Core Wall	3

The following table shows the number of barriers by one of four categories of recommended action along with associated work order costs and the number of barriers that are in each recommended action. All work order information is presented for individual barriers, even though some work orders were not accepted by the Park. Some work orders were later combined to simplify route deferred maintenance requests.

Table 4: Number of Barriers by Recommended Action and Associated 2008 Cost

Recommended Action	Repair Costs*	No. of Barriers
No Action	$0	33
Monitor	$0	0
Repair	$5,498,029	103
Replace	$171,497	6
Totals	**$5,669,526**	**142**

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

The following table categorizes the number of barriers that fall into one of ten cost ranges, based on the prepared work orders. The locations, work descriptions, and cost of the recommended repairs for these barriers are listed by individual barrier in Tier 3 of this report.

Table 5: Number of Barriers Grouped by Associated 2008 Cost

Cost Range*	No. of Barriers
$0	33
$1 - $25,000	79
$25,001 - $50,000	10
$50,001 - $100,000	5
$100,001 - $250,000	10
$250,001 - $500,000	2
$500,001 - $1,000,000	3
$1,000,001 - $2,000,000	0
$2,000,001 - $3,000,000	0
$3,000,001 - $4,000,000	0
Total Number of Barriers	**142**

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Data for end terminals was collected on the GIP data collection form and indicates if an end terminal meets current crashworthiness standards. End terminals are specially designed barrier ends that attenuate impacts to the ends of barriers. This is supplemental information that WASO designed into the inventory program.

A total of 154 end terminals were found on barriers at the Park. There are generally a greater number of end treatments than actual barriers because end treatments are located at both the beginning and end of each barrier.

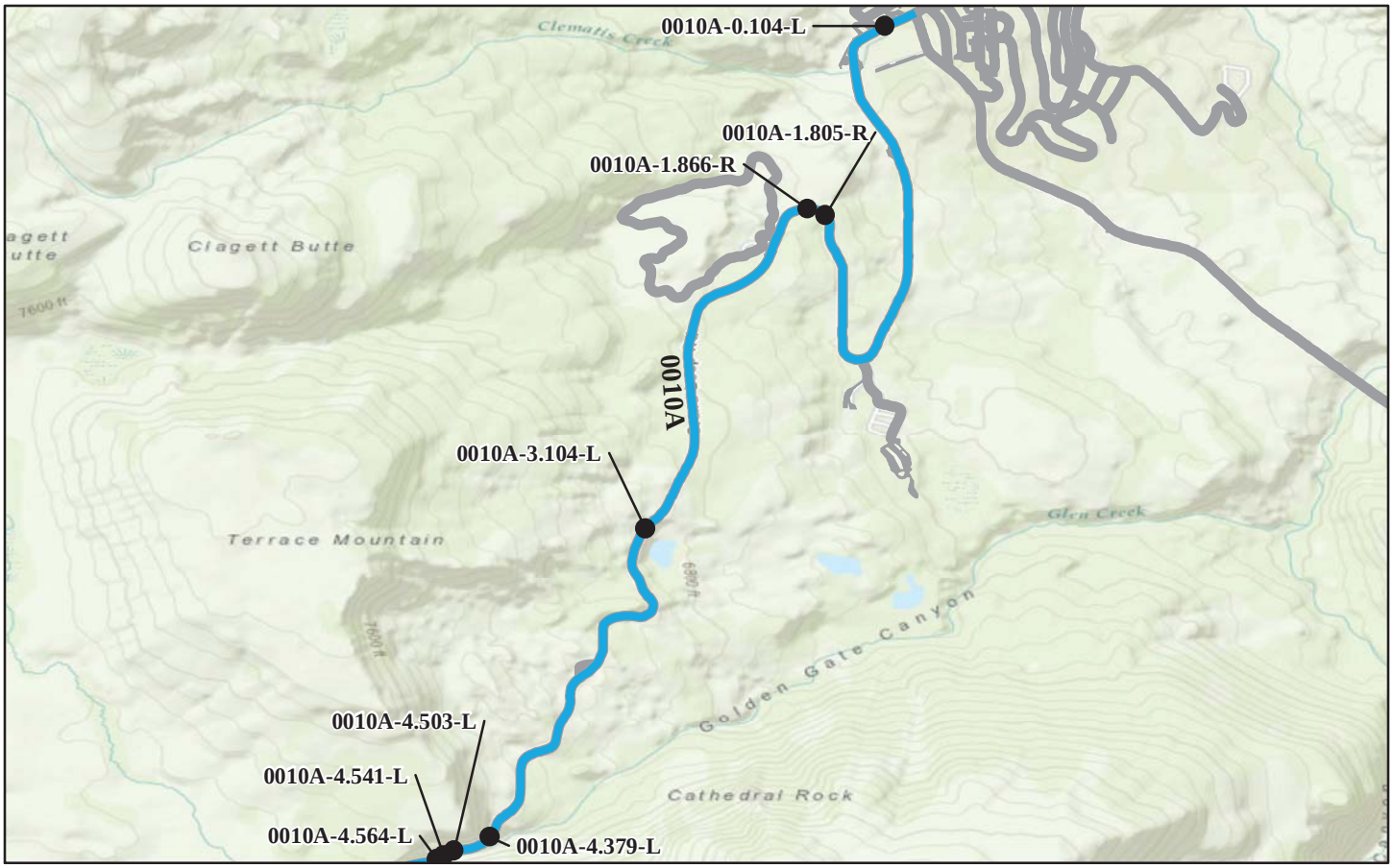
Tier 2
Route Barrier Overview

Yellowstone National Park

Federal Lands Highway
Road Inventory Program

Yellowstone National Park

ROUTE 0010A: MAMMOTH TO NORRIS ROAD



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment Begin	 End	*Repair Cost
YELL-0010A-0.104-L 10/8/2009	118	STONE MASONRY WITHOUT CONCRETE CORE WALL	NONE	NONE	$146,933.00
YELL-0010A-1.805-R 10/8/2009	327	OTHER: LOG RAIL ON LOG POSTS	OTHER: LOG FLARED	NONE	$3,823.00
YELL-0010A-1.866-R 10/8/2009	556	OTHER: LOG RAIL ON LOG POSTS	NONE	NONE	$7,645.00
YELL-0010A-3.104-L 10/8/2009	2450	W-BEAM STRONG POST	W-BEAM BURIED END	NONE	$111,925.00
YELL-0010A-4.379-L 10/8/2009	128	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$66,138.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010A: MAMMOTH TO NORRIS ROAD

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment Begin	 End	*Repair Cost
YELL-0010A-4.503-L 10/8/2009	209	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$103,758.00
YELL-0010A-4.541-L 10/8/2009	124	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$2,514.00
YELL-0010A-4.564-L 10/8/2009	1183	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$11,011.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0010D-53.234-R 10/13/2009	1,063	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$23,408.00
YELL-0010D-54.935-L 10/14/2009	1204	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$14,108.00
YELL-0010D-56.809-R 10/13/2009	926	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$16,830.00
YELL-0010D-57.164-R 10/13/2009	887	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$23,282.00
YELL-0010D-57.420-L 10/14/2009	650	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$0.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment Begin	 End	*Repair Cost
YELL-0010D-57.643-R 10/13/2009	691	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$11,033.00
YELL-0010D-58.376-R 10/13/2009	600	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$14,476.00
YELL-0010D-58.541-R 10/13/2009	366	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$8,371.00
YELL-0010D-58.910-R 10/13/2009	227	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$4,153.00
YELL-0010D-59.004-R 10/13/2009	190	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$3,713.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0010D-59.189-R 10/13/2009	652	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$12,436.00
YELL-0010D-59.233-L 10/14/2009	565	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$11,468.00
YELL-0010D-59.413-L 10/14/2009	277	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$6,292.00
YELL-0010D-59.775-R 10/14/2009	460	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$8,635.00
YELL-0010D-59.923-R 10/14/2009	418	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$6,809.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

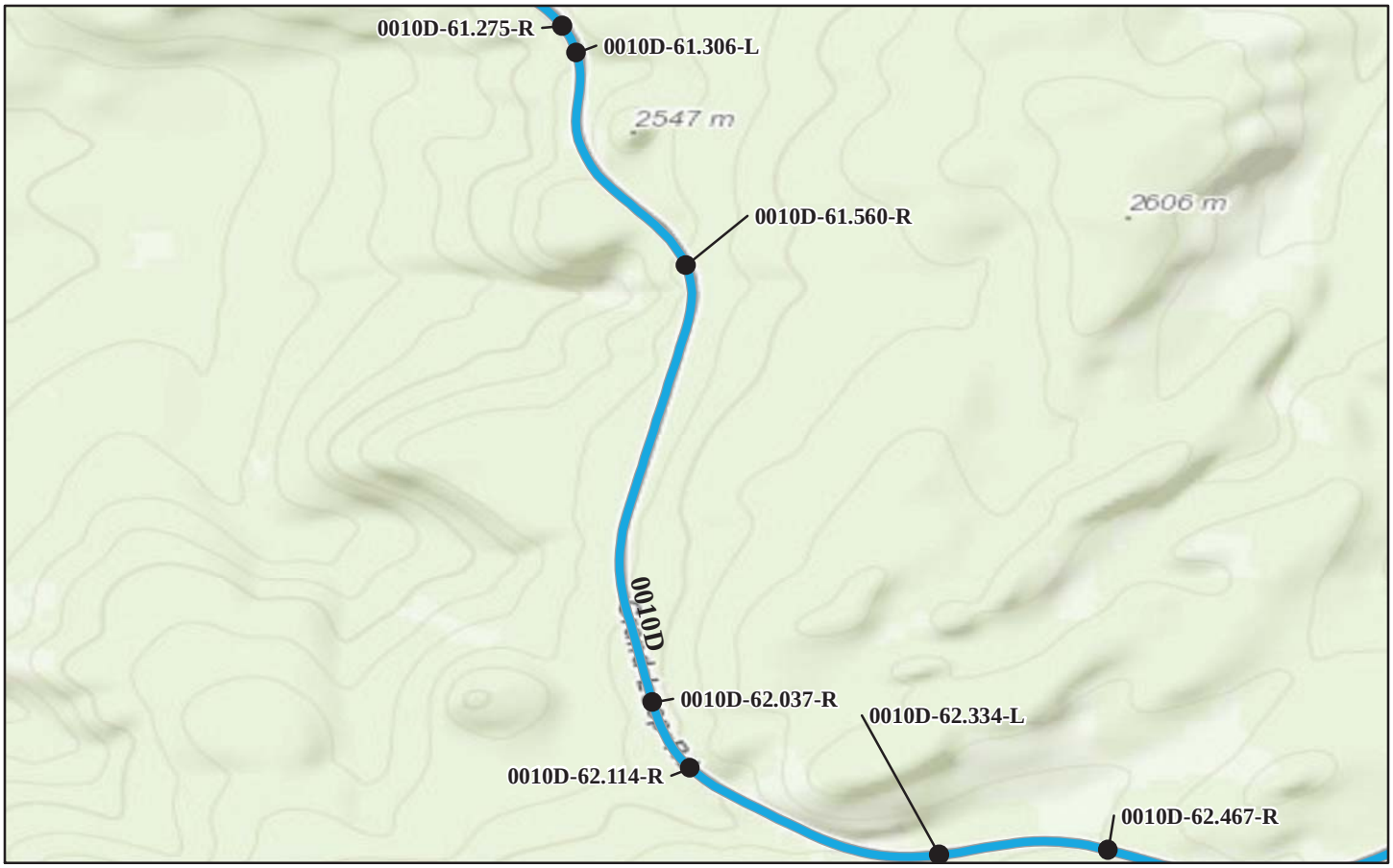
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment Begin	 End	*Repair Cost
YELL-0010D-60.052-R 10/14/2009	752	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$15,026.00
YELL-0010D-60.286-L 10/13/2009	498	W-BEAM STRONG POST	W-BEAM BURIED END	W-BEAM BURIED END	$1,898.00
YELL-0010D-60.287-R 10/14/2009	495	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$3,273.00
YELL-0010D-60.726-L 10/13/2009	1133	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$2,338.00
YELL-0010D-61.039-R 10/14/2009	664	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$3,449.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD



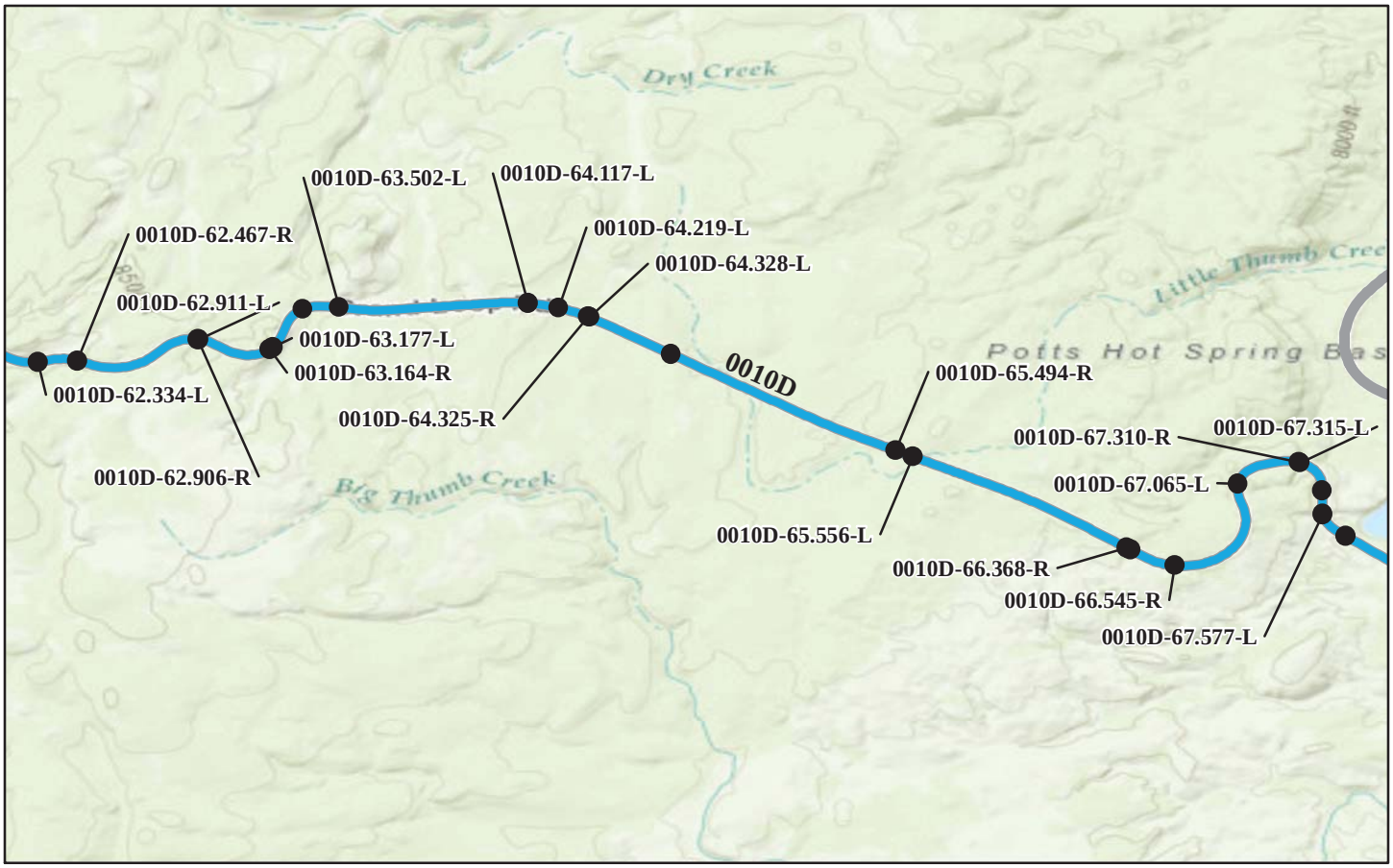
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0010D-61.275-R 10/14/2009	352	W-BEAM STRONG POST	W-BEAM BURIED END	W-BEAM BCT	$6,765.00
YELL-0010D-61.306-L 10/13/2009	235	W-BEAM STRONG POST	W-BEAM BURIED END	W-BEAM BCT	$2,558.00
YELL-0010D-61.560-R 10/14/2009	2094	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$2,052.00
YELL-0010D-62.037-R 10/14/2009	200	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$2,173.00
YELL-0010D-62.114-R 10/14/2009	692	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$5,660.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD



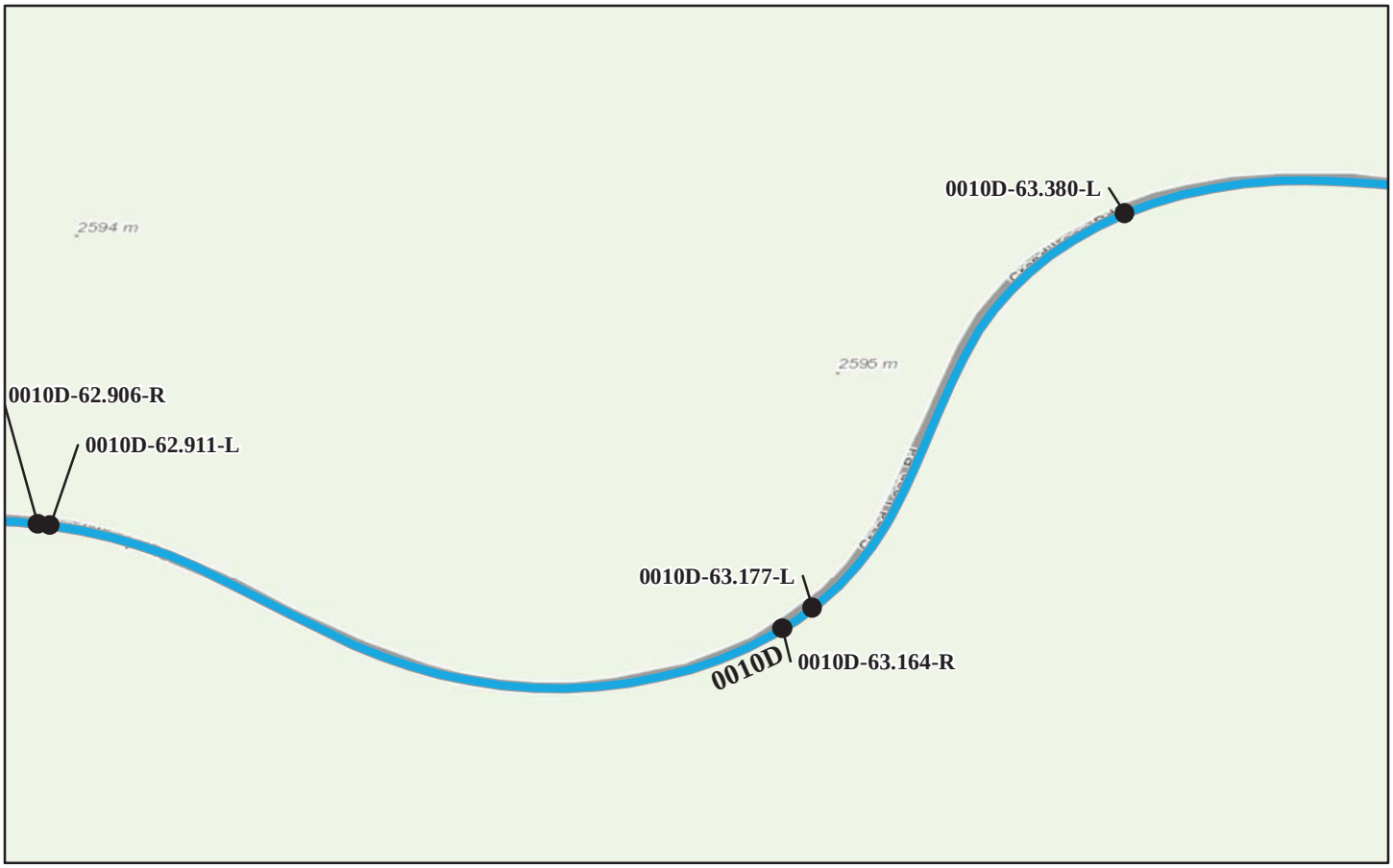
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0010D-62.334-L 10/15/2009	794	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BURIED END	$12,243.00
YELL-0010D-62.467-R 10/15/2009	360	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BURIED END	$2,151.00
YELL-0010D-67.577-L 10/13/2009	505	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$3,460.00
YELL-0010D-67.582-R 10/15/2009	549	W-BEAM STRONG POST	W-BEAM BURIED END	W-BEAM BCT	$3,558.00
YELL-0010D-67.705-R 10/15/2009	204	W-BEAM STRONG POST	W-BEAM BURIED END	W-BEAM BCT	$2,822.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD



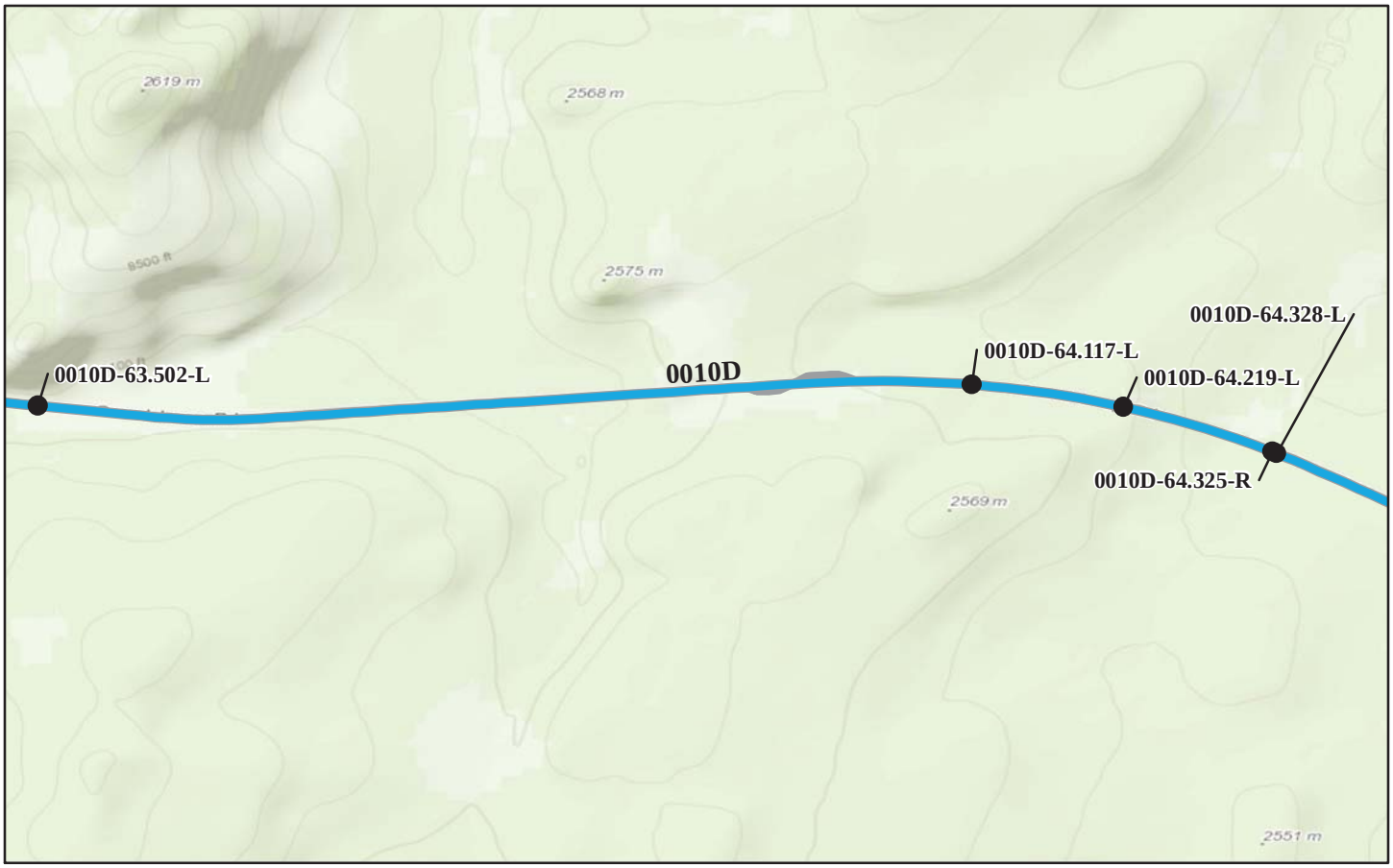
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0010D-62.906-R 10/15/2009	242	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$1,821.00
YELL-0010D-62.911-L 10/7/2009	312	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$2,596.00
YELL-0010D-63.164-R 10/15/2009	592	W-BEAM STRONG POST	W-BEAM BURIED END	W-BEAM BURIED END	$3,146.00
YELL-0010D-63.177-L 10/7/2009	444	W-BEAM STRONG POST	W-BEAM BURIED END	W-BEAM BURIED END	$0.00
YELL-0010D-63.380-L 10/7/2009	401	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BURIED END	$3,267.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment Begin	 End	*Repair Cost
YELL-0010D-63.502-L 10/7/2009	310	W-BEAM STRONG POST	W-BEAM BURIED END	W-BEAM BCT	$2,723.00
YELL-0010D-64.117-L 10/14/2009	372	W-BEAM STRONG POST	W-BEAM FLARED 350 COMPLIANT	W-BEAM BURIED END	$3,053.00
YELL-0010D-64.219-L 10/14/2009	283	W-BEAM STRONG POST	W-BEAM BURIED END	W-BEAM BCT	$3,163.00
YELL-0010D-64.325-R 10/14/2009	386	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$10,164.00
YELL-0010D-64.328-L 10/13/2009	326	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$4,065.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

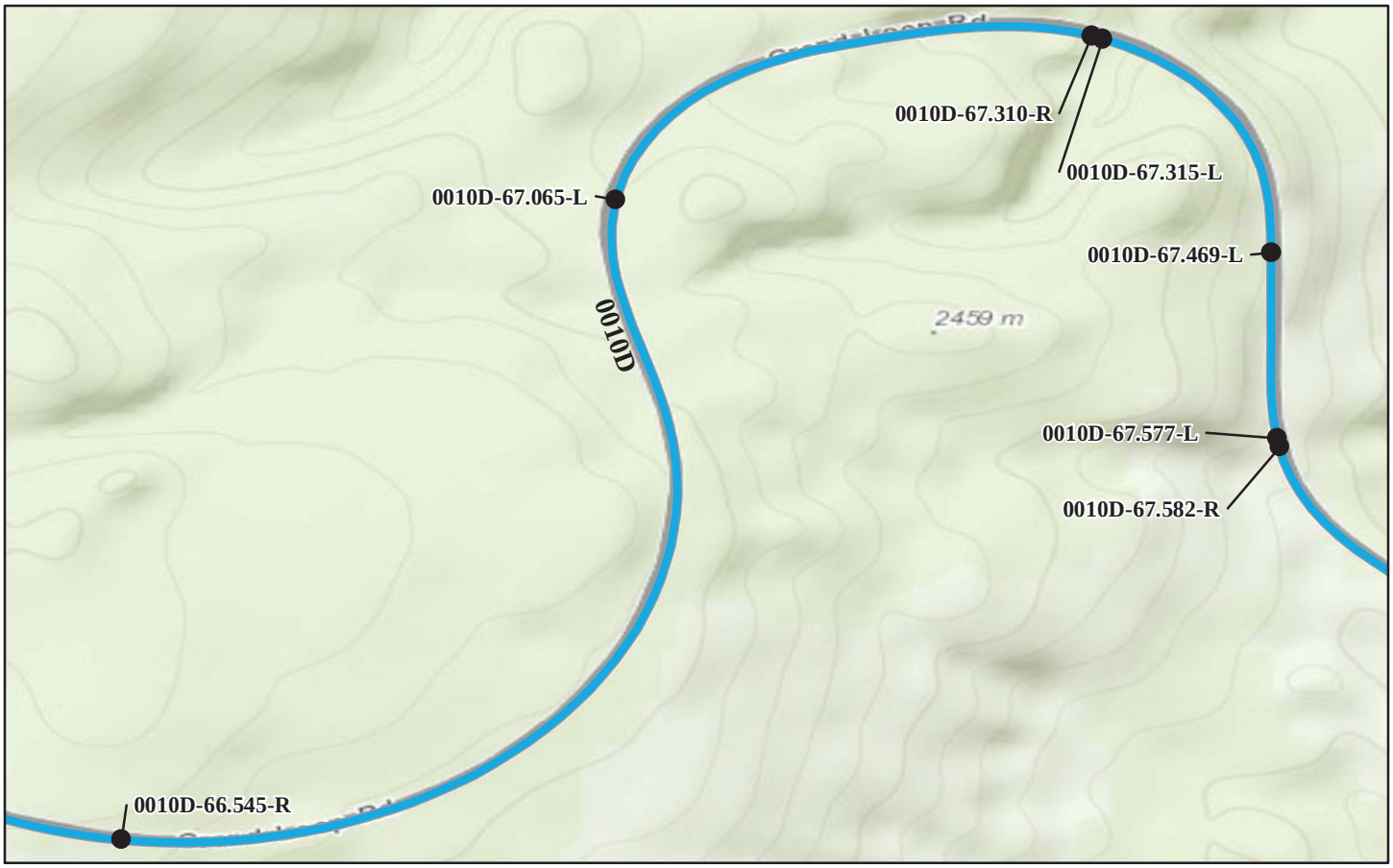
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0010D-64.642-L 10/13/2009	602	W-BEAM STRONG POST	W-BEAM BURIED END	W-BEAM BCT	$11,820.00
YELL-0010D-65.494-R 10/14/2009	628	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$7,799.00
YELL-0010D-65.556-L 10/13/2009	365	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$5,011.00
YELL-0010D-66.368-R 10/14/2009	649	W-BEAM STRONG POST	W-BEAM BURIED END	W-BEAM BCT	$10,373.00
YELL-0010D-66.383-L 10/13/2009	585	W-BEAM STRONG POST	W-BEAM BURIED END	W-BEAM BCT	$11,918.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD



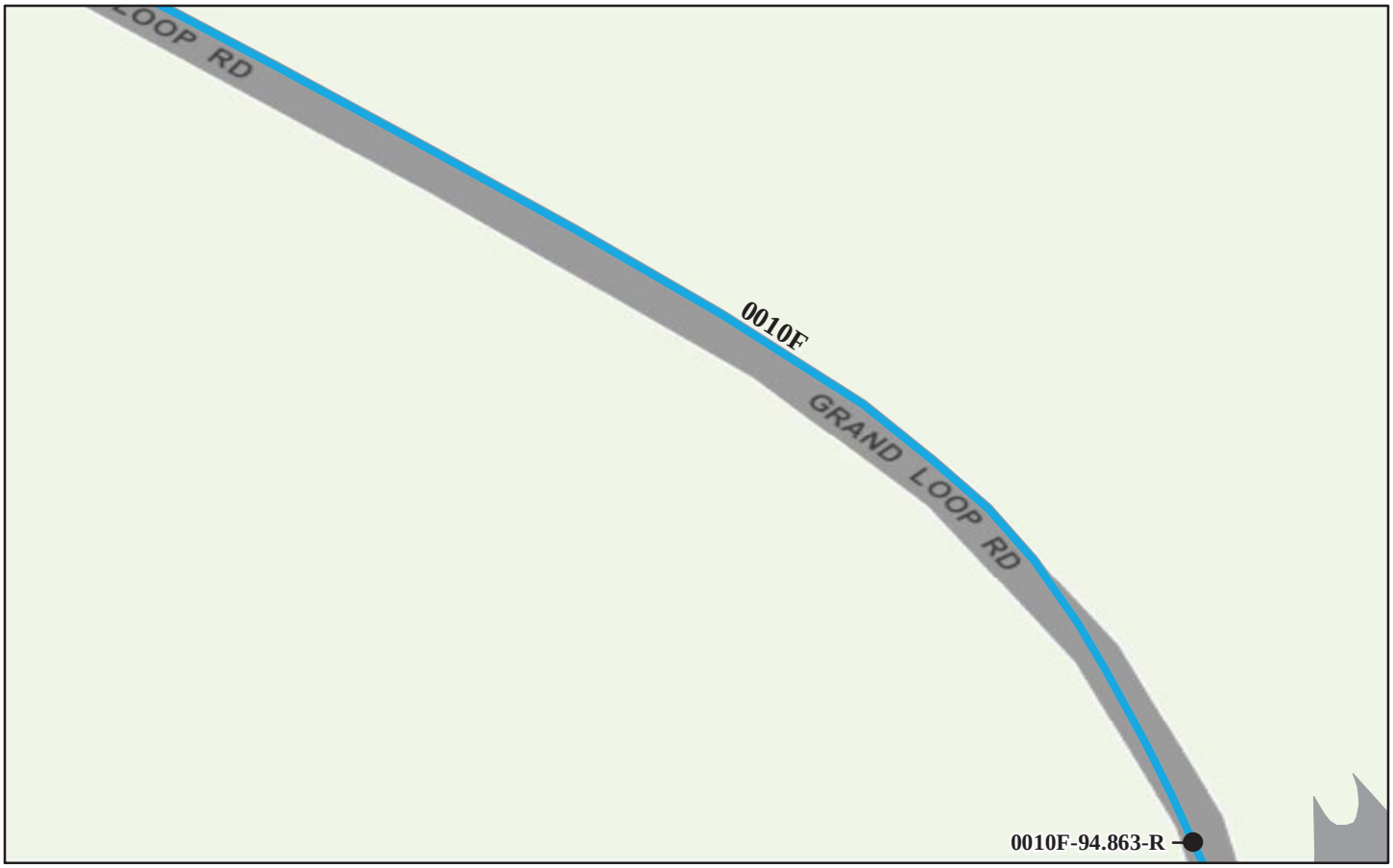
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0010D-66.545-R 10/14/2009	1,020	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$9,812.00
YELL-0010D-67.065-L 10/13/2009	265	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$0.00
YELL-0010D-67.310-R 10/14/2009	303	W-BEAM STRONG POST	W-BEAM BURIED END	W-BEAM BURIED END	$9,218.00
YELL-0010D-67.315-L 10/13/2009	812	W-BEAM STRONG POST	W-BEAM BURIED END	NONE	$1,733.00
YELL-0010D-67.469-L 10/13/2009	305	W-BEAM STRONG POST	NONE	W-BEAM BURIED END	$0.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010F: FISHING BRIDGE TO CANYON ROAD



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0010F-94.863-R 10/8/2009	436	OTHER: LOG RAIL ON STONE POSTS	NONE	NONE	$0.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010G: CANYON TO TOWER ROAD

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment Begin	 End	*Repair Cost
YELL-0010G-109.359-L 10/6/2009	2,090	W-BEAM STRONG POST	W-BEAM FLARED 350 COMPLIANT	W-BEAM FLARED 350 COMPLIANT	$3,273.00
YELL-0010G-110.996-L 10/6/2009	1540	W-BEAM STRONG POST	W-BEAM FLARED 350 COMPLIANT	W-BEAM FLARED 350 COMPLIANT	$2,943.00
YELL-0010G-114.276-L 10/6/2009	100	OTHER: LOG RAIL ON LOG POSTS	NONE	NONE	$17,985.00
YELL-0010G-114.418-R 10/6/2009	270	OTHER: LOG RAIL ON LOG POSTS	NONE	NONE	$0.00
YELL-0010G-119.734-R 10/6/2009	335	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$188,606.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010G: CANYON TO TOWER ROAD

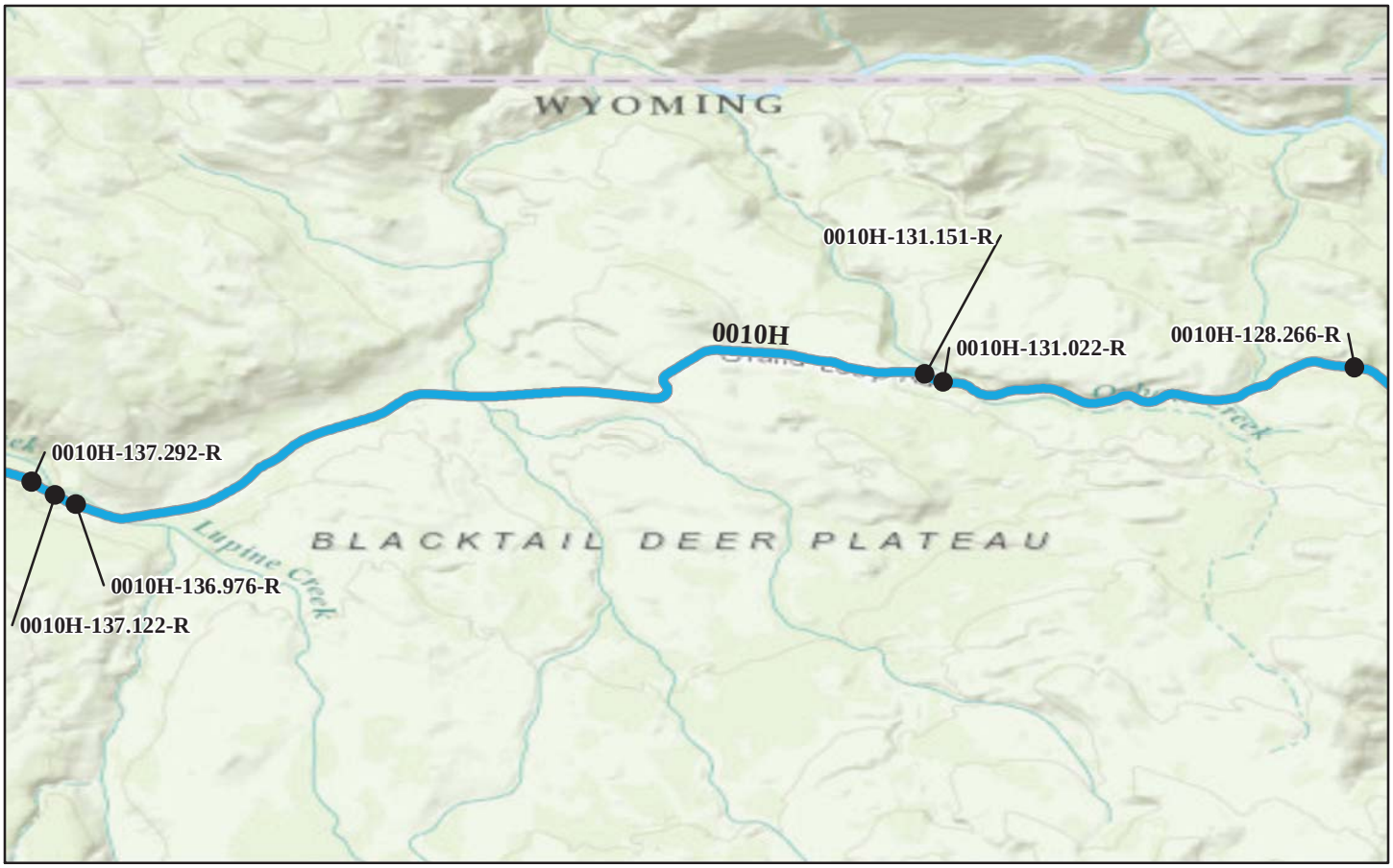
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0010G-120.268-R 10/6/2009	433	OTHER: LOG RAIL ON LOG POSTS	NONE	NONE	$0.00
YELL-0010G-120.401-R 10/6/2009	750	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$588,280.00
YELL-0010G-120.573-R 10/6/2009	105	OTHER: LOG RAIL ON LOG POSTS	NONE	NONE	$0.00
YELL-0010G-120.588-R 10/6/2009	890	OTHER: LOG RAIL ON LOG POSTS	NONE	NONE	$4,263.00
YELL-0010G-120.800-R 10/6/2009	1381	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$223,850.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010H: TOWER JUNCTION TO MAMMOTH ROAD



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0010H-128.266-R 10/7/2009	850	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$706,393.00
YELL-0010H-131.022-R 10/7/2009	496	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$475,063.00
YELL-0010H-131.151-R 10/7/2009	324	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$95,013.00
YELL-0010H-136.976-R 10/7/2009	47	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$0.00
YELL-0010H-137.122-R 10/7/2009	665	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$20,917.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010H: TOWER JUNCTION TO MAMMOTH ROAD

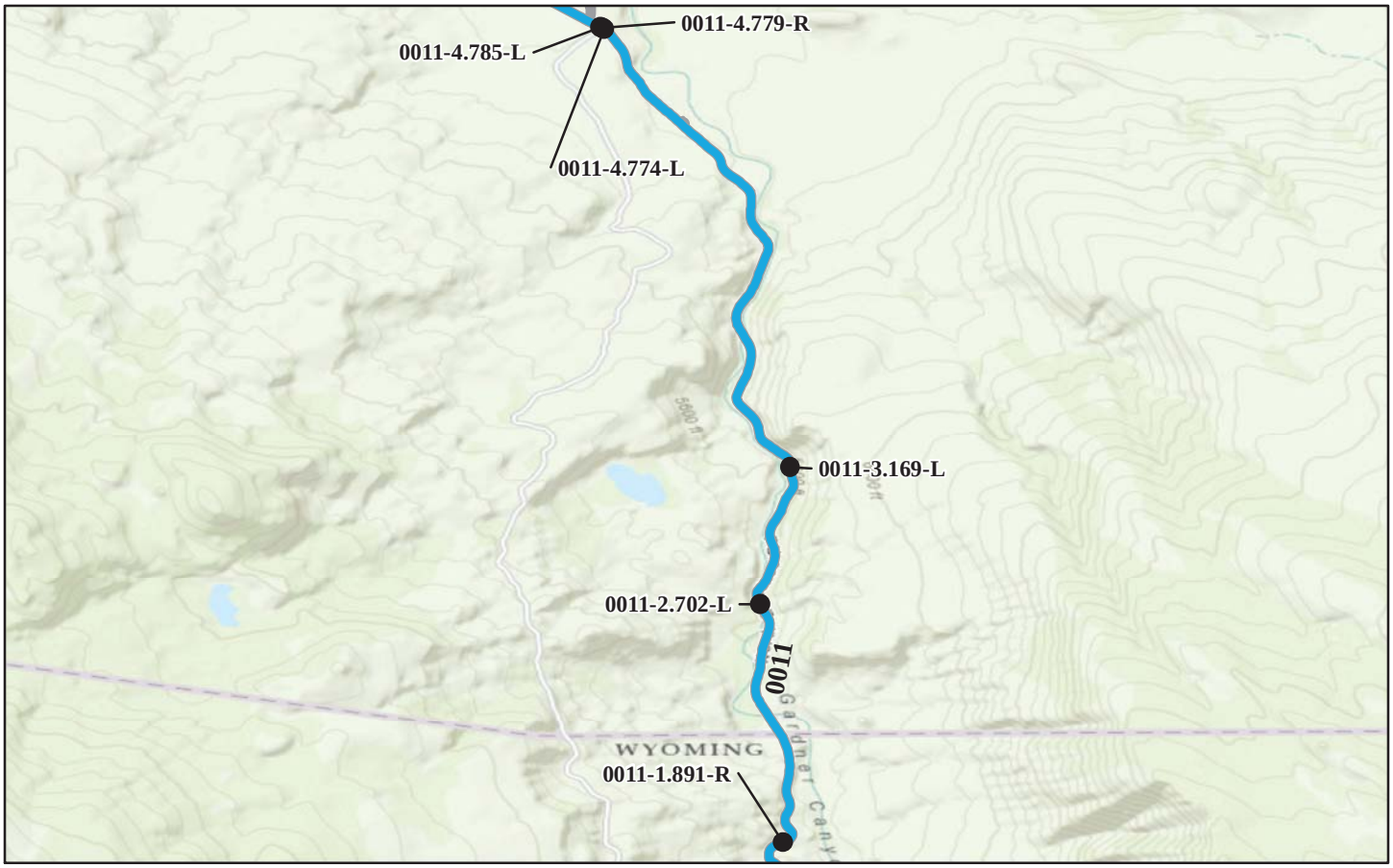
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0010H-137.292-R 10/8/2009	725	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$19,542.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0011: NORTH ENTRANCE ROAD



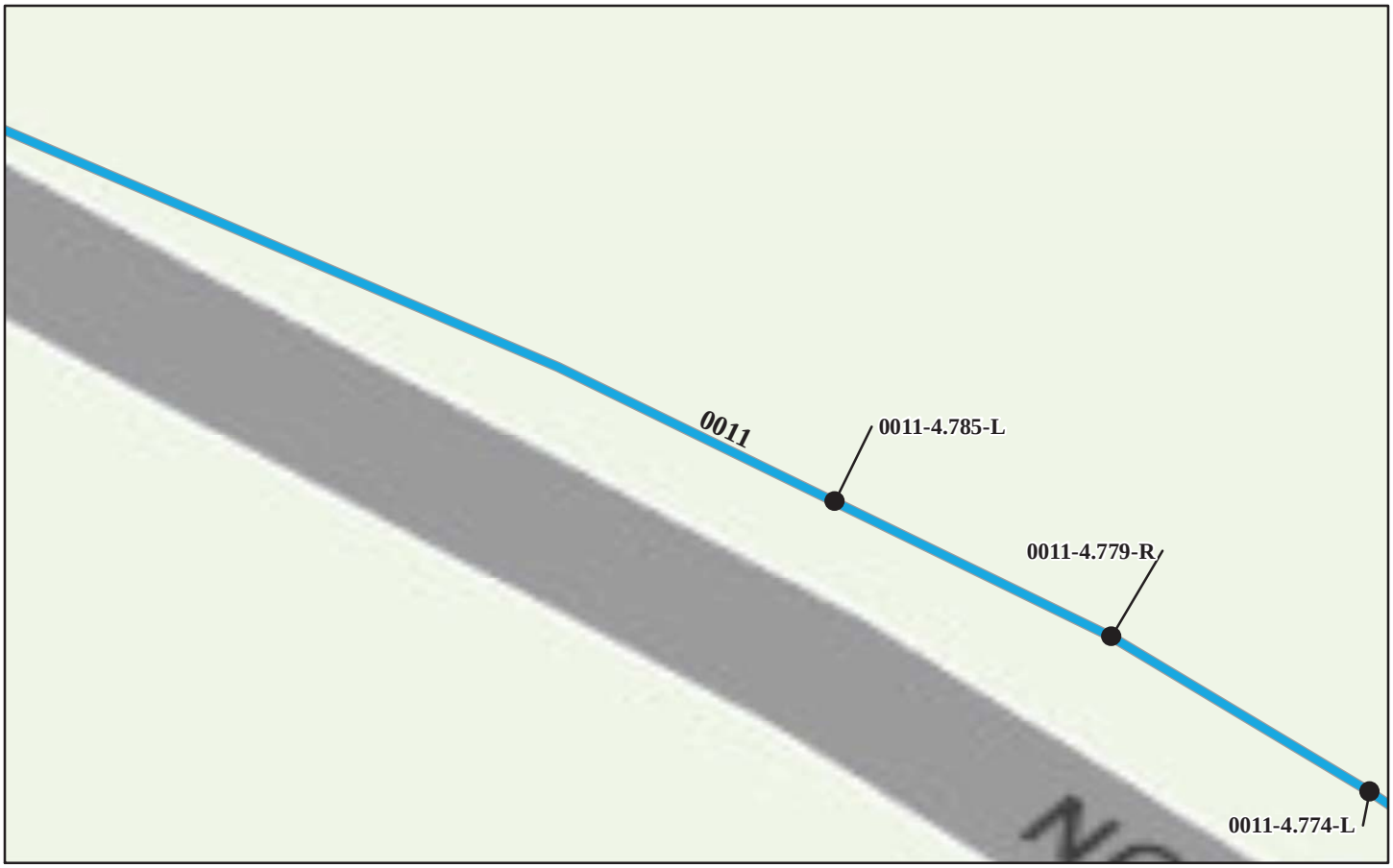
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment Begin	 End	*Repair Cost
YELL-0011-1.891-R 10/7/2009	1,435	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$38,748.00
YELL-0011-2.702-L 10/7/2009	313	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$3,581.00
YELL-0011-3.169-L 10/7/2009	664	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$42,906.00
YELL-0011-4.774-L 10/7/2009	57	OTHER: LOG RAIL ON LOG POSTS	NONE	NONE	$0.00
YELL-0011-4.779-R 10/7/2009	20	OTHER: LOG RAIL ON LOG POSTS	NONE	NONE	$0.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0011: NORTH ENTRANCE ROAD



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0011-4.785-L 10/7/2009	49	OTHER: LOG RAIL ON LOG POSTS	NONE	NONE	$0.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0012: NORTHEAST ENTRANCE ROAD

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0012-7.443-R 10/7/2009	151	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$46,668.00
YELL-0012-7.618-R 10/7/2009	154	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$0.00
YELL-0012-7.764-R 10/7/2009	608	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$2,085.00
YELL-0012-8.376-R 10/7/2009	94	OTHER: LOG RAIL ON LOG POSTS	NONE	NONE	$2,283.00
YELL-0012-9.374-R 10/7/2009	164	OTHER: LOG RAIL ON LOG POSTS	NONE	NONE	$0.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0012: NORTHEAST ENTRANCE ROAD

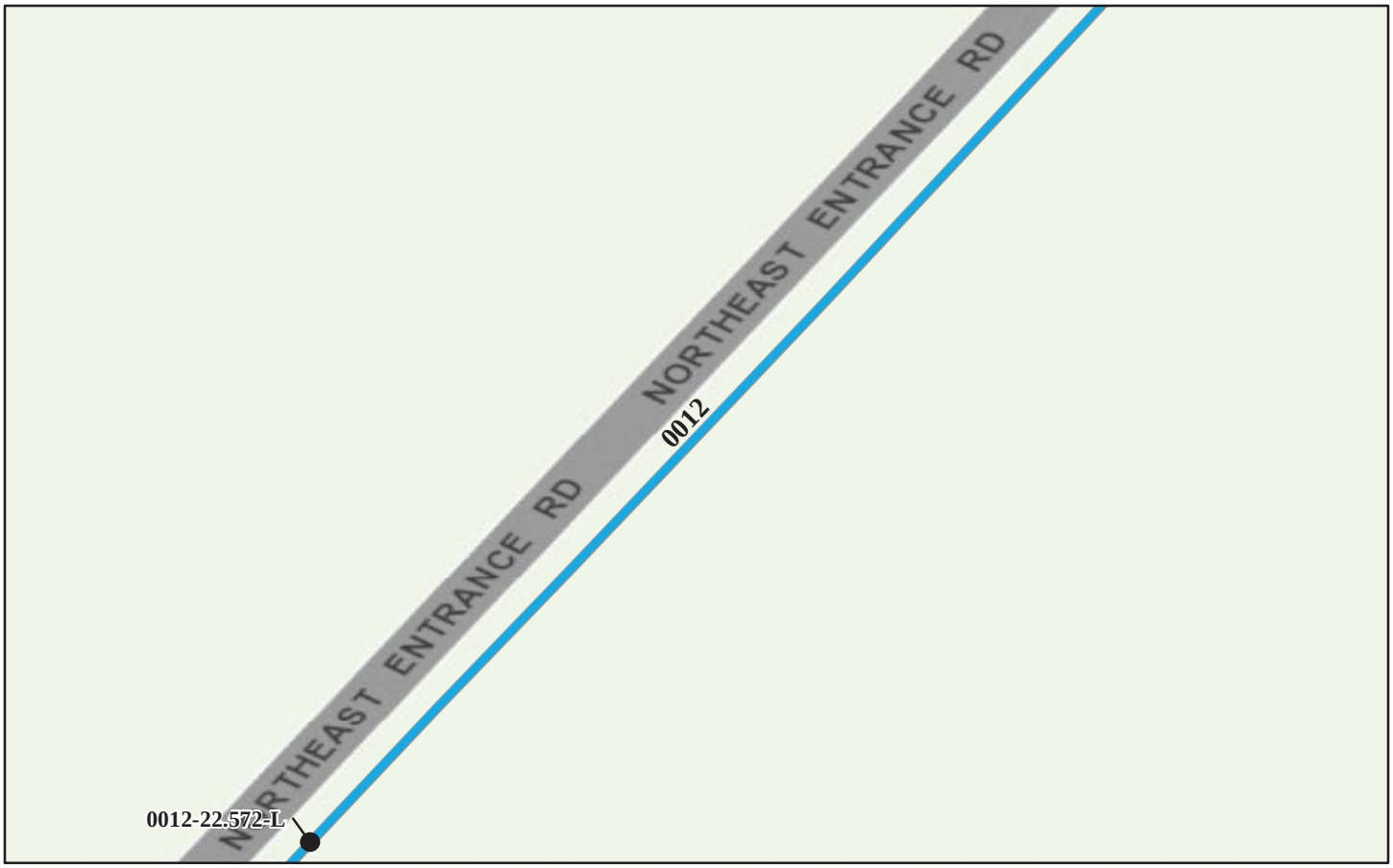
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0012-13.260-R 10/7/2009	633	OTHER: LOG RAIL ON LOG POSTS	NONE	NONE	$0.00
YELL-0012-14.783-R 10/7/2009	208	OTHER: LOG RAIL ON LOG POSTS	NONE	NONE	$0.00
YELL-0012-18.017-R 10/7/2009	400	OTHER: LOG RAIL ON LOG POSTS	NONE	NONE	$0.00
YELL-0012-20.687-R 10/7/2009	79	OTHER: LOG RAIL ON LOG POSTS	NONE	NONE	$39,347.00
YELL-0012-20.763-R 10/7/2009	384	OTHER: LOG RAIL ON LOG POSTS	NONE	NONE	$0.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0012: NORTHEAST ENTRANCE ROAD



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0012-22.572-L 10/7/2009	280	OTHER: LOG RAIL ON LOG POSTS	NONE	NONE	$1,870.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment Begin	 End	*Repair Cost
YELL-0013-5.723-R 10/10/2009	1,035	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$0.00
YELL-0013-6.065-R 10/10/2009	698	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$0.00
YELL-0013-6.509-R 10/10/2009	111	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$0.00
YELL-0013-6.526-R 10/10/2009	171	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$0.00
YELL-0013-6.552-R 10/10/2009	20	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$0.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

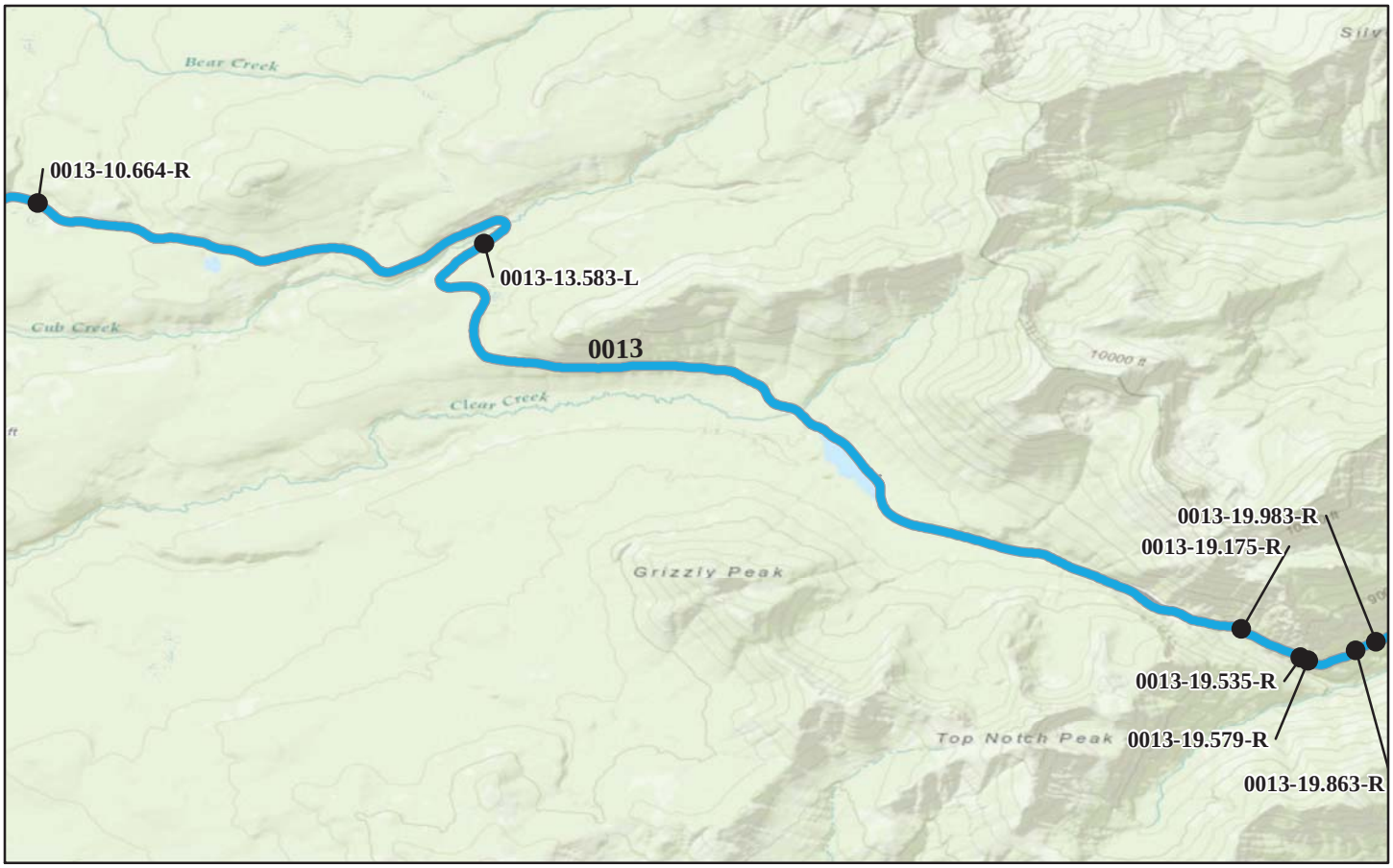
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment Begin	 End	*Repair Cost
YELL-0013-6.556-R 10/10/2009	260	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$0.00
YELL-0013-6.599-R 10/10/2009	204	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$0.00
YELL-0013-6.642-R 10/10/2009	97	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$0.00
YELL-0013-10.280-R 10/10/2009	381	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BURIED END	$11,743.00
YELL-0013-10.295-L 10/10/2009	321	W-BEAM STRONG POST	W-BEAM BURIED END	W-BEAM BURIED END	$4,752.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD



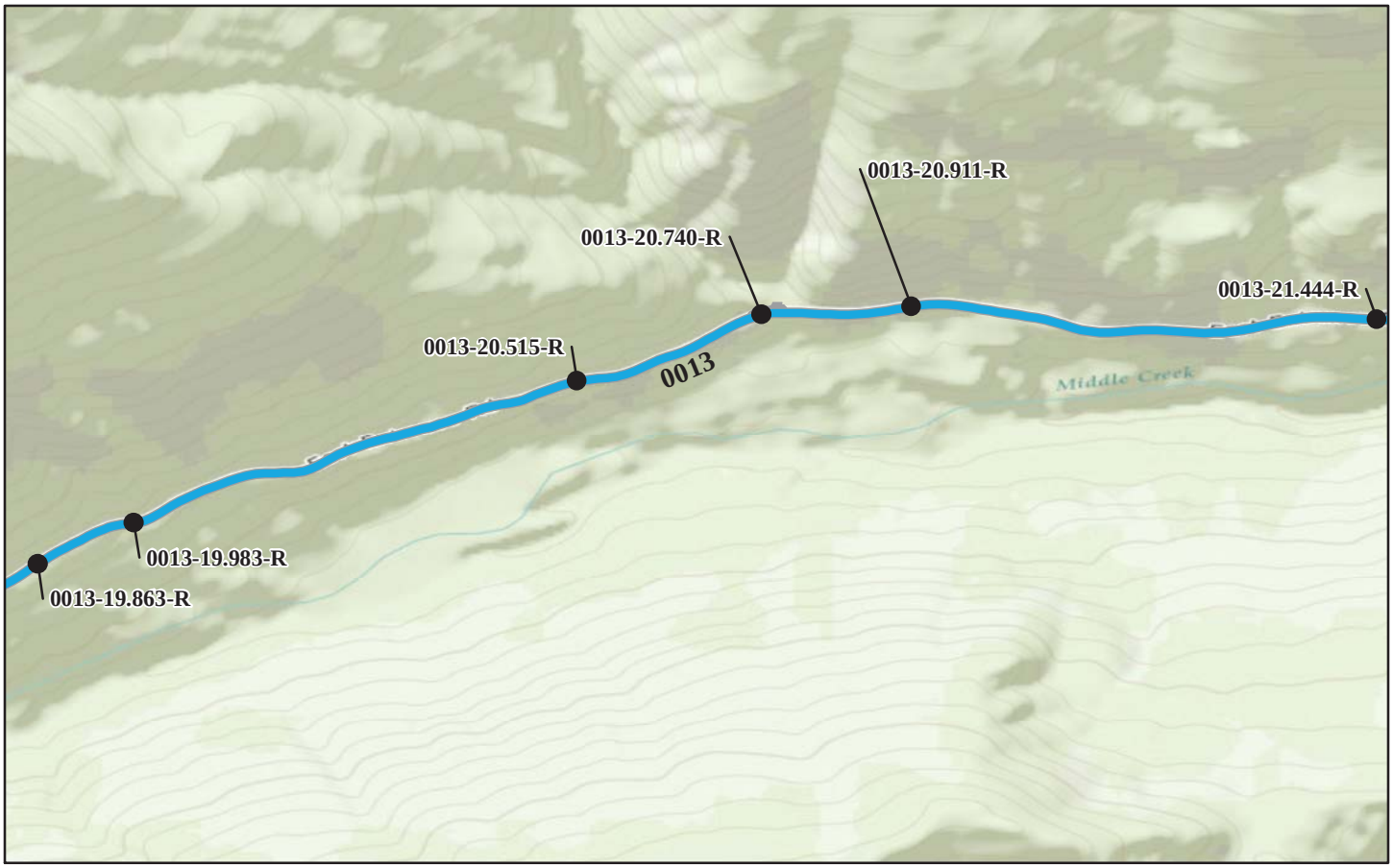
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment Begin	 End	*Repair Cost
YELL-0013-10.664-R 10/10/2009	332	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$2,283.00
YELL-0013-13.583-L 10/13/2009	315	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BURIED END	$23,155.00
YELL-0013-19.175-R 10/13/2009	1920	W-BEAM STRONG POST	W-BEAM FLARED 350 COMPLIANT	W-BEAM FLARED 350 COMPLIANT	$41,030.00
YELL-0013-19.535-R 10/13/2009	210	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$0.00
YELL-0013-19.579-R 10/13/2009	1496	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$0.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0013-19.863-R 10/13/2009	540	W-BEAM STRONG POST	W-BEAM FLARED 350 COMPLIANT	W-BEAM FLARED 350 COMPLIANT	$19,597.00
YELL-0013-19.983-R 10/13/2009	2698	W-BEAM STRONG POST	W-BEAM FLARED 350 COMPLIANT	W-BEAM FLARED 350 COMPLIANT	$55,677.00
YELL-0013-20.515-R 10/14/2009	1195	W-BEAM STRONG POST	W-BEAM FLARED 350 COMPLIANT	W-BEAM FLARED 350 COMPLIANT	$10,863.00
YELL-0013-20.740-R 10/14/2009	766	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$0.00
YELL-0013-20.911-R 10/14/2009	2698	W-BEAM STRONG POST	W-BEAM FLARED 350 COMPLIANT	W-BEAM FLARED 350 COMPLIANT	$15,901.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

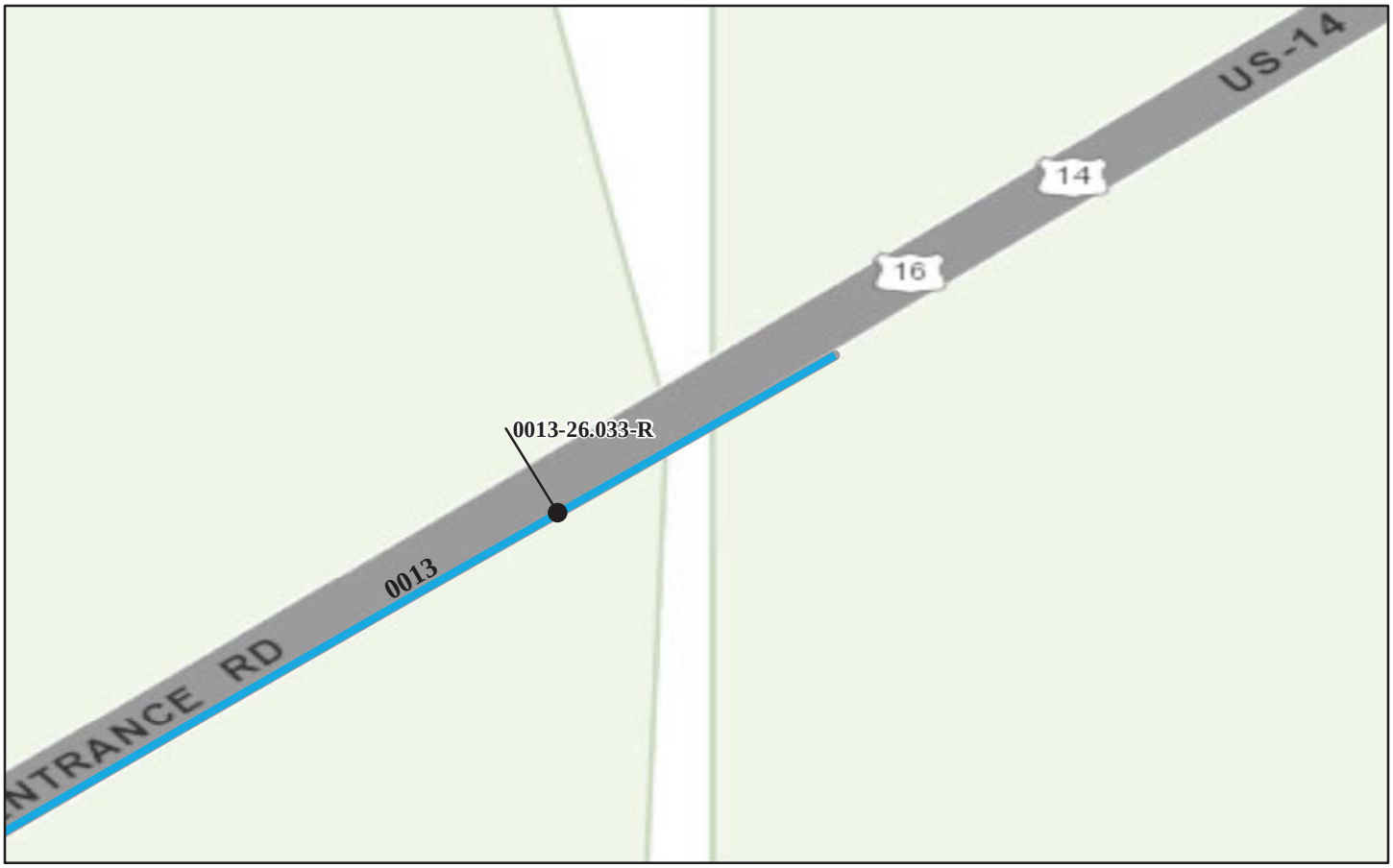
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment Begin	 End	*Repair Cost
YELL-0013-21.444-R 10/14/2009	4,322	W-BEAM STRONG POST	W-BEAM FLARED 350 COMPLIANT	W-BEAM FLARED 350 COMPLIANT	$29,315.00
YELL-0013-22.280-R 10/14/2009	4365	W-BEAM STRONG POST	W-BEAM FLARED 350 COMPLIANT	W-BEAM FLARED 350 COMPLIANT	$24,976.00
YELL-0013-23.121-R 10/10/2009	3857	W-BEAM STRONG POST	W-BEAM FLARED 350 COMPLIANT	W-BEAM FLARED 350 COMPLIANT	$30,333.00
YELL-0013-24.662-R 10/10/2009	368	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$0.00
YELL-0013-25.230-R 10/10/2009	270	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$2,206.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0013-26.033-R 10/10/2009	338	W-BEAM STRONG POST	W-BEAM FLARED 350 COMPLIANT	W-BEAM FLARED 350 COMPLIANT	$3,273.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0014-8.206-R 10/12/2009	88	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$85,113.00
YELL-0014-9.687-R 10/12/2009	250	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$160,353.00
YELL-0014-9.753-R 10/12/2009	280	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$269,638.00
YELL-0014-13.738-L 10/12/2009	650	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$641,493.00
YELL-0014-14.429-L 10/12/2009	765	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$29,755.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

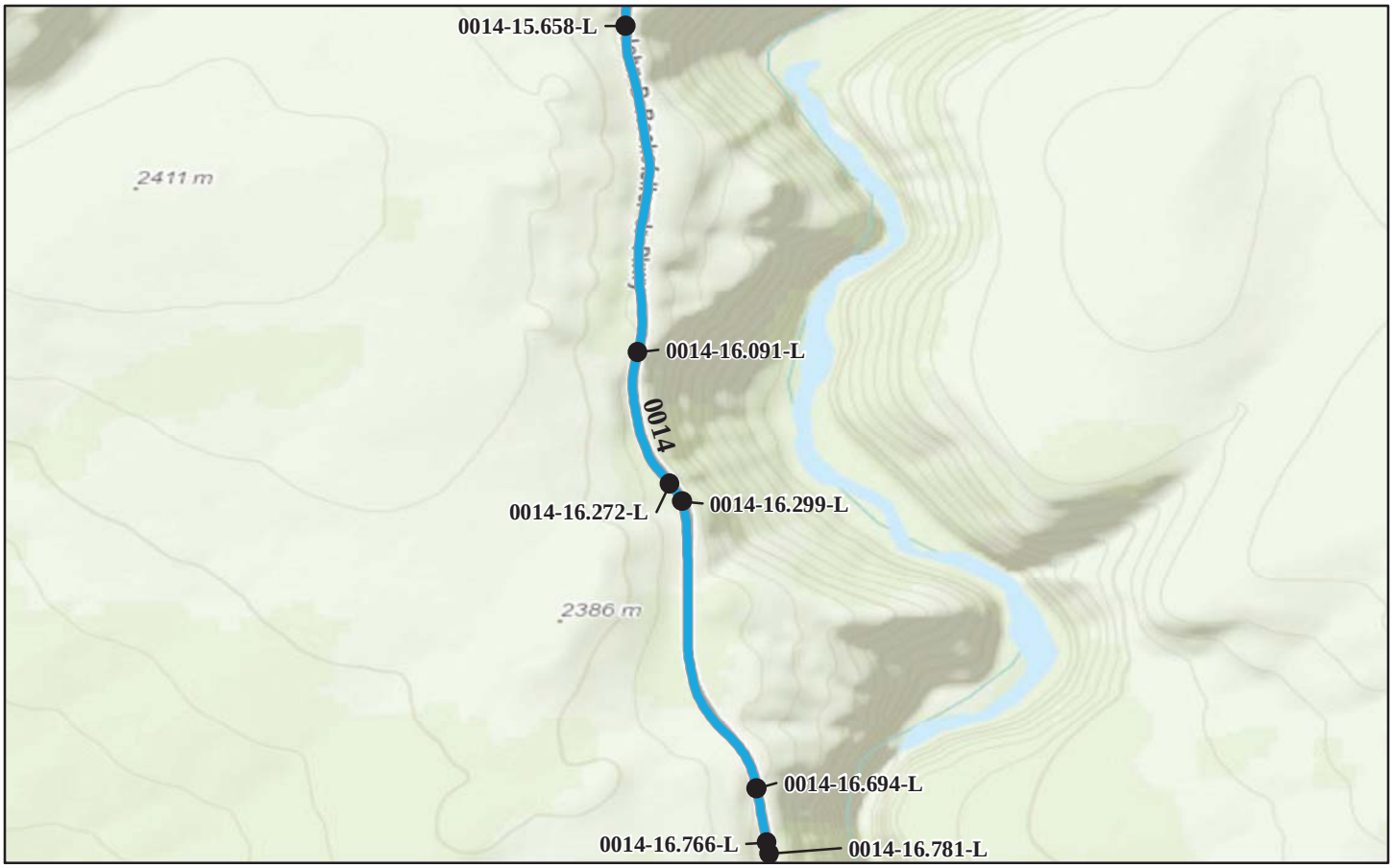
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0014-14.576-L 10/12/2009	118	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$123,008.00
YELL-0014-14.702-L 10/12/2009	724	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$30,811.00
YELL-0014-14.936-L 10/12/2009	215	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$71,390.00
YELL-0014-15.081-L 10/12/2009	117	W-BEAM STRONG POST	W-BEAM BURIED END	NONE	$3,427.00
YELL-0014-15.103-L 10/12/2009	262	W-BEAM STRONG POST	NONE	W-BEAM BURIED END	$6,798.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD



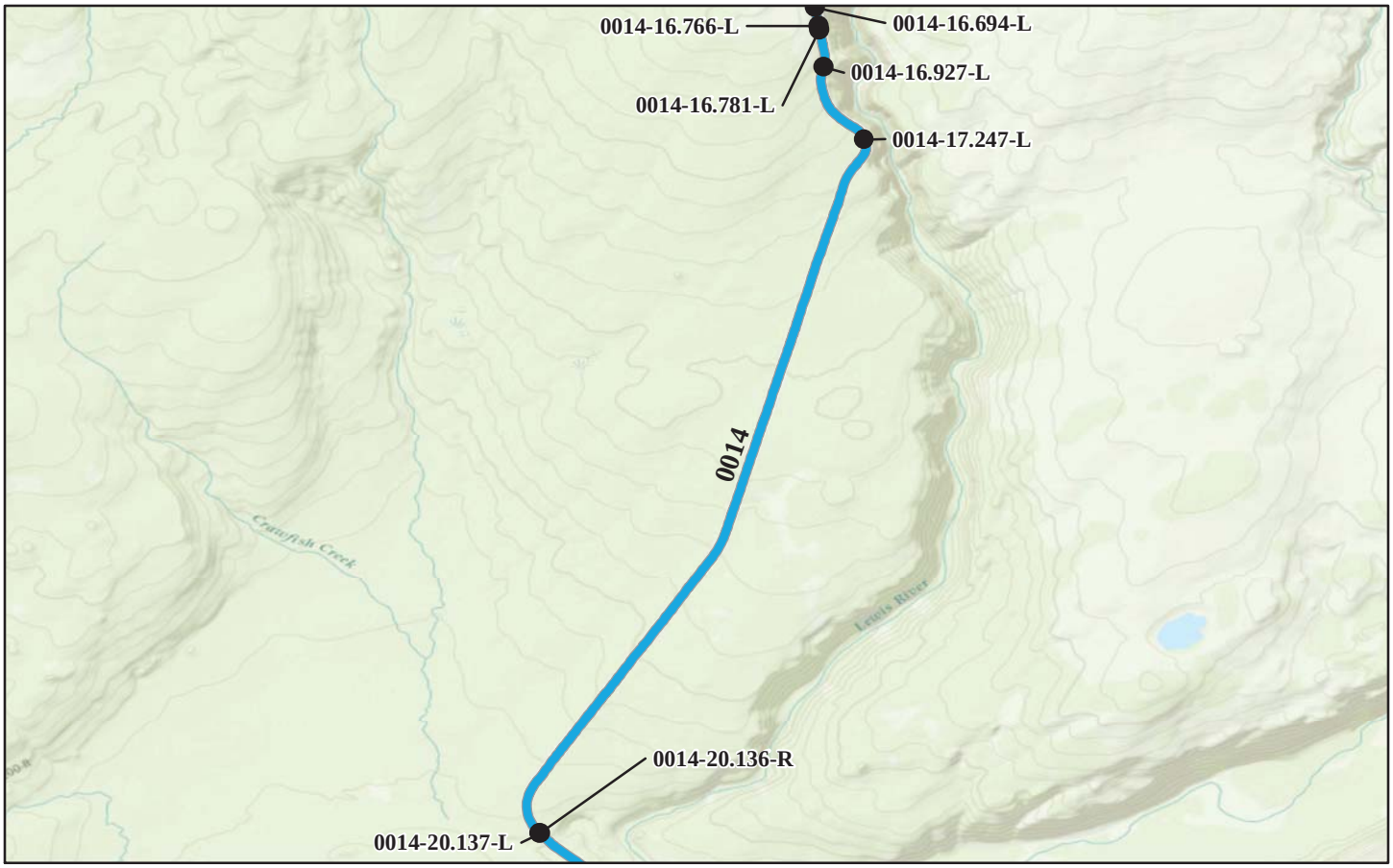
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0014-15.658-L 10/12/2009	500	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$14,306.00
YELL-0014-16.091-L 10/12/2009	920	W-BEAM STRONG POST	W-BEAM BURIED END	W-BEAM BCT	$10,192.00
YELL-0014-16.272-L 10/12/2009	144	STONE MASONRY CRENELLATED WITHOUT CORE WALL	NONE	NONE	$147,455.00
YELL-0014-16.299-L 10/12/2009	202	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$7,101.00
YELL-0014-16.694-L 10/8/2009	389	W-BEAM STRONG POST	W-BEAM BURIED END	NONE	$4,851.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD



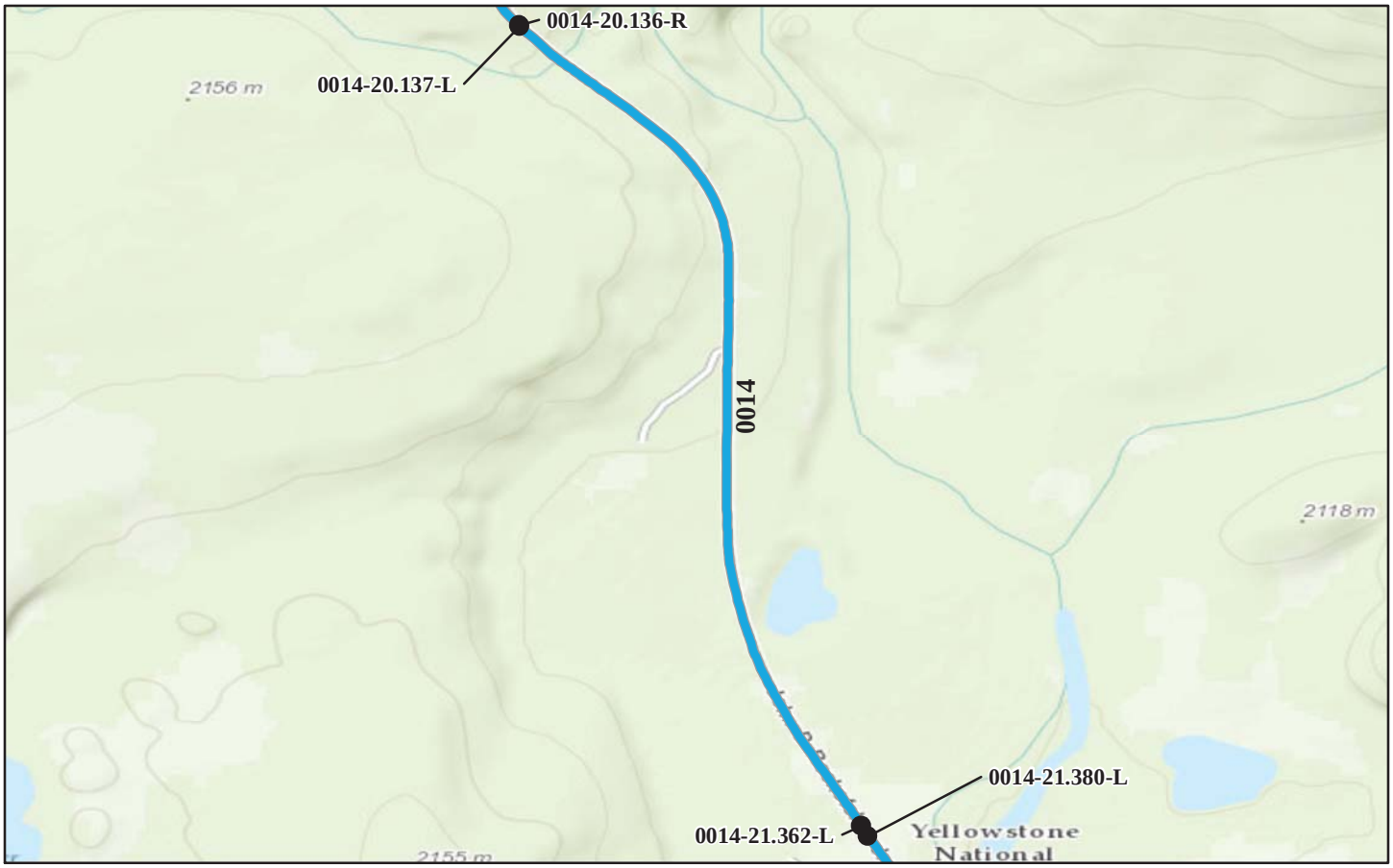
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment Begin	 End	*Repair Cost
YELL-0014-16.766-L 10/8/2009	81	W-BEAM STRONG POST	NONE	NONE	$0.00
YELL-0014-16.781-L 10/8/2009	98	W-BEAM STRONG POST	NONE	W-BEAM BCT	$3,025.00
YELL-0014-16.927-L 10/8/2009	304	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$25,328.00
YELL-0014-17.247-L 10/8/2009	476	W-BEAM STRONG POST	W-BEAM BCT	W-BEAM BCT	$5,913.00
YELL-0014-20.136-R 10/12/2009	206	STONE MASONRY WITHOUT CONCRETE CORE WALL	NONE	NONE	$201,520.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Barrier ID Inspection Date	Barrier Length (Ft.)	Barrier Type	Barrier End Treatment		*Repair Cost
			Begin	End	
YELL-0014-20.137-L 10/8/2009	232	STONE MASONRY WITHOUT CONCRETE CORE WALL	NONE	NONE	$237,518.00
YELL-0014-21.362-L 10/8/2009	80	OTHER: LOG RAIL ON LOG POSTS	NONE	NONE	$0.00
YELL-0014-21.380-L 10/8/2009	120	OTHER: LOG RAIL ON LOG POSTS	NONE	NONE	$0.00

*2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Tier 3
Barrier Details

Yellowstone National Park

Federal Lands Highway
Road Inventory Program

Barrier ID:	**YELL-0010A-0.104-L**		
Route Name:	MAMMOTH TO NORRIS ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	40.90

Barrier Description

Type:	STONE MASONRY WITHOUT CONCRETE CORE WALL	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	118
Speed Limit (MPH):	25	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-1	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	22.7	**Post Spacing (In.):**	0.0
Height (In.):	9.0	**Lateral Offset (In.):**	73.0	**Road Grade (%):**	0.40

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 11-18in below the 24-in design height. The bottom is shifting out at the end approach.
	Breaking and Cracking:	Cracking throughout section stones breaking off.
	Missing Elements:	Stones missing for 25 feet through section mainly off of the top part of the wall.
	Corrrosion and Weathering:	Minor weathering erosion at end approach causing the wall to shift out and stones to come loose.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0010A-0.104-L**		
Route Name:	MAMMOTH TO NORRIS ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	40.90

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$146933
Brief Workorder:	Raise guardwall 15-in. Remove and reset 118-ft of stone masonry guardwall on concrete footer to design height of 24-in.				
Workorder:	Remove & Reset Stone Masonry Guardwall at $250- per -Cu. Ft. for 449 CF = $112250. [(2ft)(1.9ft)(118ft)] = 448.4 CF. Structural Concrete at $1000- per -Cu. Yd. for 11 CY = $11000. [(1.9ft)(1.25ft)(118ft)] /27 = 10.4 CY. Low Speed Traffic Control at $1475- per -Day for 7 Day(s) = $10325. 2 days removal 5 days installation.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010A: MAMMOTH TO NORRIS ROAD

Barrier Condition Photos

YELL_0010A_0.104_L_1.JPG

Barrier ID:	**YELL-0010A-1.805-R**		
Route Name:	MAMMOTH TO NORRIS ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	22.70

Barrier Description

Type:	OTHER: LOG RAIL ON LOG POSTS	**Barrier Function:**	NON-TRAFFIC
Barrier Material:	LOG/TIMBER/WOOD	**Post Material:**	WOOD
Blockout Type:	N/A	**Length (ft.):**	327
Speed Limit (MPH):	35	**Placement with Respect to Road:**	NON-TRAFFIC BARRIER
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	N/A	**Is Barrier Crashworthy?:**	N/A
Beg. End Trtmt Type:	OTHER: LOG FLARED	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	20	**Width (In.):**	0.0	**Post Spacing (In.):**	91.6
Height (In.):	19.7	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 200ft was 1-2in below the assumed 20-in design height. Remainder was between 1 in below to 3 in above the design height.
	Breaking and Cracking:	Logs and posts are cracking but no structural concerns.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	Minor weathering.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 20-in design height.
	Breaking and Cracking:	Minor cracking.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	Minor weathering.

Barrier ID:	**YELL-0010A-1.805-R**		
Route Name:	MAMMOTH TO NORRIS ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	22.70

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$3823
Brief Workorder:	Raise 200-ft of barrier to 20-in design height.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 200 LF = $2000. Raise 200-ft of barrier to 20-in design height. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010A: MAMMOTH TO NORRIS ROAD

Barrier Condition Photos

YELL_0010A_1.805_R_1.JPG

Barrier ID:	**YELL-0010A-3.104-L**		
Route Name:	MAMMOTH TO NORRIS ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	74.00

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	2450
Speed Limit (MPH):	35	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BURIED END	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	21.7	**Lateral Offset (In.):**	18.8	**Road Grade (%):**	5.20

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Entire barrier is between 3-7in below the 27-in design height.
	Breaking and Cracking:	1850 ft of damaged and bent rail.
	Missing Elements:	There were 50 missing blockouts.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010A-3.104-L**		
Route Name:	MAMMOTH TO NORRIS ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	74.00

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$111925
Brief Workorder:	Raise 2450-ft of barrier to 27-in design height replace 1850 feet of rail and 50 blockouts.				
Workorder:	Replace Rail at $25- per -Lin. Ft. for 1850 LF = $46250. Replace Block at $30- per -Each for 50 Block(s) = $1500. Adjust Guardrail at $10- per -Lin. Ft. for 2450 LF = $24500. Raise 2450-ft of barrier to 27-in design height. Low Speed Traffic Control at $1475- per -Day for 20 Day(s) = $29500. 10 days to raise barrier; 8 days to replace rail; 2 days all other work.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010A: MAMMOTH TO NORRIS ROAD

Barrier Condition Photos

YELL_0010A_3.104_L_1.JPG

YELL_0010A_3.104_L_2.JPG

Barrier ID:	**YELL-0010A-4.503-L**		
Route Name:	MAMMOTH TO NORRIS ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	47.20

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	209
Speed Limit (MPH):	25	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-1	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	19.0	**Post Spacing (In.):**	0.0
Height (In.):	12.3	**Lateral Offset (In.):**	50.7	**Road Grade (%):**	7.20

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 50ft was 3-6in below the 18in/24in crenellated design height and 100 ft was 6-10 in below.
	Breaking and Cracking:	Cracking throughout with stone breaking off.
	Missing Elements:	12 feet of stone crenellation missing.
	Corrrosion and Weathering:	Weathering observed with lichen growing on stone.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0010A-4.503-L**		
Route Name:	MAMMOTH TO NORRIS ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	47.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$103758
Brief Workorder:	Raise guardwall 6-in. Remove and reset 100-ft of stone masonry guardwall on concrete footer to adjacent crenellated 12-in/18-in height. Replace 12-ft of crenellation.				
Workorder:	New Stones at $250- per -Each for 4 Unit(s) = $1000. Remove & reset stone masonry guardwall at $250- per -Cu. Ft. for 320 CF = $80000. [(2ft)(1.6ft)(100ft)] = 320 CF. Structural Concrete at $1000- per -Cu. Yd. for 3 CY = $3000. [(1.6ft)(0.5ft)(100ft)] /27 = 2.9 CY. Low Speed Traffic Control at $1475- per -Day for 7 Day(s) = $10325. 1 day removal 6 days installation.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010A: MAMMOTH TO NORRIS ROAD

Barrier Condition Photos

YELL_0010A_4.503_L_1.JPG

Barrier ID:	**YELL-0010A-4.541-L**		
Route Name:	MAMMOTH TO NORRIS ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	28.00

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	NON-TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	124
Speed Limit (MPH):	25	**Placement with Respect to Road:**	NON-TRAFFIC BARRIER
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	N/A	**Is Barrier Crashworthy?:**	N/A
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	19.0	**Post Spacing (In.):**	0.0
Height (In.):	15.3	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was between 2-4in below the 18in/24in crenellated design height.
	Breaking and Cracking:	1 section of crenellation is loose cracks in grout.
	Missing Elements:	4 ft of crenellation is missing.
	Corrrosion and Weathering:	Weathering observed with lichen growing on stone.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0010A-4.541-L**		
Route Name:	MAMMOTH TO NORRIS ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	28.00

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$2514
Brief Workorder:	Repoint 4-sy and replace missing crenellation.				
Workorder:	New Stones at $250- per -Each for 1 Unit(s) = $250. Replace missing crenellation. Re-Point Masonry Barrier at $140- per -Sq. Yd. for 4 SY = $560. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010A: MAMMOTH TO NORRIS ROAD

Barrier Condition Photos

YELL_0010A_4.541_L_1.JPG

Barrier ID:	**YELL-0010A-4.564-L**		
Route Name:	MAMMOTH TO NORRIS ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	48.70

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	1183
Speed Limit (MPH):	25	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-1	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	18.7	**Post Spacing (In.):**	0.0
Height (In.):	17.5	**Lateral Offset (In.):**	66.5	**Road Grade (%):**	5.90

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 1147ft was 0-6in below the 18in/24in crenellated design height and 36 ft was 1-4in above.
	Breaking and Cracking:	Some cracking and loose stone.
	Missing Elements:	6 feet of crenellated stone is missing and 12 feet of entire wall is missing.
	Corrrosion and Weathering:	Some corrosion/weathering with lichen growth.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0010A-4.564-L**		
Route Name:	MAMMOTH TO NORRIS ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	48.70

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$11011
Brief Workorder:	Install 2 new crenellations 12-ft of barrier and repoint 4 sy.				
Workorder:	Stone Masonry w/o concrete corewall at $500- per -Lin. Ft. for 12 = $6000. Install 12 ft of wall. Re-Point Masonry Barrier at $140- per -Sq. Yd. for 4 SY = $560. Replace Stones at $250- per -Each for 2 Block(s) = $500. Replace missing crenellations. Low Speed Traffic Control at $1475- per -Day for 2 Day(s) = $2950.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010A: MAMMOTH TO NORRIS ROAD

Barrier Condition Photos

YELL_0010A_4.564_L_1.JPG

Barrier ID:	**YELL-0010D-53.234-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	45.20

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	1063
Speed Limit (MPH):	45	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	25.2	**Lateral Offset (In.):**	60.2	**Road Grade (%):**	2.60

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 1063ft was between 1 and 3-in below the 27-in design height.
	Breaking and Cracking:	72 ft. of guardrail was bent or cracked with associated blocks and several posts misaligned.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	Several blocks with .5 in cracks and are misaligned.
End Treatments	**Alignment and Height:**	The alignment was more than 12 in out for 24 ft. Height was 1-3in below the 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-53.234-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	45.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$23408
Brief Workorder:	Raise 1063-ft of barrier up to the 27-in design height and replace 72-ft of rail.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 1063 LF = $10630. Raise 1063-ft of barrier up to the 27-in design height. Replace Rail at $25- per -Lin. Ft. for 72 LF = $1800. Replace damaged rail. Low Speed Traffic Control at $1475- per -Day for 6 Day(s) = $8850. 5 days to raise barrier 1 day to replace rail.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_53.234_R_1.JPG

Barrier ID:	**YELL-0010D-54.935-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	41.00

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	1204
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.5
Height (In.):	25.2	**Lateral Offset (In.):**	51.5	**Road Grade (%):**	2.30

Physical Condition

Barrier	**Alignment and Height:**	Alignment is good for the length of barrier. The height is 1 to 3 in below the design height of 27 in for 840 linear ft.
	Breaking and Cracking:	No cracking or tearing at the barrier length.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-54.935-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	41.00

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$14108
Brief Workorder:	Raise 840-ft of barrier up to the 27-in design height.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 840 LF = $8400. Raise 840-ft of barrier up to the 27-in design height. Low Speed Traffic Control at $1475- per -Day for 3 Day(s) = $4425.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_54.935_L_1.JPG

Barrier ID:	**YELL-0010D-56.809-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	28.00

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	926
Speed Limit (MPH):	45	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.1
Height (In.):	26.0	**Lateral Offset (In.):**	55.9	**Road Grade (%):**	3.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 775-ft was between 1 and 3-in below the 27-in design height.
	Breaking and Cracking:	5 cracked blocks 60 ft of bent rail.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-56.809-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	28.00

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$16830
Brief Workorder:	Raise 775-ft of barrier up to the 27-in design height replace 60-ft of rail and 5 blocks.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 775 LF = $7750. Raise 775-ft of barrier up to the 27-in design height. Replace Rail at $25- per -Lin. Ft. for 60 LF = $1500. Replace Block at $30- per -Each for 5 Block(s) = $150. Low Speed Traffic Control at $1475- per -Day for 4 Day(s) = $5900.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_56.809_R_1.JPG

Barrier ID:	**YELL-0010D-57.164-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	39.50

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	887
Speed Limit (MPH):	45	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	24.6	**Lateral Offset (In.):**	45.5	**Road Grade (%):**	2.20

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 711-ft was between 1 and 3-in below the 27-in design height and 176-ft was more than 3-in below the design height.
	Breaking and Cracking:	10 cracked blocks apprx. .5 in 180 ft of bent rail and several blocks needing to be realigned.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	One bolt on end treatment broke through rail.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-57.164-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	39.50

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$23282
Brief Workorder:	Raise 887-ft of barrier up to the 27-in design height replace 180-ft of rail and 10 blocks. Right the tilted blocks.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 887 LF = $8870. Raise 887-ft of barrier up to the 27-in design height. Replace Rail at $25- per -Lin. Ft. for 180 LF = $4500. Replace 180-ft of damaged rail. Replace Blocks at $30- per -Each for 10 Block(s) = $300. Labor at $60- per -Hour for 2 Hrs = $120. Right the tilted blocks. Low Speed Traffic Control at $1475- per -Day for 5 Day(s) = $7375.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_57.164_R_1.JPG

Barrier ID:	**YELL-0010D-57.420-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	33.70

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	650
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.3
Height (In.):	27.5	**Lateral Offset (In.):**	51.7	**Road Grade (%):**	3.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-57.420-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	33.70

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_57.420_L_1.JPG

Barrier ID:	**YELL-0010D-57.643-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	35.50

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	691
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	26.3	**Lateral Offset (In.):**	57.4	**Road Grade (%):**	5.40

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 305-ft was between 1 and 3-in below the 27-in design height.
	Breaking and Cracking:	144 ft of W-beam impacted.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. 40ft of beginning end treatment was 4-5in below the 27-in design height.
	Breaking and Cracking:	One broken blockout on beginning end.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-57.643-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	35.50

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$11033
Brief Workorder:	Raise 345-ft of barrier up to the 27-in design height replace 144-ft of rail and 1 block.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 345 LF = $3450. Raise 345-ft of barrier up to the 27-in design height. Replace Rail at $25- per -Lin. Ft. for 144 LF = $3600. Replace damaged section of rail. Replace Blocks at $30- per -Each for 1 Block(s) = $30. Low Speed Traffic Control at $1475- per -Day for 2 Day(s) = $2950.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_57.643_R_1.JPG

Barrier ID:	**YELL-0010D-58.376-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	42.50

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	600
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.5
Height (In.):	25.2	**Lateral Offset (In.):**	57.5	**Road Grade (%):**	5.10

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 600-ft was between 1 and 3-in below the 27-in design height.
	Breaking and Cracking:	2 broken blocks and 48 ft of rail dented.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-58.376-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	42.50

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$14476
Brief Workorder:	Raise 600-ft of barrier up to the 27-in design height replace 48-ft of rail and 2 blocks.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 600 LF = $6000. Raise 600-ft of barrier up to the 27-in design height. Replace Rail at $25- per -Lin. Ft. for 48 LF = $1200. Replace damaged rail. Replace Blocks at $30- per -Each for 2 Block(s) = $60. Replace broken blocks. Low Speed Traffic Control at $1475- per -Day for 4 Day(s) = $5900.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_58.376_R_1.JPG

Barrier ID:	**YELL-0010D-58.541-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	40.00

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	366
Speed Limit (MPH):	45	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	24.2	**Lateral Offset (In.):**	57.7	**Road Grade (%):**	6.90

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 366-ft was between 1 and 3-in below the 27-in design height.
	Breaking and Cracking:	12 ft of rail slightly scraped 2 posts damaged.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Both end treatments were 3 in below the 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No cable on ending end treatment.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-58.541-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	40.00

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$8371
Brief Workorder:	Raise 366-ft of barrier up to the 27-in design height replace 12-ft of rail 2 posts and cable in end treatment.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 366 LF = $3660. Raise 366-ft of barrier up to the 27-in design height. Replace Rail at $25- per -Lin. Ft. for 12 LF = $300. Replace damaged rail. Replace Post at $100- per -Each for 2 Post(s) = $200. Lump sum - replace cable in ending end treatment for $500. Low Speed Traffic Control at $1475- per -Day for 2 Day(s) = $2950.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_58.541_R_1.JPG

Barrier ID:	**YELL-0010D-58.910-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	39.50

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	227
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	74.5
Height (In.):	25.2	**Lateral Offset (In.):**	55.7	**Road Grade (%):**	5.70

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 227-ft was between 1 and 3-in below the 27-in design height.
	Breaking and Cracking:	No breaking or cracking.
	Missing Elements:	One bock missing.
	Corrrosion and Weathering:	No corrosion or weathering at barrier length.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking at the end treatments.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-58.910-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	39.50

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$4153
Brief Workorder:	Raise 227-ft of barrier up to the 27-in design height and replace 1 block.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 227 LF = $2270. Raise 227-ft of barrier up to the 27-in design height. Replace Blocks at $30- per -Each for 1 Block(s) = $30. Replace cracked block. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_58.910_R_1.JPG

Barrier ID:	**YELL-0010D-59.004-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	42.90

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	190
Speed Limit (MPH):	45	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	23.7	**Lateral Offset (In.):**	44.0	**Road Grade (%):**	7.40

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 190-ft was between 1 and 3-in below the 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-59.004-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	42.90

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$3713
Brief Workorder:	Raise 190-ft of barrier up to the 27-in design height.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 190 LF = $1900. Raise 190-ft of barrier up to the 27-in design height Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_59.004_R_1.JPG

Barrier ID:	**YELL-0010D-59.189-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	36.70

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	652
Speed Limit (MPH):	45	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	74.5
Height (In.):	25.1	**Lateral Offset (In.):**	58.5	**Road Grade (%):**	5.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 652-ft was between 1 and 3-in below the 27-in design height.
	Breaking and Cracking:	4 blocks have cracks apprx. .5 in.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	Moderate weathering.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height was 3-in below the 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-59.189-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	36.70

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$12436
Brief Workorder:	Raise 652-ft of barrier up to the 27-in design height replace 4 blocks and realign blocks to posts.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 652 LF = $6520. Raise 652-ft of barrier up to the 27-in design height. Replace Block at $30- per -Each for 4 Block(s) = $120. Replace cracked blocks. Labor at $60- per -Hour for 4 Hrs = $240. Realign blocks and posts. Low Speed Traffic Control at $1475- per -Day for 3 Day(s) = $4425.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_59.189_R_1.JPG

Barrier ID:	**YELL-0010D-59.233-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	51.40

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	565
Speed Limit (MPH):	45	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	74.6
Height (In.):	23.2	**Lateral Offset (In.):**	47.2	**Road Grade (%):**	3.20

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 423-ft was between 1 and 3-in below the 27-in design height and 142-ft was more than 3-in below the design height.
	Breaking and Cracking:	One tear in rail.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height was more than 3-in below the 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-59.233-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	51.40

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$11468
Brief Workorder:	Raise 565-ft of barrier up to the 27-in design height and replace 14-ft of rail.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 565 LF = $5650. Raise 565-ft of barrier up to the 27-in design height. Replace Rail at $25- per -Lin. Ft. for 14 LF = $350. Replace damaged rail. Low Speed Traffic Control at $1475- per -Day for 3 Day(s) = $4425.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_59.233_L_1.JPG

Barrier ID:	**YELL-0010D-59.413-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	51.20

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	277
Speed Limit (MPH):	45	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	74.3
Height (In.):	21.0	**Lateral Offset (In.):**	49.7	**Road Grade (%):**	4.40

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. The height is 5 to 8 in below the design height of 27 in.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. The height is 5 to 8 in below the design height of 27 ines.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-59.413-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	51.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$6292
Brief Workorder:	Raise 277--ft of barrier up to the 27-in design height.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 277 LF = $2770. Raise 277-ft of barrier up to the 27-in design height. Low Speed Traffic Control at $1475- per -Day for 2 Day(s) = $2950.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_59.413_L_1.JPG

Barrier ID:	**YELL-0010D-59.775-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	40.00

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	460
Speed Limit (MPH):	45	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.3
Height (In.):	25.1	**Lateral Offset (In.):**	57.5	**Road Grade (%):**	5.90

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 460-ft was between 1 and 3-in below the 27-in design height.
	Breaking and Cracking:	12 ft of rail peeling from low damage at post.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height was 3-in below the 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-59.775-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	40.00

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$8635
Brief Workorder:	Raise 460-ft of barrier up to the 27-in design height and replace 12ft of rail.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 460 LF = $4600. Raise 460-ft of barrier up to the 27-in design height. Replace Rail at $25- per -Lin. Ft. for 12 LF = $300. Replace damaged section of rail. Low Speed Traffic Control at $1475- per -Day for 2 Day(s) = $2950.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_59.775_R_1.JPG

Barrier ID:	**YELL-0010D-59.923-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	40.00

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	418
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	74.6
Height (In.):	25.3	**Lateral Offset (In.):**	65.6	**Road Grade (%):**	2.10

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 148-ft was within 1-in of the 27-in design height 270-ft was between 1 and 3-in below.
	Breaking and Cracking:	No breaking or cracking observed. Several blocks were twisted.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	3 broken posts.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-59.923-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	40.00

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$6809
Brief Workorder:	Raise 270-ft of barrier up to the 27-in design heigh replace 3 posts and realign twisted blocks.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 270 LF = $2700. Raise 270-ft of barrier up to the 27-in design height. Labor at $60- per -Hour for 4 Hrs = $240. Realign twisted blocks. Replace Post at $100- per -Each for 3 Post(s) = $300. Low Speed Traffic Control at $1475- per -Day for 2 Day(s) = $2950.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_59.923_R_1.JPG

Barrier ID:	**YELL-0010D-60.052-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	41.40

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	752
Speed Limit (MPH):	45	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.5
Height (In.):	25.2	**Lateral Offset (In.):**	59.0	**Road Grade (%):**	5.60

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 752-ft was between 1 and 3-in below the 27-in design height.
	Breaking and Cracking:	20 twisted blocks.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height was 2-in below the 27-in design height.
	Breaking and Cracking:	Cracks less than .5 in observed in posts.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-60.052-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	41.40

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$15026
Brief Workorder:	Raise 752-ft of barrier up to the 27-in design height and realign twisted blocks.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 752 LF = $7520. Raise 752-ft of barrier up to the 27-in design height Labor at $60- per -Hour for 4 Hrs = $240. Realign twisted blocks. Low Speed Traffic Control at $1475- per -Day for 4 Day(s) = $5900.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_60.052_R_1.JPG

Barrier ID:	**YELL-0010D-60.286-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	31.20

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	498
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BURIED END	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BURIED END	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	74.3
Height (In.):	27.2	**Lateral Offset (In.):**	54.5	**Road Grade (%):**	1.35

Physical Condition

Barrier	**Alignment and Height:**	A 10 ft section of W-Beam alignment is off between 6 to 12 in. Height was within 1 in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-60.286-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	31.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$1898
Brief Workorder:	Realign 10 feet of barrier.				
Workorder:	Remove & Reset Guardrail at $25- per -Lin. Ft. for 10 LF = $250. Realign 10ft of barrier. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_60.286_L_1.JPG

Barrier ID:	**YELL-0010D-60.287-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	34.20

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	495
Speed Limit (MPH):	45	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	78.3
Height (In.):	25.5	**Lateral Offset (In.):**	51.0	**Road Grade (%):**	2.10

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 355-ft was within 1-in of the 27-in design height 20-ft was between 1 and 3-in below and 120-ft was more than 3-in below the design height.
	Breaking and Cracking:	1 rotted/broken post.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height was 3-in below the 27-in design height.
	Breaking and Cracking:	No breaking or cracking.
	Missing Elements:	No missing elements.
	Corrrosion and Weathering:	No corrosion or weathering.

Barrier ID:	**YELL-0010D-60.287-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	34.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$3273
Brief Workorder:	Raise 140-ft of barrier up to the 27-in design height and replace 1 post.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 140 LF = $1400. Raise 140-ft of barrier up to the 27-in design height. Replace Post at $100- per -Each for 1 Post(s) = $100. Replace broken post. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_60.287_R_1.JPG

Barrier ID:	**YELL-0010D-60.726-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	43.70

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	1133
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	74.4
Height (In.):	28.0	**Lateral Offset (In.):**	47.2	**Road Grade (%):**	5.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 1077-ft was within 1-in of the 27-in design height 56-ft was between 1 and 3-in below.
	Breaking and Cracking:	Few minor bends in rail; 3 blocks turned and 1 broken block.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-60.726-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	43.70

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$2338
Brief Workorder:	Raise 56-ft of barrier up to the 27-in design height replace 1 block and realign 3 blocks.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 56 LF = $560. Raise 56-ft of barrier up to the 27-in design height. Replace Block at $30- per -Each for 1 Block(s) = $30. Labor at $60- per -Hour for 1 Hrs = $60. Adjust 3 misaligned blocks. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_60.726_L_1.JPG

Barrier ID:	**YELL-0010D-61.039-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	29.30

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	664
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.1
Height (In.):	26.7	**Lateral Offset (In.):**	54.7	**Road Grade (%):**	5.30

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	Several twisted bocks.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height was 2-3in below the 27-in design height.
	Breaking and Cracking:	1 broken post 2 cracked blocks.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-61.039-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	29.30

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$3449
Brief Workorder:	Raise 72-ft of barrier up to the 27-in design height replace 24-ft of rail 2 blocks and 1 post.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 72 LF = $720. Raise 72-ft of barrier up to the 27-in design height. Replace Post at $100- per -Each for 1 Post(s) = $100. Replace broken post. Replace Rail at $25- per -Lin. Ft. for 24 LF = $600. Replace damaged rail at end section. Replace Block at $30- per -Each for 2 Block(s) = $60. Replace cracked blocks. Labor at $60- per -Hour for 3 Hrs = $180. Realign twisted blocks. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_61.039_R_1.JPG

Barrier ID:	**YELL-0010D-61.275-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	38.50

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	352
Speed Limit (MPH):	45	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BURIED END	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	74.6
Height (In.):	24.2	**Lateral Offset (In.):**	53.5	**Road Grade (%):**	6.30

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 32-ft was within 1-in of the 27-in design height 140-ft was between 1 and 3-in below and 180-ft was more than 3-in below the design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-61.275-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	38.50

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$6765
Brief Workorder:	Raise 320-ft of barrier up to the 27-in design height.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 320 LF = $3200. Raise 320-ft of barrier up to the 27-in design height. Low Speed Traffic Control at $1475- per -Day for 2 Day(s) = $2950.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

Condition photos are not available for YELL-0010D-61.275-R.

Barrier ID:	**YELL-0010D-61.306-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	37.00

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	235
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BURIED END	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	25.6	**Lateral Offset (In.):**	55.2	**Road Grade (%):**	5.30

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 150-ft was within 1-in of the 27-in design height 150-ft was between 1 and 3-in below and 75-ft was more than 3-in below the design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-61.306-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	37.00

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$2558
Brief Workorder:	Raise 85-ft of barrier up to the 27-in design height.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 85 LF = $850. Raise 85-ft of barrier up to the 27-in design height. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_61.306_L_1.JPG

Barrier ID:	**YELL-0010D-61.560-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	34.00

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	2094
Speed Limit (MPH):	45	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	26.6	**Lateral Offset (In.):**	53.2	**Road Grade (%):**	2.20

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	Several blocks twisted.
	Missing Elements:	One block missing.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-61.560-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	34.00

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$2052
Brief Workorder:	Replace 1 block and realign twisted blocks.				
Workorder:	Replace Block at $30- per -Each for 1 Block(s) = $30. Replace 1 block. Labor at $60- per -Hour for 6 Hrs = $360. Realign twisted blocks. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_61.560_R_1.JPG

Barrier ID:	**YELL-0010D-62.037-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	28.20

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	200
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	26.7	**Lateral Offset (In.):**	57.7	**Road Grade (%):**	4.30

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 180-ft was within 1-in of the 27-in design height 20-ft was between 1 and 3-in below.
	Breaking and Cracking:	12 ft of impacted rail.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-62.037-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	28.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$2173
Brief Workorder:	Raise 20-ft of barrier up to the 27-in design heightand replace 12-ft of rail.				
Workorder:	Replace Rail at $25- per -Lin. Ft. for 12 LF = $300. Replace damaged rail. Adjust Guardrail at $10- per -Lin. Ft. for 20 LF = $200. Raise 20-ft of barrier up to the 27-in design height. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_62.037_R_1.JPG

Barrier ID:	**YELL-0010D-62.114-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	40.00

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	692
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	25.7	**Lateral Offset (In.):**	62.5	**Road Grade (%):**	4.70

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 527-ft was within 1-in of the 27-in design height 120-ft was between 1 and 3-in below and 45-ft was more than 3-in below the design height.
	Breaking and Cracking:	72 ft of impacted rail one split post and twisted blocks throughout the barrier.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height was 2-in below the 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-62.114-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	40.00

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$5660
Brief Workorder:	Raise 165-ft of barrier up to the 27-in design height replace 72-ft of rail 1 block and realign twisted blocks.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 165 LF = $1650. Raise 165-ft of barrier up to the 27-in design height. Replace Rail at $25- per -Lin. Ft. for 72 LF = $1800. Replace 72ft of damaged rail. Replace Post at $100- per -Each for 1 Post(s) = $100. Replace broken post. Labor at $60- per -Hour for 2 Hrs = $120. Straighten blocks. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_62.114_R_1.JPG

Barrier ID:	**YELL-0010D-62.334-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/15/2009	**Barrier Rating:**	47.00

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	794
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BURIED END	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	25.7	**Lateral Offset (In.):**	65.3	**Road Grade (%):**	4.20

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 520-ft was within 1-in of the 27-in design height 250-ft was between 1 and 3-in below and 24-ft was more than 3-in below the design height.
	Breaking and Cracking:	204 ft of impacted rail 1 broken post 2 cracked blocks and twisted blocks throughout the barrier.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-62.334-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/15/2009	**Barrier Rating:**	47.00

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$12243
Brief Workorder:	Raise 274-ft of barrier up to the 27-in design height replace 204-ft of rail 1 post 2 blocks and realign twisted blocks.				
Workorder:	Replace Rail at $25- per -Lin. Ft. for 204 LF = $5100. Replace damaged rail. Replace Post at $100- per -Each for 1 Post(s) = $100. Replace cracked post. Replace Block at $30- per -Each for 2 Block(s) = $60. Replace cracked blocks. Adjust Guardrail at $10- per -Lin. Ft. for 274 LF = $2740. Raise 274-ft of barrier up to the 27-in design height. Labor at $60- per -Hour for 3 Hrs = $180. Realign twisted blocks. Low Speed Traffic Control at $1475- per -Day for 2 Day(s) = $2950.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_62.334_L_1.JPG

Barrier ID:	**YELL-0010D-62.467-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/15/2009	**Barrier Rating:**	23.70

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	360
Speed Limit (MPH):	45	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BURIED END	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.3
Height (In.):	27.3	**Lateral Offset (In.):**	41.5	**Road Grade (%):**	5.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	12 ft section of rail broken and several twisted blocks.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-62.467-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/15/2009	**Barrier Rating:**	23.70

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$2151
Brief Workorder:	Replace 12-ft of rail and realign twisted blocks.				
Workorder:	Replace Rail at $25- per -Lin. Ft. for 12 LF = $300. Replace a section of damaged rail. Labor at $60- per -Hour for 3 Hrs = $180. Realign twisted blocks. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_62.467_R_1.JPG

Barrier ID:	**YELL-0010D-62.906-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/15/2009	**Barrier Rating:**	25.50

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	242
Speed Limit (MPH):	45	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.3
Height (In.):	26.2	**Lateral Offset (In.):**	38.0	**Road Grade (%):**	1.50

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	Several twisted blocks.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-62.906-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/15/2009	**Barrier Rating:**	25.50

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$1821
Brief Workorder:	Realign twisted blocks.				
Workorder:	Labor at $60- per -Hour for 3 Hrs = $180. Realign twisted blocks. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_62.906_R_1.JPG

Barrier ID:	**YELL-0010D-62.911-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	29.30

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	312
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	26.2	**Lateral Offset (In.):**	59.0	**Road Grade (%):**	1.60

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	1 post and 2 blockouts cracked approx 2-in. 25 ft of rail is twisted and bent.
	Missing Elements:	1 missing post.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-62.911-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	29.30

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$2596
Brief Workorder:	Replace 2 posts 2 blockouts and 25-ft of rail.				
Workorder:	Replace Post at $100- per -Each for 2 Post(s) = $200. Replace 2 missing posts. Replace Block at $30- per -Each for 2 Block(s) = $60. Replace 2 cracked blocks. Replace Rail at $25- per -Lin. Ft. for 25 LF = $625. Replace 25-ft of twisted rail. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_62.911_L_1.JPG

Barrier ID:	**YELL-0010D-63.164-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/15/2009	**Barrier Rating:**	39.90

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	592
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BURIED END	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BURIED END	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.6
Height (In.):	27.7	**Lateral Offset (In.):**	59.0	**Road Grade (%):**	5.70

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	7 posts and 2 blocks are breaking and cracking. 25 ft of rail is cracked/torn.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	Posts are weathered with small cracks; some with loss of more than 50 percent of the cross section.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-63.164-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/15/2009	**Barrier Rating:**	39.90

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$3146
Brief Workorder:	Replace 25-ft of rail 7 posts and two blocks.				
Workorder:	Replace Rail at $25- per -Lin. Ft. for 25 LF = $625. Replace 25-ft of cracked rail that has deformed the original cross section. Replace Post at $100- per -Each for 7 Post(s) = $700. Replace 7 broken posts. Replace Block at $30- per -Each for 2 Block(s) = $60. Replace 2 cracked blocks. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_63.164_R_1.JPG

Barrier ID:	**YELL-0010D-63.177-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	23.70

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	444
Speed Limit (MPH):	45	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BURIED END	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BURIED END	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	74.1
Height (In.):	26.7	**Lateral Offset (In.):**	55.0	**Road Grade (%):**	6.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-63.177-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	23.70

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_63.177_L_1.JPG

Barrier ID:	**YELL-0010D-63.380-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	31.20

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	401
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	LOW		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BURIED END	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	74.5
Height (In.):	27.0	**Lateral Offset (In.):**	57.0	**Road Grade (%):**	5.80

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 353-ft was within 1-in of the 27-in design height 48-ft was between 1 and 3-in below.
	Breaking and Cracking:	12 ft of bent rail.
	Missing Elements:	3 missing blockouts.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	25 ft of bent rail.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-63.380-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	31.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$3267
Brief Workorder:	Raise 48-ft of barrier up to the 27-in design height replace 37 feet of rail and 3 blocks.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 48 LF = $480. Raise 48-ft of barrier up to the 27-in design height. Replace Rail at $25- per -Lin. Ft. for 37 LF = $925. Replace 37-ft of rail at end section and 12ft of W-beam. Replace Block at $30- per -Each for 3 Block(s) = $90. Replace 3 missing blocks. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_63.380_L_1.JPG

Barrier ID:	**YELL-0010D-63.502-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	23.70

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	310
Speed Limit (MPH):	45	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BURIED END	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.3
Height (In.):	26.7	**Lateral Offset (In.):**	48.0	**Road Grade (%):**	2.30

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 210-ft was within 1-in of the 27-in design height 100-ft was between 1 and 3-in below.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-63.502-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	23.70

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$2723
Brief Workorder:	Raise 100-ft of barrier up to the 27-in design height.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 100 LF = $1000. Raise 100-ft of barrier up to the 27-in design height. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_63.502_L_1.JPG

Barrier ID:	**YELL-0010D-64.117-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	29.30

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	372
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BURIED END	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	74.3
Height (In.):	26.2	**Lateral Offset (In.):**	51.7	**Road Grade (%):**	1.70

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	A 15 ft section of rail is severely bent.
	Missing Elements:	No missing elements.
	Corrrosion and Weathering:	No corrosion or weathering at the barrier length. There is no erosion at the barrier foundation.
End Treatments	**Alignment and Height:**	The beginning end treatment needs to be realigned.
	Breaking and Cracking:	No breaking or cracking at the end treatments.
	Missing Elements:	No missing elements..
	Corrrosion and Weathering:	No corrosion weathering or erosion at the end treatments.

Barrier ID:	**YELL-0010D-64.117-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	29.30

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$3053
Brief Workorder:	Replace 15-ft of rail and remove/reset end treatment.				
Workorder:	Remove & Reset Guardrail at $25- per -Lin. Ft. for 37 LF = $925. Realign 37-ft of end treatment. Replace Rail at $25- per -Lin. Ft. for 15 LF = $375. Replace bent rail. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_64.117_L_1.JPG

Barrier ID:	**YELL-0010D-64.219-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	36.70

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	283
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BURIED END	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.6
Height (In.):	26.2	**Lateral Offset (In.):**	41.0	**Road Grade (%):**	2.30

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	28 ft of bent rail.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. 70ft was 1-3in below the 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-64.219-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	36.70

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$3163
Brief Workorder:	Raise 70-ft of barrier up to the 27-in design height and replace 28-ft of rail.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 70 LF = $700. Raise 70-ft of barrier up to the 27-in design height. Replace Rail at $25- per -Lin. Ft. for 28 LF = $700. Replace 28-ft of bent rail. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_64.219_L_1.JPG

Barrier ID:	**YELL-0010D-64.325-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	29.60

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	386
Speed Limit (MPH):	45	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	25.0	**Lateral Offset (In.):**	58.5	**Road Grade (%):**	1.80

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 386-ft was between 1 and 3-in below the 27-in design height.
	Breaking and Cracking:	24 ft of torn rail and 72 ft of damaged rail. One damaged block.
	Missing Elements:	No missing elements.
	Corrrosion and Weathering:	No notable corrosion/weathering or erosion.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking of any elements
	Missing Elements:	No missing elements..
	Corrrosion and Weathering:	No notable corrosion/weathering or erosion

Barrier ID:	**YELL-0010D-64.325-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	29.60

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$10164
Brief Workorder:	Raise 386-ft of barrier up to the 27-in design height and replace 96-ft of rail and 1 block.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 386 LF = $3860. Raise 386-ft of barrier up to the 27-in design height. Replace Rail at $25- per -Lin. Ft. for 96 LF = $2400. Replace 96ft of rail. Replace Block at $30- per -Each for 1 Block(s) = $30. Replace damaged/cracked block. Low Speed Traffic Control at $1475- per -Day for 2 Day(s) = $2950.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

Condition photos are not available for YELL-0010D-64.325-R.

Barrier ID:	**YELL-0010D-64.328-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	41.00

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	326
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.3
Height (In.):	25.2	**Lateral Offset (In.):**	46.0	**Road Grade (%):**	2.50

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 158-ft was within 1-in of the 27-in design height and 168-ft was between 1 and 3-in below design height.
	Breaking and Cracking:	1 broken post; 1 block turned; 14 ft of bent rail.
	Missing Elements:	1 missing block.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-64.328-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	41.00

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$4065
Brief Workorder:	Raise 168-ft of barrier up to the 27-in design height replace 14-ft of rail 1 post 1 block and align one block.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 168 = $1680. Raise 168-ft of barrier up to the 27-in design height. Replace rail at $25- per -Lin. Ft. for 14 = $350. Replace a 14 ft section of torn rail. Replace block at $30- per -Each for 1 = $30. Replace 1 missing block. Replace post at $100- per -Each for 1 = $100. Replace broken post. Labor at $60- per -Hour for 1 = $60. Realign turned block. Low Speed Traffic Control at $1475- per -Day for 1 = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_64.328_L_1.JPG

Barrier ID:	**YELL-0010D-64.642-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	29.60

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	602
Speed Limit (MPH):	45	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BURIED END	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	74.3
Height (In.):	24.2	**Lateral Offset (In.):**	49.2	**Road Grade (%):**	3.90

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 602-ft was between 1 and 3-in below the 27-in design height.
	Breaking and Cracking:	No cracking or breaking of posts. 12 ft section of W-beam with tears.
	Missing Elements:	No missing elements.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-64.642-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	29.60

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$11820
Brief Workorder:	Raise 602-ft of barrier up to the 27-in design height and replace 12 feet of rail				
Workorder:	Replace rail at $25- per -Lin. Ft. for 12 LF = $300. 12 ft section w/tears. Adjust Guardrail at $10- per -Lin. Ft. for 602 LF = $6020. Raise 602-ft of barrier up to the 27-in design height. Low Speed Traffic Control at $1475- per -Day for 3 Day(s) = $4425.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_64.642_L_1.JPG

Barrier ID:	**YELL-0010D-65.494-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	35.70

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	628
Speed Limit (MPH):	45	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	76.0
Height (In.):	25.7	**Lateral Offset (In.):**	51.7	**Road Grade (%):**	4.40

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 404-ft was within 1-in of the 27-in design height and 224-ft was between 1 and 3-in below design height.
	Breaking and Cracking:	Posts and blocks have some breaking/cracking but still have good cross section.
	Missing Elements:	No missing elements.
	Corrrosion and Weathering:	Loss of less than 5% of cross section. Could not see erosion around post due to snow.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed. 76 ft of rail bent in both end treatments.
	Missing Elements:	No missing elements..
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-65.494-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	35.70

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$7799
Brief Workorder:	Raise 224-ft of barrier up to the 27-in design height and replace 76 feet of rail.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 224 LF = $2240. Raise 224-ft of barrier up to the 27-in design height. Replace rail at $25- per -Lin. Ft. for 76 LF = $1900. Replace rail in both end treatments. Low Speed Traffic Control at $1475- per -Day for 2 Day(s) = $2950.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_65.494_R_1.jpg

Barrier ID:	**YELL-0010D-65.556-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	29.60

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	365
Speed Limit (MPH):	45	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	74.6
Height (In.):	25.6	**Lateral Offset (In.):**	49.2	**Road Grade (%):**	2.70

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 197-ft was within 1-in of the 27-in design height and 168-ft was between 1 and 3-in below design height.
	Breaking and Cracking:	48 ft of bent rail; 2 posts split and broken.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height was 1-3in below the 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-65.556-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	29.60

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$5011
Brief Workorder:	Raise 168-ft of barrier up to the 27-in design height and replace 48 feet of rail and 2 posts.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 168 LF = $1680. Raise 168-ft of barrier up to the 27-in design height. Replace Post at $100- per -Each for 2 Post(s) = $200. Replace 2 broken posts. Replace Rail at $25- per -Lin. Ft. for 48 LF = $1200. Replace 48-ft of rail. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_65.556_L_1.JPG

Barrier ID:	**YELL-0010D-66.368-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	42.50

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	649
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BURIED END	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.5
Height (In.):	25.2	**Lateral Offset (In.):**	69.8	**Road Grade (%):**	4.30

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 228-ft was within 1-in of the 27-in design height 349-ft was between 1 and 3-in below and 72-ft was more than 3-in below the design height.
	Breaking and Cracking:	72 ft of bent rail 7 broken blocks and 2 broken posts.
	Missing Elements:	Two missing blocks.
	Corrrosion and Weathering:	Severe weathering of 24 ft of rail.
End Treatments	**Alignment and Height:**	Alignment acceptable. Beginning end treatment was 4in below the 27-in design height.
	Breaking and Cracking:	No breaking or cracking of any elements
	Missing Elements:	No missing elements..
	Corrrosion and Weathering:	No notable corrosion/weathering or erosion.

Barrier ID:	**YELL-0010D-66.368-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	42.50

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$10373
Brief Workorder:	Raise 421-ft of barrier up to the 27-in design height replace 2 posts and 9 blocks.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 421 LF = $4210. Raise 421-ft of barrier up to the 27-in design height. Replace rail at $25- per -Lin. Ft. for 72 LF = $1800. Replace 72 ft of rail. Replace post at $100- per -Each for 2 Post(s) = $200. Replace 2 damaged posts. Replace block at $30- per -Each for 9 Block(s) = $270. Replace 9 damaged or broken blocks. Low Speed Traffic Control at $1475- per -Day for 2 Day(s) = $2950.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_66.368_R_1.jpg

Barrier ID:	**YELL-0010D-66.383-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	28.20

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	585
Speed Limit (MPH):	35	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BURIED END	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	74.3
Height (In.):	23.6	**Lateral Offset (In.):**	53.2	**Road Grade (%):**	5.40

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 505-ft was between 1 and 3-in below the 27-in design height and 80-ft was more than 3-in below the design height.
	Breaking and Cracking:	5 posts cracked.
	Missing Elements:	Two missing blocks.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-66.383-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	28.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$11918
Brief Workorder:	Raise 585-ft of barrier up to the 27-in design height replace 5 posts and 2 blocks.				
Workorder:	Replace post at $100- per -Each for 5 = $500. Replace 5 cracked posts. Replace block at $30- per -Each for 2 = $60. Replace 2 missing blocks. Adjust Guardrail at $10- per -Lin. Ft. for 585 = $5850. Raise 585-ft of barrier up to the 27-in design height. Low Speed Traffic Control at $1475- per -Day for 3 = $4425.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_66.383_L_1.JPG

Barrier ID:	**YELL-0010D-66.545-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	45.00

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	1020
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	76.1
Height (In.):	27.7	**Lateral Offset (In.):**	50.5	**Road Grade (%):**	3.10

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 870-ft was within 1-in of the 27-in design height and 150-ft was between 1 and 3-in below design height.
	Breaking and Cracking:	144 ft of bent or torn rail; 6 missing posts and 9 broken or cracked blocks.
	Missing Elements:	One missing block and post.
	Corrrosion and Weathering:	No notable corrosion/weathering or erosion.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking of any barrier components.
	Missing Elements:	No missing elements..
	Corrrosion and Weathering:	No notable corrosion/weathering or erosion.

Barrier ID:	**YELL-0010D-66.545-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	45.00

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$9812
Brief Workorder:	Raise 150-ft of barrier up to the 27-in design height replace 144-ft of rail 6 posts and 9 blocks.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 150 LF = $1500. Raise 150-ft of barrier up to the 27-in design height. Replace rail at $25- per -Lin. Ft. for 144 LF = $3600. Replace 144 linear feet of rail. Replace post at $100- per -Each for 6 Post(s) = $600. Replace 6 missing broken or cracked posts. Replace block at $30- per -Each for 9 Block(s) = $270. Replace 9 missing broken or cracked blocks. Low Speed Traffic Control at $1475- per -Day for 2 Day(s) = $2950.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_66.545_R_1.jpg

Barrier ID:	**YELL-0010D-67.065-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	25.10

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	265
Speed Limit (MPH):	35	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	74.5
Height (In.):	26.2	**Lateral Offset (In.):**	64.0	**Road Grade (%):**	5.70

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-67.065-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	25.10

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_67.065_L_1.JPG

Barrier ID:	**YELL-0010D-67.310-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	37.20

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	303
Speed Limit (MPH):	35	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BURIED END	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BURIED END	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	76.3
Height (In.):	23.0	**Lateral Offset (In.):**	46.2	**Road Grade (%):**	3.40

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 168-ft was between 1 and 3-in below the 27-in design height and 135-ft was more than 3-in below the design height.
	Breaking and Cracking:	Cracked wood posts and blocks and 96 ft of bent rail.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height was 3in below the 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-67.310-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	37.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$9218
Brief Workorder:	Raise 303-ft of barrier up to the 27-in design height and replace 96-ft of rail.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 303 LF = $3030. Raise 303-ft of barrier up to the 27-in design height. Replace rail at $25- per -Lin. Ft. for 96 LF = $2400. Low Speed Traffic Control at $1475- per -Day for 2 Day(s) = $2950.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_67.310_R_1.jpg

Barrier ID:	**YELL-0010D-67.315-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	29.70

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	812
Speed Limit (MPH):	35	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BURIED END	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.5
Height (In.):	27.1	**Lateral Offset (In.):**	67.0	**Road Grade (%):**	5.50

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	One broken post.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-67.315-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	29.70

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$1733
Brief Workorder:	Replace one post.				
Workorder:	Replace post at $100- per -Each for 1 = $100. Replace broken post. Low Speed Traffic Control at $1475- per -Day for 1 = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_67.315_L_1.JPG

Barrier ID:	**YELL-0010D-67.469-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	7.10

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	NON-TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	305
Speed Limit (MPH):	35	**Placement with Respect to Road:**	NON-TRAFFIC BARRIER
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	N/A	**Is Barrier Crashworthy?:**	N/A
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BURIED END	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	74.5
Height (In.):	28.2	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-67.469-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	7.10

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_67.469_L_1.JPG

Barrier ID:	**YELL-0010D-67.577-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	25.60

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	505
Speed Limit (MPH):	35	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	77.3
Height (In.):	26.6	**Lateral Offset (In.):**	48.2	**Road Grade (%):**	4.30

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	62 ft of rail bent and torn. 12 blocks misaligned.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-67.577-L**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	25.60

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$3460
Brief Workorder:	Replace 62-ft of rail and realign blocks.				
Workorder:	Replace rail at $25- per -Lin. Ft. for 62 LF = $1550. Labor at $60- per -Hour for 2 Hrs = $120. Adjust blocks and check bolts. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_67.577_L_1.JPG

Barrier ID:	**YELL-0010D-67.582-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/15/2009	**Barrier Rating:**	25.10

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	549
Speed Limit (MPH):	35	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BURIED END	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	76.1
Height (In.):	27.0	**Lateral Offset (In.):**	64.6	**Road Grade (%):**	1.80

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	28 ft of rail bent on top; 78 ft of rail has minor bends on top of rail.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-67.582-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/15/2009	**Barrier Rating:**	25.10

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$3558
Brief Workorder:	Raise 106-ft of barrier up to the 27-in design height and replace 28-ft of rail.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 106 = $1060. Raise 106-ft of barrier up to the 27-in design height. Replace rail at $25- per -Lin. Ft. for 28 = $700. Replace 28 LF of damaged rail. Low Speed Traffic Control at $1475- per -Day for 1 = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_67.582_R_1.JPG

Barrier ID:	**YELL-0010D-67.705-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/15/2009	**Barrier Rating:**	22.20

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	204
Speed Limit (MPH):	35	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BURIED END	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.3
Height (In.):	24.7	**Lateral Offset (In.):**	50.2	**Road Grade (%):**	5.50

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 113-ft was within 1-in of the 27-in design height and 91-ft was between 1 and 3-in below design height.
	Breaking and Cracking:	1 block turned; minor bends in top of w-beam rail.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010D-67.705-R**		
Route Name:	OLD FAITHFUL TO WEST THUMB ROAD		
Inspection Date:	10/15/2009	**Barrier Rating:**	22.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$2822
Brief Workorder:	Raise 91-ft of barrier up to the 27-in design height and realign 1 block.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 91 = $910. Raise 91-ft of barrier up to the 27-in design height. Labor at $60- per -Hour for 3 = $180. Realign 1 block which is turned at an angle. Low Speed Traffic Control at $1475- per -Day for 1 = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010D: OLD FAITHFUL TO WEST THUMB ROAD

Barrier Condition Photos

YELL_0010D_67.705_R_1.JPG

Barrier ID:	**YELL-0010F-94.863-R**		
Route Name:	FISHING BRIDGE TO CANYON ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	31.20

Barrier Description

Type:	OTHER: LOG RAIL ON STONE POSTS	**Barrier Function:**	TRAFFIC
Barrier Material:	LOG/TIMBER/WOOD	**Post Material:**	OTHER
Blockout Type:	N/A	**Length (ft.):**	436
Speed Limit (MPH):	25	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-1	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	18	**Width (In.):**	0.0	**Post Spacing (In.):**	94.3
Height (In.):	17.0	**Lateral Offset (In.):**	41.0	**Road Grade (%):**	2.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was within 1-in of assumed 18-in design height.
	Breaking and Cracking:	Cracks less than 0.25 in observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0010F-94.863-R**		
Route Name:	FISHING BRIDGE TO CANYON ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	31.20

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010F: FISHING BRIDGE TO CANYON ROAD

Barrier Condition Photos

YELL_0010F_94.863_R_1.jpg

Barrier ID:	**YELL-0010G-109.359-L**		
Route Name:	CANYON TO TOWER ROAD		
Inspection Date:	10/06/2009	**Barrier Rating:**	34.20

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	2090
Speed Limit (MPH):	25	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-1	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	RIGID W-BEAM - W-BEAM
Ending End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	27.5	**Lateral Offset (In.):**	44.2	**Road Grade (%):**	5.20

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 150 ft was 1-3in below 27-in design height and 1940 ft was between 1 in below to 3 in above.
	Breaking and Cracking:	There were no breaking or cracking within the w-beam blockouts or wood posts.
	Missing Elements:	There were no missing elements associated with this barrier.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	There were no visual signs of breaking or cracking associated to this end treatment.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010G-109.359-L**		
Route Name:	CANYON TO TOWER ROAD		
Inspection Date:	10/06/2009	**Barrier Rating:**	34.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$3273
Brief Workorder:	Raise 150-ft of barrier up to the 27-in design height.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 150 LF = $1500. Raise 150-ft of barrier up to the 27-in design height. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010G: CANYON TO TOWER ROAD

Barrier Condition Photos

YELL_0010G_109.359_L_1.JPG

Barrier ID:	**YELL-0010G-110.996-L**		
Route Name:	CANYON TO TOWER ROAD		
Inspection Date:	10/06/2009	**Barrier Rating:**	30.20

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	1540
Speed Limit (MPH):	25	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-1	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	29.2	**Lateral Offset (In.):**	32.4	**Road Grade (%):**	1.60

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Entire barrier is between 0-in below to 4-in above the 27-in design height.
	Breaking and Cracking:	24 ft of rail bent and torn. 4 blocks cracked.
	Missing Elements:	Loose bolts throughout the barrier approximately 400.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0010G-110.996-L**		
Route Name:	CANYON TO TOWER ROAD		
Inspection Date:	10/06/2009	**Barrier Rating:**	30.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$2943
Brief Workorder:	Replace 24-ft of rail 4 blocks and tighten approximately 400 loose bolts.				
Workorder:	Replace rail at $25- per -Lin. Ft. for 24 LF = $600. Replace 24-ft of rail. Replace block at $30- per -Each for 4 Block(s) = $120. Replace cracked blocks. Labor at $60- per -Hour for 8 Hrs = $480. Labor to tighten approximately 400 loose bolts. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010G: CANYON TO TOWER ROAD

Barrier Condition Photos

YELL_0010G_110.996_L_1.JPG

Barrier ID:	**YELL-0010G-114.276-L**		
Route Name:	CANYON TO TOWER ROAD		
Inspection Date:	10/06/2009	**Barrier Rating:**	28.20

Barrier Description

Type:	OTHER: LOG RAIL ON LOG POSTS	**Barrier Function:**	TRAFFIC
Barrier Material:	LOG/TIMBER/WOOD	**Post Material:**	WOOD
Blockout Type:	N/A	**Length (ft.):**	100
Speed Limit (MPH):	25	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-1	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	20	**Width (In.):**	0.0	**Post Spacing (In.):**	98.6
Height (In.):	23.0	**Lateral Offset (In.):**	48.0	**Road Grade (%):**	6.10

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height ranged from 2in below to 6in above the assumed 20-in design height with 30 ft being 1-2in below.
	Breaking and Cracking:	A few places where major cracking has happened but the original cross section is intact and the cracking is not due to impact.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	Rails are corroded between 5% and 50% throughout the barrier. There is no notable erosion around posts.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0010G-114.276-L**		
Route Name:	CANYON TO TOWER ROAD		
Inspection Date:	10/06/2009	**Barrier Rating:**	28.20

Repair Recommendations

Repair Action:	REPLACE	**FMSS Work Type:**	CAPITAL IMPROVEMENT	**Repair Cost:**	$17985
Brief Workorder:	Replace log-on-log barrier with Steel-backed timber without blockouts barrier.				
Workorder:	Remove Guardrail at $10- per -Lin. Ft. for 100 LF = $1000. Remove 100-ft of barrier. SBT / Log Flared at $5000- per -Each for 2 Unit(s) = $10000. Install 2 Steel-backed timber flared end treatments. Steel-Backed Timber w/o Blockout at $60- per -Lin. Ft. for 40 LF = $2400. Install 40-ft of Steel-backed timber w/out blocouts barrier. Low Speed Traffic Control at $1475- per -Day for 2 Day(s) = $2950. 1 day removal 1 day installation.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010G: CANYON TO TOWER ROAD

Barrier Condition Photos

YELL_0010G_114.276_L_1.jpg

Barrier ID:	**YELL-0010G-114.418-R**		
Route Name:	CANYON TO TOWER ROAD		
Inspection Date:	10/06/2009	**Barrier Rating:**	34.20

Barrier Description

Type:	OTHER: LOG RAIL ON LOG POSTS	**Barrier Function:**	TRAFFIC
Barrier Material:	LOG/TIMBER/WOOD	**Post Material:**	WOOD
Blockout Type:	N/A	**Length (ft.):**	270
Speed Limit (MPH):	25	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-1	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	20	**Width (In.):**	10.0	**Post Spacing (In.):**	96.0
Height (In.):	23.0	**Lateral Offset (In.):**	95.0	**Road Grade (%):**	3.80

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 2-4in above the assumed 20-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0010G-114.418-R**		
Route Name:	CANYON TO TOWER ROAD		
Inspection Date:	10/06/2009	**Barrier Rating:**	34.20

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010G: CANYON TO TOWER ROAD

Barrier Condition Photos

YELL_0010G_114.418_R_1.JPG

Barrier ID:	**YELL-0010G-119.734-R**		
Route Name:	CANYON TO TOWER ROAD		
Inspection Date:	10/06/2009	**Barrier Rating:**	55.70

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	335
Speed Limit (MPH):	25	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-1	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	20.0	**Post Spacing (In.):**	0.0
Height (In.):	10.0	**Lateral Offset (In.):**	43.2	**Road Grade (%):**	3.50

Physical Condition

Barrier	**Alignment and Height:**	Alignment off by 6-12in for 80 ft. 184 ft was 6-13in below the 18in/24in crenellated design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	Missing boulder and 2 sy of grout.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	NA
	Breaking and Cracking:	NA
	Missing Elements:	NA
	Corrrosion and Weathering:	NA

Barrier ID:	**YELL-0010G-119.734-R**		
Route Name:	CANYON TO TOWER ROAD		
Inspection Date:	10/06/2009	**Barrier Rating:**	55.70

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$188606
Brief Workorder:	Raise guardwall 9-in. Remove and reset 184-ft of stone masonry guardwall on concrete footer to adjacent crenellated 12-in/18-in height. Repoint 2sy and remove vegetation from face of barrier.				
Workorder:	Re-Point Masonry Barrier at $140- per -Sq. Yd. for 2 SY = $280. 2 SY of grout needed at ending end of wall. Remove & Reset Stone Masonry Guardwall at $250- per -Cu. Ft. for 589 CF = $147250. [(2ft)(1.6ft)(184ft)] = 588.8 CF. Structural Concrete at $1000- per -Cu. Yd. for 9 CY = $9000. [(1.6ft)(0.75ft)(184ft)] /27 = 8.2 CY. Labor at $60- per -Hour for 3 Hrs = $180. Remove vegetation from face of barrier. Low Speed Traffic Control at $1475- per -Day for 10 Day(s) = $14750. 2 days removal 8 days installation.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010G: CANYON TO TOWER ROAD

Barrier Condition Photos

YELL_0010G_119.734_R_1.JPG

Barrier ID:	**YELL-0010G-120.268-R**		
Route Name:	CANYON TO TOWER ROAD		
Inspection Date:	10/06/2009	**Barrier Rating:**	16.70

Barrier Description

Type:	OTHER: LOG RAIL ON LOG POSTS	**Barrier Function:**	NON-TRAFFIC
Barrier Material:	LOG/TIMBER/WOOD	**Post Material:**	WOOD
Blockout Type:	N/A	**Length (ft.):**	433
Speed Limit (MPH):	35	**Placement with Respect to Road:**	NON-TRAFFIC BARRIER
Hazard Behind Barrier:	N/A		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	N/A	**Is Barrier Crashworthy?:**	N/A
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	20	**Width (In.):**	0.0	**Post Spacing (In.):**	0.0
Height (In.):	23.2	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 2-4in above the assumed 20-in design height.
	Breaking and Cracking:	No breaking or cracking in the barrier length.
	Missing Elements:	No missing elements.
	Corrrosion and Weathering:	No weathering corrosion or erosion for the length of barrier.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0010G-120.268-R**		
Route Name:	CANYON TO TOWER ROAD		
Inspection Date:	10/06/2009	**Barrier Rating:**	16.70

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010G: CANYON TO TOWER ROAD

Barrier Condition Photos

YELL_0010G_120.268_R_1.jpg

Barrier ID:	**YELL-0010G-120.401-R**		
Route Name:	CANYON TO TOWER ROAD		
Inspection Date:	10/06/2009	**Barrier Rating:**	68.60

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	750
Speed Limit (MPH):	35	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	20.3	**Post Spacing (In.):**	71.5
Height (In.):	8.8	**Lateral Offset (In.):**	85.4	**Road Grade (%):**	3.30

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 200-ft was 3-6in below the 18in/24in crenellated design height and 550-ft was 6-16in below.
	Breaking and Cracking:	End point stones are loose.
	Missing Elements:	End section crenellation missing.
	Corrrosion and Weathering:	No corrosion or weathering.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0010G-120.401-R**		
Route Name:	CANYON TO TOWER ROAD		
Inspection Date:	10/06/2009	**Barrier Rating:**	68.60

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$588280
Brief Workorder:	Raise guardwall 9-in. Remove and reset 550-ft of stone masonry guardwall on concrete footer to adjacent crenellated 12-in/18-in height.				
Workorder:	Remove & reset stone masonry guardwall at $250- per -Cu. Ft. for 1870 CF = $467500. [(2ft)(1.7ft)(550ft)] = 1870 CF. Structural Concrete at $1000- per -Cu. Yd. for 26 CY = $26000. [(1.7ft)(0.75ft)(550ft)] /27 = 25.9 CY. Low Speed Traffic Control at $1475- per -Day for 28 Day(s) = $41300. 6 days removal 22 days installation.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010G: CANYON TO TOWER ROAD

Barrier Condition Photos

YELL_0010G_120.401_R_1.jpg

Barrier ID:	**YELL-0010G-120.573-R**		
Route Name:	CANYON TO TOWER ROAD		
Inspection Date:	10/06/2009	**Barrier Rating:**	17.10

Barrier Description

Type:	OTHER: LOG RAIL ON LOG POSTS	**Barrier Function:**	NON-TRAFFIC
Barrier Material:	LOG/TIMBER/WOOD	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	105
Speed Limit (MPH):	35	**Placement with Respect to Road:**	NON-TRAFFIC BARRIER
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	N/A	**Is Barrier Crashworthy?:**	N/A
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	20	**Width (In.):**	0.0	**Post Spacing (In.):**	95.3
Height (In.):	21.0	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was between 1in below to 3in above the assumed 20-in design height.
	Breaking and Cracking:	Minor breaking/cracking on some of the logs.
	Missing Elements:	No missing elements.
	Corrrosion and Weathering:	Only slight weathering/corrosion.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0010G-120.573-R**		
Route Name:	CANYON TO TOWER ROAD		
Inspection Date:	10/06/2009	**Barrier Rating:**	17.10

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010G: CANYON TO TOWER ROAD

Barrier Condition Photos

YELL_0010G_120.573_R_1.jpg

Barrier ID:	**YELL-0010G-120.588-R**		
Route Name:	CANYON TO TOWER ROAD		
Inspection Date:	10/06/2009	**Barrier Rating:**	38.50

Barrier Description

Type:	OTHER: LOG RAIL ON LOG POSTS	**Barrier Function:**	TRAFFIC
Barrier Material:	LOG/TIMBER/WOOD	**Post Material:**	WOOD
Blockout Type:	N/A	**Length (ft.):**	890
Speed Limit (MPH):	35	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	20	**Width (In.):**	0.0	**Post Spacing (In.):**	95.8
Height (In.):	18.6	**Lateral Offset (In.):**	39.7	**Road Grade (%):**	2.90

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 200-ft was 1-5in below the assumed 20-in design height and 674-ft was 1in below to 4in above. 16-ft of guardrail is on the ground.
	Breaking and Cracking:	Minor breaking/cracking in a 20 ft section of the guardrail.
	Missing Elements:	No missing elements.
	Corrrosion and Weathering:	No corrosion/weathering or erosion at barrier length.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0010G-120.588-R**		
Route Name:	CANYON TO TOWER ROAD		
Inspection Date:	10/06/2009	**Barrier Rating:**	38.50

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$4263
Brief Workorder:	Raise 200 feet of barrier to assumed 20-in design height and replace 16 feet of rail.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 200 LF = $2000. Raise 200-ft of barrier to assumed 20-in design height. Replace Rail at $25- per -Lin. Ft. for 16 LF = $400. Replace 16-ft of rail. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010G: CANYON TO TOWER ROAD

Barrier Condition Photos

YELL_0010G_120.588_R_1.jpg

Barrier ID:	**YELL-0010G-120.800-R**		
Route Name:	CANYON TO TOWER ROAD		
Inspection Date:	10/06/2009	**Barrier Rating:**	54.20

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	1381
Speed Limit (MPH):	25	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-1	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	21.0	**Post Spacing (In.):**	74.0
Height (In.):	13.6	**Lateral Offset (In.):**	88.3	**Road Grade (%):**	5.60

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 200-ft was 6-18in below the 18in/24in crenellated design height and 1181-ft was between 6in below to 5in above.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	Missing crenellation from one section another missing 2 feet of stone.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0010G-120.800-R**		
Route Name:	CANYON TO TOWER ROAD		
Inspection Date:	10/06/2009	**Barrier Rating:**	54.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$223850
Brief Workorder:	Raise guardwall 12-in. Remove and reset 200-ft of stone masonry guardwall on concrete footer to adjacent crenellated 12-in/18-in height and replace missing crenellation.				
Workorder:	New Stones at $250- per -Each for 3 Unit(s) = $750. Replace stone for crennelation that is missing. Remove & reset stone masonry guardwall at $250- per -Cu. Ft. for 700 CF = $175000. [(2ft)(1.75ft)(200ft)] = 700 CF. Structural Concrete at $1000- per -Cu. Yd. for 13 CY = $13000. [(1.75ft)(1ft)(200ft)] /27 = 12.9 CY. Low Speed Traffic Control at $1475- per -Day for 10 Day(s) = $14750. 2 days removal 8 days installation.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010G: CANYON TO TOWER ROAD

Barrier Condition Photos

YELL_0010G_120.800_R_1.JPG

Barrier ID:	**YELL-0010H-128.266-R**		
Route Name:	TOWER JUNCTION TO MAMMOTH ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	81.10

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	850
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	20.6	**Post Spacing (In.):**	0.0
Height (In.):	9.0	**Lateral Offset (In.):**	40.7	**Road Grade (%):**	0.90

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 650-ft was 6-16in below the 18in/24in crenellated design height and 200-ft was 1-6in below.
	Breaking and Cracking:	The grout is cracking in several locations filling in with small pebbles.
	Missing Elements:	There are quite a few missing rock/boulder sections.
	Corrrosion and Weathering:	Some lichen growing on the rock wall.
End Treatments	**Alignment and Height:**	NA
	Breaking and Cracking:	NA
	Missing Elements:	NA
	Corrrosion and Weathering:	NA

Barrier ID:	**YELL-0010H-128.266-R**		
Route Name:	TOWER JUNCTION TO MAMMOTH ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	81.10

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$706393
Brief Workorder:	Raise guardwall 12-in. Remove and reset 650-ft of stone masonry guardwall on concrete footer to adjacent crenellated 12-in/18-in height.				
Workorder:	Remove & reset stone masonry guardwall at $250- per -Cu. Ft. for 2210 CF = $552500. [(2ft)(1.7ft)(650ft)] = 2210 CF. Structural Concrete at $1000- per -Cu. Yd. for 41 CY = $41000. [(1.7ft)(1ft)(650ft)] /27 = 40.9 CY. Low Speed Traffic Control at $1475- per -Day for 33 Day(s) = $48675. 7 days removal 26 days installation.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010H: TOWER JUNCTION TO MAMMOTH ROAD

Barrier Condition Photos

YELL_0010H_128.266_R_1.JPG

YELL_0010H_128.266_R_2.JPG

Barrier ID:	**YELL-0010H-131.022-R**		
Route Name:	TOWER JUNCTION TO MAMMOTH ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	74.10

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	496
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	18.2	**Post Spacing (In.):**	0.0
Height (In.):	8.0	**Lateral Offset (In.):**	44.7	**Road Grade (%):**	4.20

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 496-ft was 7-in to 14-in below the 18in/24in crenellated design height.
	Breaking and Cracking:	Some cracking up to 0.5 in wide. A couple of pieces of crenellated stone are cracking and loose.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	Minor weathering lichen growth.
End Treatments	**Alignment and Height:**	NA
	Breaking and Cracking:	NA
	Missing Elements:	NA
	Corrrosion and Weathering:	NA

Barrier ID:	**YELL-0010H-131.022-R**		
Route Name:	TOWER JUNCTION TO MAMMOTH ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	74.10

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$475063
Brief Workorder:	Raise guardwall 10-in. Remove and reset 496-ft stone masonry guardwall on concrete footer to crenellated 18-in/24-in height.				
Workorder:	Remove & reset stone masonry guardwall at $250- per -Cu. Ft. for 1488 CF = $372000. [(2ft)(1.5ft)(496ft)] = 1488 CF. Structural Concrete at $1000- per -Cu. Yd. for 23 CY = $23000. [(1.5ft)(0.8ft)(496ft)] /27 = 22.1 CY. Low Speed Traffic Control at $1475- per -Day for 25 Day(s) = $36875. 5 days removal 20 days installation.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010H: TOWER JUNCTION TO MAMMOTH ROAD

Barrier Condition Photos

YELL_0010H_131.022_R_1.JPG

Barrier ID:	**YELL-0010H-131.151-R**		
Route Name:	TOWER JUNCTION TO MAMMOTH ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	62.70

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	324
Speed Limit (MPH):	45	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	17.7	**Post Spacing (In.):**	0.0
Height (In.):	10.6	**Lateral Offset (In.):**	19.0	**Road Grade (%):**	5.50

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 224-ft was 3-6in below the 18in/24in crenellated design height and 100-ft was 6-13in below.
	Breaking and Cracking:	There is cracking and gaps between stones.
	Missing Elements:	There are two crenellated stones missing.
	Corrrosion and Weathering:	Minor weathering lichen growth on stones.
End Treatments	**Alignment and Height:**	NA
	Breaking and Cracking:	NA
	Missing Elements:	NA
	Corrrosion and Weathering:	NA

Barrier ID:	**YELL-0010H-131.151-R**		
Route Name:	TOWER JUNCTION TO MAMMOTH ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	62.70

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$95013
Brief Workorder:	Raise guardwall 6-in. Remove and reset 100-ft of stone masonry guardwall on concrete footer to adjacent crenellated 12-in/18-in height and replace missing crenellation stones.				
Workorder:	Remove & reset stone masonry guardwall at $250- per -Cu. Ft. for 300 CF = $75000. [(2ft)(1.5ft)(100ft)] = 300 CF. Structural Concrete at $1000- per -Cu. Yd. for 3 CY = $3000. [(1.5ft)(0.5ft)(100ft)] /27 = 2.8 CY. New Stones at $250- per -Each for 4 Unit(s) = $1000. Replace missing crenellation stones. Low Speed Traffic Control at $1475- per -Day for 5 Day(s) = $7375. 1 day removal 4 days installation.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010H: TOWER JUNCTION TO MAMMOTH ROAD

Barrier Condition Photos

YELL_0010H_131.151_R_1.JPG

Barrier ID:	**YELL-0010H-136.976-R**		
Route Name:	TOWER JUNCTION TO MAMMOTH ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	8.60

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	NON-TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	47
Speed Limit (MPH):	45	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	N/A		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	N/A	**Is Barrier Crashworthy?:**	N/A
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	24.0	**Post Spacing (In.):**	0.0
Height (In.):	26.0	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was within 3-in of the 21-in/24-in crenellated design height.
	Breaking and Cracking:	No cracks in stones one crack in grout but still structurally good.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	NA
	Breaking and Cracking:	NA
	Missing Elements:	NA
	Corrrosion and Weathering:	NA

Barrier ID:	**YELL-0010H-136.976-R**		
Route Name:	TOWER JUNCTION TO MAMMOTH ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	8.60

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010H: TOWER JUNCTION TO MAMMOTH ROAD

Barrier Condition Photos

YELL_0010H_136.976_R_1.JPG

Barrier ID:	**YELL-0010H-137.122-R**		
Route Name:	TOWER JUNCTION TO MAMMOTH ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	52.70

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	665
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	20.0	**Post Spacing (In.):**	0.0
Height (In.):	15.0	**Lateral Offset (In.):**	44.0	**Road Grade (%):**	6.20

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height ranged from 6in below to 2in above the 18in/24in crenellated design height.
	Breaking and Cracking:	Loose stones on the crenellated area and severe cracking in the grout.
	Missing Elements:	There are two missing crenellated stones.
	Corrrosion and Weathering:	At the ending end of the barrier erosion is taking place in front of the barrier and wrapping around the end of the barrier due to sheet flow runoff.
End Treatments	**Alignment and Height:**	NA
	Breaking and Cracking:	NA
	Missing Elements:	NA
	Corrrosion and Weathering:	NA

Barrier ID:	**YELL-0010H-137.122-R**		
Route Name:	TOWER JUNCTION TO MAMMOTH ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	52.70

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$20917
Brief Workorder:	Repoint 96sy of barrier replace missing crenellations and add 3cy of structural backfill.				
Workorder:	New Stones at $250- per -Each for 4 Unit(s) = $1000. Replace missing crenellation stones. Re-Point Masonry Barrier at $140- per -Sq. Yd. for 96 SY = $13440. [(1.3ft + 1.7ft + 1.3ft)(200ft)] /9 = 95.6 sy. Structural Backfill at $50- per -Cu. Yd. for 3 CY = $150. Backfill for erosion control. Low Speed Traffic Control at $1475- per -Day for 3 Day(s) = $4425.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010H: TOWER JUNCTION TO MAMMOTH ROAD

Barrier Condition Photos

YELL_0010H_137.122_R_1.JPG

Barrier ID:	**YELL-0010H-137.292-R**		
Route Name:	TOWER JUNCTION TO MAMMOTH ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	57.20

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	725
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	19.0	**Post Spacing (In.):**	0.0
Height (In.):	16.2	**Lateral Offset (In.):**	30.5	**Road Grade (%):**	6.10

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 725-ft was 3-6-in below the 18in/24in crenellated design height.
	Breaking and Cracking:	Cracking between the crenellation and fter.
	Missing Elements:	There are missing sections of crenellated stone.
	Corrrosion and Weathering:	The older stone crenellation was very weathered.
End Treatments	**Alignment and Height:**	NA
	Breaking and Cracking:	NA
	Missing Elements:	NA
	Corrrosion and Weathering:	NA

Barrier ID:	**YELL-0010H-137.292-R**		
Route Name:	TOWER JUNCTION TO MAMMOTH ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	57.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$19542
Brief Workorder:	Repoint 81sy of barrier and replace missing crenellation stones.				
Workorder:	New Stones at $250- per -Each for 8 Unit(s) = $2000. Replace missing crenellation stones. Re-Point Masonry Barrier at $140- per -Sq. Yd. for 81 SY = $11340. [(1ft)(725ft)] /9 = 80.5 SY. Low Speed Traffic Control at $1475- per -Day for 3 Day(s) = $4425.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0010H: TOWER JUNCTION TO MAMMOTH ROAD

Barrier Condition Photos

YELL_0010H_137.292_R_1.JPG

Barrier ID:	**YELL-0011-1.891-R**		
Route Name:	NORTH ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	61.40

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	1435
Speed Limit (MPH):	35	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	23.3	**Lateral Offset (In.):**	36.2	**Road Grade (%):**	2.40

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 250-ft was within 1-in of the 27-in design height 250-ft was between 1 and 3-in below and 1000-ft was more than 3-in below the design height.
	Breaking and Cracking:	There are 20 broken or badly cracked blocks 5 broken, or badly cracked posts and 375ft of damaged rail.
	Missing Elements:	15 missing blocks.
	Corrrosion and Weathering:	No corrosion or weathering associated with this guardrail.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0011-1.891-R**		
Route Name:	NORTH ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	61.40

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$38748
Brief Workorder:	Raise 1250 feet of barrier up to the 27-in design height replace 375-ft of rail 5 posts and 35 blocks.				
Workorder:	Replace rail at $25- per -Lin. Ft. for 375 LF = $9375. Replace 375-ft of damaged rail. Replace block at $30- per -Each for 35 Block(s) = $1050. Replace 35 cracked blocks. Replace post at $100- per -Each for 5 Post(s) = $500. Replace 5 cracked posts. Adjust Guardrail at $10- per -Lin. Ft. for 1250 LF = $12500. Raise 1250-ft of barrier up to the 27-in design height. Low Speed Traffic Control at $1475- per -Day for 8 Day(s) = $11800.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0011: NORTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0011_1.891_R_1.JPG

Barrier ID:	**YELL-0011-2.702-L**		
Route Name:	NORTH ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	36.70

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	313
Speed Limit (MPH):	35	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	25.2	**Lateral Offset (In.):**	50.0	**Road Grade (%):**	0.40

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 163-ft was within 1-in of the 27-in design height and 150-ft was between 1 and 3-in below the design height.
	Breaking and Cracking:	Minor cracking in blocks 30 blocks twisted.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	Minor weathering. Erosion causing 5 posts to tip.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0011-2.702-L**		
Route Name:	NORTH ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	36.70

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$3581
Brief Workorder:	Raise 150-ft of barrier up to the 27-in design height realign twisted blocks and add 2cy of structural backfill.				
Workorder:	Labor at $60- per -Hour for 3 Hrs = $180. Realign twisted blocks. Adjust Guardrail at $10- per -Lin. Ft. for 150 LF = $1500. Raise 150-ft of barrier up to the 27-in design height. Structural Backfill at $50- per -Cu. Yd. for 2 CY = $100. Backfill for erosion control around tipping posts. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0011: NORTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0011_2.702_L_1.JPG

Barrier ID:	**YELL-0011-3.169-L**		
Route Name:	NORTH ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	54.20

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	664
Speed Limit (MPH):	35	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	23.0	**Lateral Offset (In.):**	41.7	**Road Grade (%):**	8.10

Physical Condition

Barrier	**Alignment and Height:**	The alignment was off by more than 12 in and the height was below the design height of 27 in by 2 to 5 ines.
	Breaking and Cracking:	97 posts and 97 blocks damaged. 604 ft of rail damaged.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height was 3-in below the 27-in design height
	Breaking and Cracking:	Minor cracking.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0011-3.169-L**		
Route Name:	NORTH ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	54.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$42906
Brief Workorder:	Replace 604 feet of W-beam barrier and realign 60 feet.				
Workorder:	Remove Guardrail at $10- per -Lin. Ft. for 604 LF = $6040. Remove 604-ft of barrier with damaged rail posts and blocks. W-Beam Strong Post at $35- per -Lin. Ft. for 604 LF = $21140. Replace 604-ft of barrier. Remove & Reset Guardrail at $25- per -Lin. Ft. for 60 LF = $1500. Remove and reset section which is out of alignment. Low Speed Traffic Control at $1475- per -Day for 7 Day(s) = $10325. 3 days removal 3 days installation 1 day remaining work.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0011: NORTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0011_3.169_L_1.JPG

Barrier ID:	**YELL-0011-4.774-L**		
Route Name:	NORTH ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	21.10

Barrier Description

Type:	OTHER: LOG RAIL ON LOG POSTS	**Barrier Function:**	TRAFFIC
Barrier Material:	LOG/TIMBER/WOOD	**Post Material:**	WOOD
Blockout Type:	N/A	**Length (ft.):**	57
Speed Limit (MPH):	25	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	LOW		

Barrier Crashworthiness

Appropriate Test Level:	TL-1	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	20	**Width (In.):**	0.0	**Post Spacing (In.):**	69.1
Height (In.):	24.2	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	1.10

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was between 1 in below to 2 in above the assumed 24-in design height.
	Breaking and Cracking:	No breaking or cracking.
	Missing Elements:	No missing elements.
	Corrrosion and Weathering:	No corrosion or weathering.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0011-4.774-L**		
Route Name:	NORTH ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	21.10

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0011: NORTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0011_4.774_L_1.JPG

Barrier ID:	**YELL-0011-4.779-R**		
Route Name:	NORTH ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	14.00

Barrier Description

Type:	OTHER: LOG RAIL ON LOG POSTS	**Barrier Function:**	TRAFFIC
Barrier Material:	LOG/TIMBER/WOOD	**Post Material:**	WOOD
Blockout Type:	N/A	**Length (ft.):**	20
Speed Limit (MPH):	25	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	LOW		

Barrier Crashworthiness

Appropriate Test Level:	TL-1	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	20	**Width (In.):**	0.0	**Post Spacing (In.):**	99.3
Height (In.):	25.2	**Lateral Offset (In.):**	23.0	**Road Grade (%):**	0.70

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 1-2in above the assumed 24-in design height.
	Breaking and Cracking:	No breaking or cracking.
	Missing Elements:	No missing elements.
	Corrrosion and Weathering:	No corrosion or weathering.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0011-4.779-R**		
Route Name:	NORTH ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	14.00

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0011: NORTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0011_4.779_R_1.JPG

Barrier ID:	**YELL-0011-4.785-L**		
Route Name:	NORTH ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	21.10

Barrier Description

Type:	OTHER: LOG RAIL ON LOG POSTS	**Barrier Function:**	TRAFFIC
Barrier Material:	LOG/TIMBER/WOOD	**Post Material:**	WOOD
Blockout Type:	N/A	**Length (ft.):**	49
Speed Limit (MPH):	25	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	LOW		

Barrier Crashworthiness

Appropriate Test Level:	TL-1	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	20	**Width (In.):**	0.0	**Post Spacing (In.):**	68.6
Height (In.):	26.2	**Lateral Offset (In.):**	6.8	**Road Grade (%):**	1.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 2-3in above the assumed 24-in design height.
	Breaking and Cracking:	No breaking or cracking of logs.
	Missing Elements:	No missing elements.
	Corrrosion and Weathering:	No corrosion or weathering seen on logs.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0011-4.785-L**		
Route Name:	NORTH ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	21.10

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0011: NORTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0011_4.785_L_1.JPG

Barrier ID:	**YELL-0012-7.443-R**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	48.50

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	151
Speed Limit (MPH):	45	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	21.0	**Post Spacing (In.):**	0.0
Height (In.):	13.3	**Lateral Offset (In.):**	25.0	**Road Grade (%):**	2.90

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 111-ft was 3-6-in below the 18in/24in crenellated design height and 40-ft was 6-7in below.
	Breaking and Cracking:	The entire top section of stones is missing in two locations along the wall.
	Missing Elements:	Top section missing stones in two locations.
	Corrrosion and Weathering:	No notable erosion and no noticeable cracks in mortar that could be attributed to weathering or corrosion.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0012-7.443-R**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	48.50

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$46668
Brief Workorder:	Raise guardwall 1-in. Remove and reset 40-ft of stone masonry guardwall on concrete footer to adjacent crenellated 12-in/18-in height.				
Workorder:	New Stones at $250- per -Each for 4 Unit(s) = $1000. Replace missing stones. Remove & Reset Stone Masonry Guardwall at $250- per -Cu. Ft. for 140 CF = $35000. [(2ft)(1.75ft)(40ft)] = 140 CF. Structural Concrete at $1000- per -Cu. Yd. for 2 CY = $2000. [(1.5ft)(.5ft)(40ft)] /27 = 1.3 CY. Low Speed Traffic Control at $1475- per -Day for 3 Day(s) = $4425. 1 day removal 2 days installation.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0012: NORTHEAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0012_7.443_R_1.jpg

Barrier ID:	**YELL-0012-7.618-R**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	58.70

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	154
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	21.2	**Post Spacing (In.):**	0.0
Height (In.):	12.6	**Lateral Offset (In.):**	32.7	**Road Grade (%):**	2.30

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 154-ft was 3-6-in below the 18in/24in crenellated design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion weathering or erosion observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0012-7.618-R**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	58.70

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0012: NORTHEAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0012_7.618_R_1.jpg

Barrier ID:	**YELL-0012-7.764-R**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	64.30

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	608
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	20.2	**Post Spacing (In.):**	0.0
Height (In.):	13.8	**Lateral Offset (In.):**	45.2	**Road Grade (%):**	3.20

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 608-ft was 3-6-in below the 18in/24in crenellated design height.
	Breaking and Cracking:	A 15 ft section of the top row of stones has broken off.
	Missing Elements:	No missing elements.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0012-7.764-R**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	64.30

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$2085
Brief Workorder:	Reattach top row of stones and repoint.				
Workorder:	Re-Point Masonry Barrier at $140- per -Sq. Yd. for 3 SY = $420. [(15ft)(1.75ft)] /9 = 3 SY. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0012: NORTHEAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0012_7.764_R_1.jpg

Barrier ID:	**YELL-0012-8.376-R**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	13.60

Barrier Description

Type:	OTHER: LOG RAIL ON LOG POSTS	**Barrier Function:**	NON-TRAFFIC
Barrier Material:	LOG/TIMBER/WOOD	**Post Material:**	WOOD
Blockout Type:	N/A	**Length (ft.):**	94
Speed Limit (MPH):	45	**Placement with Respect to Road:**	NON-TRAFFIC BARRIER
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	N/A	**Is Barrier Crashworthy?:**	N/A
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	20	**Width (In.):**	0.0	**Post Spacing (In.):**	0.0
Height (In.):	29.6	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 1-9in above the assumed 24-in design height with 60 ft being 5-9in above.
	Breaking and Cracking:	Cracks less than 1/4in wide throughout the entire barrier.
	Missing Elements:	No missing elements.
	Corrrosion and Weathering:	Only minor corrosion and weathering (less than 5% of cross section and less than 8 in around exposed posts).
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0012-8.376-R**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	13.60

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$2283
Brief Workorder:	Lower 60-ft of barrier down to assumed 24-in design height.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 60 LF = $600. Lower 60ft of barrier down to assumed 24-in design height. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0012: NORTHEAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0012_8.376_R_1.jpg

Barrier ID:	**YELL-0012-9.374-R**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	20.70

Barrier Description

Type:	OTHER: LOG RAIL ON LOG POSTS	**Barrier Function:**	NON-TRAFFIC
Barrier Material:	LOG/TIMBER/WOOD	**Post Material:**	WOOD
Blockout Type:	N/A	**Length (ft.):**	164
Speed Limit (MPH):	45	**Placement with Respect to Road:**	NON-TRAFFIC BARRIER
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	N/A	**Is Barrier Crashworthy?:**	N/A
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	18	**Width (In.):**	0.0	**Post Spacing (In.):**	79.3
Height (In.):	27.7	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 3-5in above the assumed 24-in design height.
	Breaking and Cracking:	Cracks less than 1/4in wide throughout the entire barrier.
	Missing Elements:	Missing some of the wood plugs that cover the bolts.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0012-9.374-R**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	20.70

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0012: NORTHEAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0012_9.374_R_1.jpg

Barrier ID:	**YELL-0012-13.260-R**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	49.90

Barrier Description

Type:	OTHER: LOG RAIL ON LOG POSTS	**Barrier Function:**	TRAFFIC
Barrier Material:	LOG/TIMBER/WOOD	**Post Material:**	WOOD
Blockout Type:	N/A	**Length (ft.):**	633
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	20	**Width (In.):**	0.0	**Post Spacing (In.):**	100.0
Height (In.):	26.6	**Lateral Offset (In.):**	23.0	**Road Grade (%):**	0.50

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 2-3in above the assumed 24-in design height.
	Breaking and Cracking:	Minor cracking along most of the rail.
	Missing Elements:	Several barrier reflectors are bent/damaged but still functioning.
	Corrrosion and Weathering:	Very minor signs of corrosion and weathering.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0012-13.260-R**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	49.90

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0012: NORTHEAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0012_13.260_R_1.jpg

Barrier ID:	**YELL-0012-14.783-R**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	13.60

Barrier Description

Type:	OTHER: LOG RAIL ON LOG POSTS	**Barrier Function:**	NON-TRAFFIC
Barrier Material:	LOG/TIMBER/WOOD	**Post Material:**	WOOD
Blockout Type:	N/A	**Length (ft.):**	208
Speed Limit (MPH):	45	**Placement with Respect to Road:**	NON-TRAFFIC BARRIER
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	N/A	**Is Barrier Crashworthy?:**	N/A
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	20	**Width (In.):**	0.0	**Post Spacing (In.):**	78.6
Height (In.):	28.7	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 4-5in above the assumed 24-in design height.
	Breaking and Cracking:	Some minor cracking but barrier still maintains original cross section.
	Missing Elements:	Missing some wood plugs that cover the bolts.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0012-14.783-R**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	13.60

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0012: NORTHEAST ENTRANCE ROAD

Barrier Condition Photos

Condition photos are not available for YELL-0012-14.783-R.

Barrier ID:	**YELL-0012-18.017-R**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	39.70

Barrier Description

Type:	OTHER: LOG RAIL ON LOG POSTS	**Barrier Function:**	TRAFFIC
Barrier Material:	LOG/TIMBER/WOOD	**Post Material:**	WOOD
Blockout Type:	N/A	**Length (ft.):**	400
Speed Limit (MPH):	45	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	20	**Width (In.):**	0.0	**Post Spacing (In.):**	95.6
Height (In.):	25.0	**Lateral Offset (In.):**	22.7	**Road Grade (%):**	3.20

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 0-2in above the assumed 24-in design height.
	Breaking and Cracking:	Some minor cracking throughout the rails.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	Minor weathering and corrosion.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0012-18.017-R**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	39.70

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0012: NORTHEAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0012_18.017_R_1.jpg

Barrier ID:	**YELL-0012-20.687-R**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	32.90

Barrier Description

Type:	OTHER: LOG RAIL ON LOG POSTS	**Barrier Function:**	TRAFFIC
Barrier Material:	LOG/TIMBER/WOOD	**Post Material:**	WOOD
Blockout Type:	N/A	**Length (ft.):**	79
Speed Limit (MPH):	45	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	20	**Width (In.):**	0.0	**Post Spacing (In.):**	101.5
Height (In.):	27.2	**Lateral Offset (In.):**	39.7	**Road Grade (%):**	1.50

Physical Condition

Barrier	**Alignment and Height:**	Alignment is between 6 to 12 in off for 60 ft. Height was 3-4in above the assumed 24-in design height.
	Breaking and Cracking:	Minimal breaking/cracking.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No notable corrosion/weathering.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0012-20.687-R**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	32.90

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$39347
Brief Workorder:	Repair the roadway erosion problem and realign 60 feet of barrier.				
Workorder:	Remove Asphalt Pavement at $10- per -Sq. Yd. for 132 SY = $1320. [(15ft)(79ft)] /9 = 131.6 SY. Base Course at $75- per -Cu. Yd. for 33 CY = $2475. [(15ft)(79ft)(0.75ft)] /27 = 32.9 CY. Asphalt Patch at $175- per -Sq. Yd. for 132 SY = $23100. [(15ft)(79ft)] /9 = 131.6 SY. Remove & Reset Guardrail at $25- per -Lin. Ft. for 60 LF = $1500. Reset misaligned 60ft of barrier. Low Speed Traffic Control at $1475- per -Day for 5 Day(s) = $7375.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0012: NORTHEAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0012_20.687_R_1.jpg

YELL_0012_20.687_R_2.jpg

Barrier ID:	**YELL-0012-20.763-R**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	38.70

Barrier Description

Type:	OTHER: LOG RAIL ON LOG POSTS	**Barrier Function:**	TRAFFIC
Barrier Material:	LOG/TIMBER/WOOD	**Post Material:**	WOOD
Blockout Type:	N/A	**Length (ft.):**	384
Speed Limit (MPH):	45	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	20	**Width (In.):**	0.0	**Post Spacing (In.):**	101.3
Height (In.):	26.2	**Lateral Offset (In.):**	27.6	**Road Grade (%):**	1.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 0-4in above the assumed 24-in design height.
	Breaking and Cracking:	Minimal breaking/cracking.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No notable corrosion/weathering.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0012-20.763-R**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	38.70

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0012: NORTHEAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0012_20.763_R_1.jpg

Barrier ID:	**YELL-0012-22.572-L**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	45.20

Barrier Description

Type:	OTHER: LOG RAIL ON LOG POSTS	**Barrier Function:**	TRAFFIC
Barrier Material:	LOG/TIMBER/WOOD	**Post Material:**	WOOD
Blockout Type:	N/A	**Length (ft.):**	280
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	20	**Width (In.):**	0.0	**Post Spacing (In.):**	100.0
Height (In.):	26.7	**Lateral Offset (In.):**	40.2	**Road Grade (%):**	5.90

Physical Condition

Barrier	**Alignment and Height:**	Alignment off by less than 6 in and the height was 2-4in above the assumed 24-in design height.
	Breaking and Cracking:	Minor cracking (less than 0.5-in wide) along the entire barrier but there is no breaking. One rail with a missing section.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	Minor weathering and corrosion.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0012-22.572-L**		
Route Name:	NORTHEAST ENTRANCE ROAD		
Inspection Date:	10/07/2009	**Barrier Rating:**	45.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$1870
Brief Workorder:	Replace 9-ft of rail.				
Workorder:	Replace Rail at $25- per -Lin. Ft. for 9 LF = $225. Replace 9-ft of rail. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0012: NORTHEAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0012_22.572_L_1.jpg

Barrier ID:	**YELL-0013-5.723-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	42.50

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	1035
Speed Limit (MPH):	45	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	23.7	**Post Spacing (In.):**	0.0
Height (In.):	22.0	**Lateral Offset (In.):**	55.7	**Road Grade (%):**	1.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 3-6in above the 18in/24in crenellated design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0013-5.723-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	42.50

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_5.723_R_1.jpg

Barrier ID:	**YELL-0013-6.065-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	39.70

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	698
Speed Limit (MPH):	45	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	17.5	**Post Spacing (In.):**	0.0
Height (In.):	24.0	**Lateral Offset (In.):**	52.0	**Road Grade (%):**	1.90

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 3-8in above the 18in/24in crenellated design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0013-6.065-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	39.70

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_6.065_R_1.jpg

Barrier ID:	**YELL-0013-6.509-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	35.00

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	111
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	18.0	**Post Spacing (In.):**	0.0
Height (In.):	25.2	**Lateral Offset (In.):**	91.3	**Road Grade (%):**	4.80

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 7-8in above the 18in/24in crenellated design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0013-6.509-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	35.00

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_6.509_R_1.jpg

Barrier ID:	**YELL-0013-6.526-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	13.60

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	NON-TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	171
Speed Limit (MPH):	45	**Placement with Respect to Road:**	NON-TRAFFIC BARRIER
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	N/A	**Is Barrier Crashworthy?:**	N/A
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	18.0	**Post Spacing (In.):**	0.0
Height (In.):	24.0	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 6-in above the 18in/24in crenellated design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0013-6.526-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	13.60

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_6.526_R_1.jpg

Barrier ID:	**YELL-0013-6.552-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	22.60

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	NON-TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	20
Speed Limit (MPH):	45	**Placement with Respect to Road:**	NON-TRAFFIC BARRIER
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	N/A	**Is Barrier Crashworthy?:**	N/A
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	18.0	**Post Spacing (In.):**	0.0
Height (In.):	25.0	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 7-in above the 18in/24in crenellated design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0013-6.552-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	22.60

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_6.552_R_1.jpg

Barrier ID:	**YELL-0013-6.556-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	0.00

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	260
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	18	**Width (In.):**	18.7	**Post Spacing (In.):**	0.0
Height (In.):	27.2	**Lateral Offset (In.):**	93.3	**Road Grade (%):**	1.80

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 9-10 in above the 18in/24in crenellated design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0013-6.556-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	0.00

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_6.556_R_1.jpg

Barrier ID:	**YELL-0013-6.599-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	15.50

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	NON-TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	204
Speed Limit (MPH):	45	**Placement with Respect to Road:**	NON-TRAFFIC BARRIER
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	N/A	**Is Barrier Crashworthy?:**	N/A
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	18.0	**Post Spacing (In.):**	0.0
Height (In.):	25.7	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 7-8 in above the 18in/24in crenellated design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0013-6.599-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	15.50

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_6.599_R_1.jpg

Barrier ID:	**YELL-0013-6.642-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	36.90

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	97
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	18.0	**Post Spacing (In.):**	0.0
Height (In.):	24.7	**Lateral Offset (In.):**	51.2	**Road Grade (%):**	1.90

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 5-8 in above the 18-in/24-in crenellated design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	Minor weathering and corrosion.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0013-6.642-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	36.90

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_6.642_R_1.jpg

Barrier ID:	**YELL-0013-10.280-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	35.40

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	381
Speed Limit (MPH):	45	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BURIED END	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.6
Height (In.):	24.2	**Lateral Offset (In.):**	48.7	**Road Grade (%):**	5.60

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 381-ft was between 1 and 3-in below the 27-in design height.
	Breaking and Cracking:	4 damaged posts and minor cracking throughout. 72-ft of damaged or torn rail.
	Missing Elements:	Multiple turned and loose blocks but no missing elements.
	Corrrosion and Weathering:	No notable damaging corrosion or erosion.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is 3-4in below the 27-in design height.
	Breaking and Cracking:	No broken elements but minor cracking in blocks and posts.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No erosion corrosion for end terminal.

Barrier ID:	**YELL-0013-10.280-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	35.40

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$11743
Brief Workorder:	Raise 381-ft of barrier up to the 27-in design height replace 72-ft of rail 4 posts 4 blocks and realign twisted blocks.				
Workorder:	Replace Rail at $25- per -Lin. Ft. for 72 LF = $1800. Replace 72-ft of rail. Replace Block at $30- per -Each for 4 Block(s) = $120. Replace 4 blocks. Replace Post at $100- per -Each for 4 Post(s) = $400. Replace 4 posts. Adjust Guardrail at $10- per -Lin. Ft. for 381 LF = $3810. Raise 381-ft of barrier up to the 27-in design height. Labor at $60- per -Hour for 2 Hrs = $120. Realign twisted blocks. Low Speed Traffic Control at $1475- per -Day for 3 Day(s) = $4425.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_10.280_R_1.jpg

Barrier ID:	**YELL-0013-10.295-L**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	45.20

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	321
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BURIED END	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BURIED END	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	28.0	**Lateral Offset (In.):**	51.0	**Road Grade (%):**	6.80

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 0-3in above the 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	96 feet of completely burnt and destroyed posts throughout barrier.
	Corrrosion and Weathering:	Corrosion is less than 5% and erosion is minimal around post.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No erosion or corrosion problems with end terminals.

Barrier ID:	**YELL-0013-10.295-L**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	45.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$4752
Brief Workorder:	Replace 96 feet of barrier that was damaged by fire.				
Workorder:	W-Beam Strong Post at $35- per -Lin. Ft. for 96 LF = $3360. Replace 96-ft of barrier destroyed by fire. Remove Guardrail at $10- per -Lin. Ft. for 96 LF = $960. Remove burnt sections of barrier. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_10.295_L_1.jpg

YELL_0013_10.295_L_2.jpg

Barrier ID:	**YELL-0013-10.664-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	26.60

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	332
Speed Limit (MPH):	45	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	26.2	**Lateral Offset (In.):**	56.5	**Road Grade (%):**	2.70

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 282-ft was within 1-in of the 27-in design height 50-ft was between 1 and 3-in below.
	Breaking and Cracking:	No breaking or cracking of any elements.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion of the rail or rail attachments and no notable erosion around posts.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height was 3 in below the 27-in design height.
	Breaking and Cracking:	Post of one of the end treatments is damaged.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No notable corrosion or erosion.

Barrier ID:	**YELL-0013-10.664-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	26.60

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$2283
Brief Workorder:	Raise 50-ft of barrier up to the 27-in design height and replace 1 post.				
Workorder:	Replace Post at $100- per -Each for 1 Post(s) = $100. Adjust Guardrail at $10- per -Lin. Ft. for 50 LF = $500. Raise 50-ft of barrier up to the 27-in design height. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_10.664_R_1.jpg

Barrier ID:	**YELL-0013-13.583-L**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	43.70

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	315
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BURIED END	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	28.2	**Lateral Offset (In.):**	46.7	**Road Grade (%):**	2.30

Physical Condition

Barrier	**Alignment and Height:**	Alignment is off by 6-12 in for 285 ft. Height was 0-2in above the 27-in design height.
	Breaking and Cracking:	Obvious impact damage for 285ft of the barrier.
	Missing Elements:	Various locations throughout with missing bolts.
	Corrrosion and Weathering:	No notable corrosion or weathering.
End Treatments	**Alignment and Height:**	Out of alignment by more than 12 in. Height was 1-3in below the 27-in design height.
	Breaking and Cracking:	Damage to the beginning end treatment.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No notable corrosion or erosion.

Barrier ID:	**YELL-0013-13.583-L**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	43.70

Repair Recommendations

Repair Action:	REPLACE	**FMSS Work Type:**	CAPITAL IMPROVEMENT	**Repair Cost:**	$23155
Brief Workorder:	Replace 285 feet of barrier and 1 end treatment.				
Workorder:	W-beam flared 350 compliant at $3500- per -Each for 1 Unit(s) = $3500. Replace damaged beginning end treatment. W-Beam Strong Post at $35- per -Lin. Ft. for 285 LF = $9975. Replace 285ft of damaged barrier. Remove Guardrail at $10- per -Lin. Ft. for 315 LF = $3150. Remove 315-ft of barrier. Low Speed Traffic Control at $1475- per -Day for 3 Day(s) = $4425.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

Condition photos are not available for YELL-0013-13.583-L.

Barrier ID:	**YELL-0013-19.175-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	61.20

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	1920
Speed Limit (MPH):	35	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	25.7	**Lateral Offset (In.):**	42.2	**Road Grade (%):**	5.30

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 400-ft was within 1-in of the 27-in design height 1049-ft was between 1 and 3-in below. Avalanche destroyed several sections of barrier.
	Breaking and Cracking:	Breaking and cracking observed in several places along the barrier where it was destroyed by avalanche (471ft).
	Missing Elements:	Several missing elements in the sections of barrier hit by avalanche.
	Corrrosion and Weathering:	Severe corrosion and weathering where avalanche impacted the barrier.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height was 2 in below the 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0013-19.175-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	61.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$41030
Brief Workorder:	Replace 471-ft of W-beam barrier and raise 1049-ft of barrier up to the 27-in design height.				
Workorder:	W-Beam Strong Post at $35- per -Lin. Ft. for 471 LF = $16485. Replace 471-ft of barrier destroyed by avalanche. Adjust Guardrail at $10- per -Lin. Ft. for 1049 LF = $10490. Raise 1049-ft of barrier up to the 27-in design height. Low Speed Traffic Control at $1475- per -Day for 7 Day(s) = $10325.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_19.175_R_1.jpg

Barrier ID:	**YELL-0013-19.535-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	20.00

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	NON-TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	210
Speed Limit (MPH):	35	**Placement with Respect to Road:**	NON-TRAFFIC BARRIER
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	N/A	**Is Barrier Crashworthy?:**	N/A
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	19.0	**Post Spacing (In.):**	0.0
Height (In.):	27.7	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 7-9in above the 18in/24in crenellated design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0013-19.535-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	20.00

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_19.535_R_1.jpg

Barrier ID:	**YELL-0013-19.579-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	40.00

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	1496
Speed Limit (MPH):	35	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	18.0	**Post Spacing (In.):**	0.0
Height (In.):	22.6	**Lateral Offset (In.):**	43.4	**Road Grade (%):**	5.50

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 3-6in above the 18in/24in crenellated design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0013-19.579-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	40.00

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_19.579_R_1.jpg

Barrier ID:	**YELL-0013-19.863-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	47.00

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	540
Speed Limit (MPH):	35	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.3
Height (In.):	25.0	**Lateral Offset (In.):**	54.2	**Road Grade (%):**	5.80

Physical Condition

Barrier	**Alignment and Height:**	Alignment 6-12in off for 300 ft. Height is 3 in below the 27-in design height.
	Breaking and Cracking:	Numerous impact locations 96ft of bent/torn rail 3 damaged posts and 3 damaged blocks.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Both end treatments were 6-12in below the 27-in design height.
	Breaking and Cracking:	Both end treatments badly damaged from impact.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No notable corrosion/weathering or erosion.

Barrier ID:	**YELL-0013-19.863-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	47.00

Repair Recommendations

Repair Action:	REPLACE	**FMSS Work Type:**	CAPITAL IMPROVEMENT	**Repair Cost:**	$19597
Brief Workorder:	Raise 300 feet of barrier up to the 27-in design height replace 96-ft of rail 2 end treatments 3 posts and 3 blocks.				
Workorder:	W-beam flared 350 compliant at $3500- per -Each for 2 Unit(s) = $7000. Replace 2 end treatments. Replace Post at $100- per -Each for 3 Post(s) = $300. Replace damaged posts. Replace Rail at $25- per -Lin. Ft. for 96 LF = $2400. Replace 96-ft of rail. Replace Block at $30- per -Each for 3 Block(s) = $90. Replace damaged blocks. Remove Guardrail at $10- per -Lin. Ft. for 60 LF = $600. Remove two end treatments. Adjust Guardrail at $10- per -Lin. Ft. for 300 LF = $3000. Raise 300-ft of barrier up to the 27-in design height. Low Speed Traffic Control at $1475- per -Day for 3 Day(s) = $4425.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_19.863_R_1.jpg

Barrier ID:	**YELL-0013-19.983-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	61.20

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	2698
Speed Limit (MPH):	35	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.3
Height (In.):	25.6	**Lateral Offset (In.):**	37.9	**Road Grade (%):**	5.30

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 298-ft was within 1-in of the 27-in design height 2400-ft was between 1 and 3-in below.
	Breaking and Cracking:	Numerous places of damaged barrier. 96 ft of bent/torn rail.
	Missing Elements:	3 missing posts and blocks.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is 1-3in below the 27-in design height.
	Breaking and Cracking:	Numerous posts in beginning end treatment damaged or not attached.
	Missing Elements:	Missing bolts on ending end treatment.
	Corrrosion and Weathering:	No notable corrosion/weathering or erosion.

Barrier ID:	**YELL-0013-19.983-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/13/2009	**Barrier Rating:**	61.20

Repair Recommendations

Repair Action:	REPLACE	**FMSS Work Type:**	CAPITAL IMPROVEMENT	**Repair Cost:**	$55677
Brief Workorder:	Raise 2400-ft of barrier up to the 27-in design height replace 2 end treatments 96-ft of rail 3 posts and 3 blocks.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 2400 LF = $24000. Raise 2400-ft of barrier up to the 27-in design height. Remove Guardrail at $10- per -Lin. Ft. for 60 LF = $600. Remove two 30-ft end treatments prior to installing new ones. W-beam flared 350 compliant at $3500- per -Each for 2 Unit(s) = $7000. Install new end treatments. Replace Rail at $25- per -Lin. Ft. for 96 LF = $2400. Replace damaged rail sections. Replace Post at $100- per -Each for 3 Post(s) = $300. Replace 3 posts. Replace Block at $30- per -Each for 3 Block(s) = $90. Replace 3 blocks. Low Speed Traffic Control at $1475- per -Day for 11 Day(s) = $16225.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_19.983_R_1.jpg

Barrier ID:	**YELL-0013-20.515-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	50.20

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	1195
Speed Limit (MPH):	40	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	25.7	**Lateral Offset (In.):**	35.7	**Road Grade (%):**	4.20

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 650-ft was within 1-in of the 27-in design height 545-ft was between 1 and 3-in below.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0013-20.515-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	50.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$10863
Brief Workorder:	Raise 545-ft of barrier up to the 27-in design height.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 545 LF = $5450. Raise 545-ft of barrier up to the 27-in design height. Low Speed Traffic Control at $1475- per -Day for 3 Day(s) = $4425.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_20.515_R_1.JPG

Barrier ID:	**YELL-0013-20.740-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	47.20

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	766
Speed Limit (MPH):	40	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	18.7	**Post Spacing (In.):**	0.0
Height (In.):	23.8	**Lateral Offset (In.):**	38.4	**Road Grade (%):**	5.70

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 4-7in above the 18in/24in crenellated design height.
	Breaking and Cracking:	No breaking or cracking.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0013-20.740-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	47.20

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_20.740_R_1.JPG

Barrier ID:	**YELL-0013-20.911-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	45.90

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	2698
Speed Limit (MPH):	40	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	RIGID W-BEAM - W-BEAM
Ending End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	26.0	**Lateral Offset (In.):**	35.5	**Road Grade (%):**	5.20

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 2100-ft was within 1-in of the 27-in design height 598-ft was between 1 and 3-in below.
	Breaking and Cracking:	There are 36 posts and 15 blocks that are cracked.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0013-20.911-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	45.90

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$15901
Brief Workorder:	Raise 598-ft of barrier up to the 27-in design height and replace 15 blocks and 36 posts.				
Workorder:	Replace block at $30- per -Each for 15 Block(s) = $450. Replace 15 blocks Replace post at $100- per -Each for 36 Post(s) = $3600. Replace 36 posts. Adjust Guardrail at $10- per -Lin. Ft. for 598 LF = $5980. Raise 598-ft of barrier up to the 27-in design height. Low Speed Traffic Control at $1475- per -Day for 3 Day(s) = $4425.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_20.911_R_1.JPG

Barrier ID:	**YELL-0013-21.444-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	50.00

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	4322
Speed Limit (MPH):	40	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	RIGID W-BEAM - W-BEAM
Ending End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.5
Height (In.):	26.3	**Lateral Offset (In.):**	42.0	**Road Grade (%):**	5.30

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 2932-ft was within 1-in of the 27-in design height 1400-ft was between 1 and 3-in below.
	Breaking and Cracking:	84 ft of bent rail and 17 posts with significant cracking.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	Slight cracking in blocks.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0013-21.444-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	50.00

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$29315
Brief Workorder:	Raise 1400 L.F. of rail up to design height of 27 inches replace 84-ft of rail and 17 posts.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 1400 LF = $14000. Raise 1400-ft of barrier up to the 27-in design height. Replace rail at $25- per -Lin. Ft. for 84 LF = $2100. Replace damaged sections of rail. Replace post at $100- per -Each for 17 Post(s) = $1700. Replace cracked posts. Low Speed Traffic Control at $1475- per -Day for 6 Day(s) = $8850.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_21.444_R_1.JPG

Barrier ID:	**YELL-0013-22.280-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	48.40

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	4365
Speed Limit (MPH):	40	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	RIGID W-BEAM - W-BEAM
Ending End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	74.9
Height (In.):	26.6	**Lateral Offset (In.):**	33.2	**Road Grade (%):**	4.30

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 3365-ft was within 1-in of the 27-in design height 1000-ft was between 1 and 3-in below.
	Breaking and Cracking:	There is no breaking or cracking. 168 ft of damaged rail.
	Missing Elements:	There is 1 shattered post and block.
	Corrrosion and Weathering:	There is no corrosion or weathering.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0013-22.280-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/14/2009	**Barrier Rating:**	48.40

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$24976
Brief Workorder:	Raise 1000-ft of barrier up to the 27-in design height replace 168-ft of rail 11 posts and 1 block.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 1000 LF = $10000. Raise 1000-ft of barrier up to the 27-in design height. Replace post at $100- per -Each for 11 Post(s) = $1100. Replace cracked posts. Replace rail at $25- per -Lin. Ft. for 168 LF = $4200. Replace damaged rail. Replace Block at $30- per -Each for 1 Block(s) = $30. Low Speed Traffic Control at $1475- per -Day for 5 Day(s) = $7375.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_22.280_R_1.JPG

Barrier ID:	**YELL-0013-23.121-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	48.40

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	3857
Speed Limit (MPH):	40	**Placement with Respect to Road:**	BOTH INSIDE AND OUTSIDE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	RIGID W-BEAM - W-BEAM
Ending End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	26.1	**Lateral Offset (In.):**	34.5	**Road Grade (%):**	5.30

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 3107-ft was within 1-in of the 27-in design height 750-ft was between 1 and 3-in below.
	Breaking and Cracking:	100 cracked posts and 50 cracked blocks.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No notable corrosion/weathering or erosion.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	48 ft of bent rail on the approach end.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No notable corrosion/weathering or erosion.

Barrier ID:	**YELL-0013-23.121-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	48.40

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$30333
Brief Workorder:	Raise 750-ft of barrier up to the 27-in design height replace 48-ft of rail 100 posts and 50 blocks.				
Workorder:	Replace post at $100- per -Each for 100 Post(s) = $10000. Replace cracked posts. Replace block at $30- per -Each for 50 Block(s) = $1500. Replace cracked blocks. Replace rail at $25- per -Lin. Ft. for 48 LF = $1200. Replace 48-ft of rail. Adjust Guardrail at $10- per -Lin. Ft. for 750 LF = $7500. Raise 750-ft of barrier up to the 27-in design height. Low Speed Traffic Control at $1475- per -Day for 5 Day(s) = $7375.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_23.121_R_1.JPG

Barrier ID:	**YELL-0013-24.662-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	35.20

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	368
Speed Limit (MPH):	40	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	19.2	**Post Spacing (In.):**	0.0
Height (In.):	23.0	**Lateral Offset (In.):**	36.0	**Road Grade (%):**	5.40

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 3-8in above the 18in/24in crenellated design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	NA
	Breaking and Cracking:	NA
	Missing Elements:	NA
	Corrrosion and Weathering:	NA

Barrier ID:	**YELL-0013-24.662-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	35.20

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

Condition photos are not available for YELL-0013-24.662-R.

Barrier ID:	**YELL-0013-25.230-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	30.80

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	270
Speed Limit (MPH):	40	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	18.2	**Post Spacing (In.):**	0.0
Height (In.):	22.2	**Lateral Offset (In.):**	39.7	**Road Grade (%):**	0.90

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 4-5in above the 18in/24in crenellated design height.
	Breaking and Cracking:	One 9 ft section of crenellation was cracking and breaking.
	Missing Elements:	The same 9 ft section of crenellation has a stone missing.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0013-25.230-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	30.80

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$2206
Brief Workorder:	Repoint 2-SY of crenellation and replace missing stone.				
Workorder:	Re-point masonry barrier at $140- per -Sq. Yd. for 2 SY = $280. [(9ft)(2ft)] /9 = 2 SY. New Stones at $250- per -Each for 1 Unit(s) = $250. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_25.230_R_1.JPG

Barrier ID:	**YELL-0013-26.033-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	15.10

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	WOOD	**Length (ft.):**	338
Speed Limit (MPH):	15	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-1	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	RIGID W-BEAM - W-BEAM
Ending End Trtmt Type:	W-BEAM FLARED 350 COMPLIANT	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	74.3
Height (In.):	27.7	**Lateral Offset (In.):**	66.0	**Road Grade (%):**	0.80

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Entire barrier is between 1-in below to 2-in above the 27-in design height.
	Breaking and Cracking:	15 posts have vertical cracks.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	End treatments and rail are rusty.

Barrier ID:	**YELL-0013-26.033-R**		
Route Name:	EAST ENTRANCE ROAD		
Inspection Date:	10/10/2009	**Barrier Rating:**	15.10

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$3273
Brief Workorder:	Replace 15 posts.				
Workorder:	Replace Post at $100- per -Each for 15 Post(s) = $1500. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0013: EAST ENTRANCE ROAD

Barrier Condition Photos

YELL_0013_26.033_R_1.JPG

Barrier ID:	**YELL-0014-8.206-R**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	57.00

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	88
Speed Limit (MPH):	45	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	17.7	**Post Spacing (In.):**	0.0
Height (In.):	9.7	**Lateral Offset (In.):**	59.2	**Road Grade (%):**	2.10

Physical Condition

Barrier	**Alignment and Height:**	Ending end has 7ft of rock pushed out of alignment. Height was 8-9in below the 18in/24in crenellated design height.
	Breaking and Cracking:	No breaking or cracking observed. Barrier was partially covered with snow.
	Missing Elements:	No missing elements observed. Barrier was partially covered with snow.
	Corrrosion and Weathering:	No corrosion or weathering observed. Barrier was partially covered with snow.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0014-8.206-R**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	57.00

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$85113
Brief Workorder:	Raise guardwall 8-in. Remove and reset 88-ft stone masonry guardwall on concrete footer to crenellated 18-in/24-in height.				
Workorder:	Remove & Reset Stone Masonry Guardwall at $250- per -Cu. Ft. for 264 CF = $66000. [(2ft)(1.5ft)(88ft)] = 264 CF. Structural Concrete at $1000- per -Cu. Yd. for 4 CY = $4000. [(1.5ft)(0.67ft)(88ft)] /27 = 3.3 CY. Low Speed Traffic Control at $1475- per -Day for 5 Day(s) = $7375. 1 day removal 4 days installation.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_8.206_R_1.JPG

Barrier ID:	**YELL-0014-9.687-R**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	68.50

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	250
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	18.2	**Post Spacing (In.):**	0.0
Height (In.):	9.3	**Lateral Offset (In.):**	22.2	**Road Grade (%):**	1.10

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 80-ft was 3-6-in below the 18-in/24-in crenellated design height and 170-ft was 6-12in below.
	Breaking and Cracking:	No breaking or cracking observed. Barrier was partially covered with snow.
	Missing Elements:	No missing elements observed. Barrier was partially covered with snow.
	Corrrosion and Weathering:	No corrosion or weathering observed. Barrier was partially covered with snow.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0014-9.687-R**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	68.50

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$160353
Brief Workorder:	Raise guardwall 3-in. Remove and reset 170-ft of stone masonry guardwall on concrete footer to adjacent crenellated 12-in/18-in height.				
Workorder:	Remove & Reset Stone Masonry Guardwall at $250- per -Cu. Ft. for 510 CF = $127500. [(2ft)(1.5ft)(170ft)] = 510 CF. Structural Concrete at $1000- per -Cu. Yd. for 5 CY = $5000. [(1.5ft)(.5ft)(170ft)] /27 = 4.7 CY. Low Speed Traffic Control at $1475- per -Day for 9 Day(s) = $13275. 2 days removal 7 days installation.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_9.687_R_1.JPG

Barrier ID:	**YELL-0014-9.753-R**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	64.10

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	280
Speed Limit (MPH):	45	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	18.5	**Post Spacing (In.):**	124.6
Height (In.):	8.5	**Lateral Offset (In.):**	54.7	**Road Grade (%):**	1.80

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 7-12in below the 18in/24in crenellated design height.
	Breaking and Cracking:	No breaking or cracking observed. Barrier was partially covered with snow.
	Missing Elements:	No missing elements observed. Barrier was partially covered with snow.
	Corrrosion and Weathering:	No corrosion or weathering observed. Barrier was partially covered with snow.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0014-9.753-R**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	64.10

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$269638
Brief Workorder:	Raise guardwall 10-in. Remove and reset 280-ft stone masonry guardwall on concrete footer to crenellated 18-in/24-in height.				
Workorder:	Remove & Reset Stone Masonry Guardwall at $250- per -Cu. Ft. for 840 CF = $210000. [(2ft)(1.5ft)(280ft)] = 840 CF. Structural Concrete at $1000- per -Cu. Yd. for 13 CY = $13000. [(1.5ft)(.8ft)(280ft)] /27 = 12.4 CY. Low Speed Traffic Control at $1475- per -Day for 15 Day(s) = $22125. 3 days removal 12 days installation.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_9.753_R_1.JPG

Barrier ID:	**YELL-0014-13.738-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	77.30

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	650
Speed Limit (MPH):	45	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	18.2	**Post Spacing (In.):**	0.0
Height (In.):	2.2	**Lateral Offset (In.):**	32.5	**Road Grade (%):**	2.50

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 15-18in below the 18in/24in crenellated design height.
	Breaking and Cracking:	Several blocks broken. Barrier was partially covered with snow.
	Missing Elements:	10 blocks missing. Barrier was partially covered with snow.
	Corrrosion and Weathering:	No corrosion or weathering observed. Barrier was partially covered with snow.
End Treatments	**Alignment and Height:**	NA
	Breaking and Cracking:	NA
	Missing Elements:	NA
	Corrrosion and Weathering:	NA

Barrier ID:	**YELL-0014-13.738-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	77.30

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$641493
Brief Workorder:	Raise guardwall 16-in. Remove and reset 650-ft stone masonry guardwall on concrete footer to crenellated 18-in/24-in height. Replace missing stones.				
Workorder:	Remove & Reset Stone Masonry Guardwall at $250- per -Cu. Ft. for 1950 CF = $487500. [(2ft)(1.5ft)(650ft)] = 1950 CF. Structural Concrete at $1000- per -Cu. Yd. for 47 CY = $47000. [(1.5ft)(1.3ft)(650ft)] /27 = 46.9 CY. Low Speed Traffic Control at $1475- per -Day for 33 Day(s) = $48675. 7 days removal 26 days installation.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_13.738_L_1.JPG

Barrier ID:	**YELL-0014-14.429-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	54.50

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	GALVANIZED STEEL
Blockout Type:	STEEL	**Length (ft.):**	765
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	74.8
Height (In.):	24.5	**Lateral Offset (In.):**	25.0	**Road Grade (%):**	1.30

Physical Condition

Barrier	**Alignment and Height:**	The alignment is off by more than 12 in and the height is 2 to 3 in below the design height of 27 ines for 765 ft.
	Breaking and Cracking:	275 ft of damaged rail and 12 bent posts.
	Missing Elements:	15 missing blocks. Bolts missing throughout barrier.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	One end treatment is missing.
	Breaking and Cracking:	Torn and broken rail.
	Missing Elements:	One end treatment is missing.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0014-14.429-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	54.50

Repair Recommendations

Repair Action:	REPLACE	**FMSS Work Type:**	CAPITAL IMPROVEMENT	**Repair Cost:**	$29755
Brief Workorder:	Raise 765-ft of barrier up to the 27-in design height replace one end treatment 275-ft of rail 12 posts and 15 blocks.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 765 LF = $7650. Raise 765-ft of barrier up to the 27-in design height. W-beam tangent 350 compliant at $3500- per -Each for 1 Unit(s) = $3500. Replace missing/broken off end treatment. Replace Rail at $25- per -Lin. Ft. for 275 LF = $6875. Replace 275-ft of rail. Replace Post at $100- per -Each for 12 Post(s) = $1200. Replace bent posts. Replace Block at $30- per -Each for 15 Block(s) = $450. Replace 15 blocks. Low Speed Traffic Control at $1475- per -Day for 5 Day(s) = $7375.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_14.429_L_1.JPG

Barrier ID:	**YELL-0014-14.576-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	58.70

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	118
Speed Limit (MPH):	45	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	18.7	**Post Spacing (In.):**	0.0
Height (In.):	6.3	**Lateral Offset (In.):**	33.7	**Road Grade (%):**	1.40

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 11-12in below the 18in/24in crenellated design height.
	Breaking and Cracking:	No breaking or cracking observed. Barrier was partially covered with snow.
	Missing Elements:	No missing elements observed. Barrier was partially covered with snow.
	Corrrosion and Weathering:	No corrosion or weathering observed. Barrier was partially covered with snow.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0014-14.576-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	58.70

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$123008
Brief Workorder:	Raise guardwall 12-in. Remove and reset 118-ft stone masonry guardwall on concrete footer to crenellated 18-in/24-in height.				
Workorder:	Remove & Reset Stone Masonry Guardwall at $250- per -Cu. Ft. for 378 CF = $94500. [(2ft)(1.6ft)(118ft)] = 377.6 CF. Structural Concrete at $1000- per -Cu. Yd. for 7 CY = $7000. [(1.6ft)(1ft)(118ft)] /27 = 6.9 CY. Low Speed Traffic Control at $1475- per -Day for 7 Day(s) = $10325. 2 days removal 5 days installation.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_14.576_L_1.JPG

Barrier ID:	**YELL-0014-14.702-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	56.00

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	GALVANIZED STEEL
Blockout Type:	STEEL	**Length (ft.):**	724
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	76.5
Height (In.):	25.7	**Lateral Offset (In.):**	36.2	**Road Grade (%):**	1.40

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 374-ft was within 1-in of the 27-in design height 350-ft was between 1 and 3-in below.
	Breaking and Cracking:	Snowplow impacted and damaged 348ft of barrier (rail posts and blocks).
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0014-14.702-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	56.00

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$30811
Brief Workorder:	Raise 350-ft of barrier up to the 27-in design height and replace 348-ft of barrier.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 350 LF = $3500. Raise 350-ft of barrier up to the 27-in design height. W-Beam Strong Post at $35- per -Lin. Ft. for 348 LF = $12180. Replace 348-ft of damaged barrier. Remove Guardrail at $10- per -Lin. Ft. for 348 LF = $3480. Remove 348-ft of damaged barrier. Low Speed Traffic Control at $1475- per -Day for 6 Day(s) = $8850. 2 days removal 2 days installation 2 days all other work.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_14.702_L_1.JPG

Barrier ID:	**YELL-0014-14.936-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	48.00

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	NON-TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	215
Speed Limit (MPH):	45	**Placement with Respect to Road:**	NON-TRAFFIC BARRIER
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	N/A	**Is Barrier Crashworthy?:**	N/A
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	19.5	**Post Spacing (In.):**	0.0
Height (In.):	12.5	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 145ft was 0-6in below the 18in/24in crenellated design height and 70ft was 6-14in below.
	Breaking and Cracking:	No breaking or cracking observed. Barrier was partially covered with snow.
	Missing Elements:	No missing elements observed. Barrier was partially covered with snow.
	Corrrosion and Weathering:	No corrosion or weathering observed. Barrier was partially covered with snow.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0014-14.936-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	48.00

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$71390
Brief Workorder:	Raise guardwall 6-in. Remove and reset 70-ft of stone masonry guardwall on concrete footer to adjacent crenellated 12-in/18-in height.				
Workorder:	Remove & Reset Stone Masonry Guardwall at $250- per -Cu. Ft. for 224 CF = $56000. [(2ft)(1.6ft)(70ft)] = 224 CF. Structural Concrete at $1000- per -Cu. Yd. for 3 CY = $3000. [(1.6ft)(.5ft)(70ft)] /27 = 2.1 CY. Low Speed Traffic Control at $1475- per -Day for 4 Day(s) = $5900. 1 day removal 3 days installation.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_14.936_L_1.JPG

Barrier ID:	**YELL-0014-15.081-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	33.00

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	NON-TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	GALVANIZED STEEL
Blockout Type:	STEEL	**Length (ft.):**	117
Speed Limit (MPH):	45	**Placement with Respect to Road:**	NON-TRAFFIC BARRIER
Hazard Behind Barrier:	N/A		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	N/A	**Is Barrier Crashworthy?:**	N/A
Beg. End Trtmt Type:	W-BEAM BURIED END	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.3
Height (In.):	21.0	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Entire barrier is between 4-10in below the 27-in design height.
	Breaking and Cracking:	14 ft of severely bent rail.
	Missing Elements:	Rail has slipped from 4 posts and bolts are missing.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height was 4-in below the 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0014-15.081-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	33.00

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$3427
Brief Workorder:	Raise 117-ft of barrier up to the 27-in design height and replace 14-ft of rail.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 117 LF = $1170. Raise 117-ft of barrier up to the 27-in design height. Replace Rail at $25- per -Lin. Ft. for 14 LF = $350. Replace 14-ft of damaged rail. Labor at $60- per -Hour for 2 Hrs = $120. Reattach rail that has slipped and replace missing bolts. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_15.081_L_1.JPG

Barrier ID:	**YELL-0014-15.103-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	39.70

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	GALVANIZED STEEL
Blockout Type:	STEEL	**Length (ft.):**	262
Speed Limit (MPH):	45	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	MEDIUM		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BURIED END	**Ending End Trtmt Crashhworthy?:**	YES		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	71.0
Height (In.):	23.7	**Lateral Offset (In.):**	38.7	**Road Grade (%):**	3.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Entire barrier is between 2-4in below the 27-in design height.
	Breaking and Cracking:	2 bent posts 2 damaged blocks and 14ft of bent rail.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height was 3-in below the 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0014-15.103-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	39.70

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$6798
Brief Workorder:	Raise 262-ft of barrier up to the 27-in design height replace 14-ft of rail 2 posts and 2 blocks.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 262 LF = $2620. Raise 262-ft of barrier up to the 27-in design height. Replace Post at $100- per -Each for 2 Post(s) = $200. Replace bent posts. Replace Block at $30- per -Each for 2 Block(s) = $60. Replace damaged blocks Replace Rail at $25- per -Lin. Ft. for 14 LF = $350. Replace 14-ft of bent rail. Low Speed Traffic Control at $1475- per -Day for 2 Day(s) = $2950.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_15.103_L_1.JPG

Barrier ID:	**YELL-0014-15.658-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	48.70

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	GALVANIZED STEEL
Blockout Type:	STEEL	**Length (ft.):**	500
Speed Limit (MPH):	45	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	25.2	**Lateral Offset (In.):**	21.2	**Road Grade (%):**	0.30

Physical Condition

Barrier	**Alignment and Height:**	136 ft is out of alignment by 6-12in. Entire barrier is between 2-3in below the 27-in design height.
	Breaking and Cracking:	136 ft of damaged/impacted rail.
	Missing Elements:	Loose and missing bolts throughout the barrier.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height was 2-in below the 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0014-15.658-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	48.70

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$14306
Brief Workorder:	Raise 500-ft of barrier up to the 27-in design height replace 136-ft of rail and tighten loose bolts.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 500 LF = $5000. Raise 500-ft of barrier up to the 27-in design height. Replace Rail at $25- per -Lin. Ft. for 136 LF = $3400. Replace 136-ft of damaged rail. Labor at $60- per -Hour for 3 Hrs = $180. Tighten loose bolts. Low Speed Traffic Control at $1475- per -Day for 3 Day(s) = $4425.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_15.658_L_1.JPG

Barrier ID:	**YELL-0014-16.091-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	40.20

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	GALVANIZED STEEL
Blockout Type:	STEEL	**Length (ft.):**	920
Speed Limit (MPH):	45	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BURIED END	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	74.8
Height (In.):	26.0	**Lateral Offset (In.):**	27.3	**Road Grade (%):**	2.70

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 627-ft was within 1-in of the 27-in design height 293-ft was between 1 and 3-in below.
	Breaking and Cracking:	93 ft of damaged rail.
	Missing Elements:	7 missing posts and 12 missing blocks.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height was 2-in below the 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0014-16.091-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	40.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$10192
Brief Workorder:	Raise 293-ft of barrier up to the 27-in design height replace 93-ft of rail 7 posts and 12 blocks.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 293 LF = $2930. Raise 293-ft of barrier up to the 27-in design height. Replace Rail at $25- per -Lin. Ft. for 93 LF = $2325. Replace 93-ft of rail. Replace Post at $100- per -Each for 7 Post(s) = $700. Replace missing posts. Replace Block at $30- per -Each for 12 Block(s) = $360. Replace missing blocks. Low Speed Traffic Control at $1475- per -Day for 2 Day(s) = $2950.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_16.091_L_1.JPG

Barrier ID:	**YELL-0014-16.272-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	41.50

Barrier Description

Type:	STONE MASONRY CRENELLATED WITHOUT	**Barrier Function:**	NON-TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	144
Speed Limit (MPH):	45	**Placement with Respect to Road:**	NON-TRAFFIC BARRIER
Hazard Behind Barrier:	N/A		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	N/A	**Is Barrier Crashworthy?:**	N/A
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	19.0	**Post Spacing (In.):**	0.0
Height (In.):	8.3	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 144-ft was 8-in to 11-in below the 18-in/24-in crenellated design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0014-16.272-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	41.50

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$147455
Brief Workorder:	Raise guardwall 10-in. Remove and reset 144-ft stone masonry guardwall on concrete footer to crenellated 18-in/24-in height.				
Workorder:	Remove & Reset Stone Masonry Guardwall at $250- per -Cu. Ft. for 461 CF = $115250. [(2ft)(1.6ft)(144ft)] = 460.8 CF. Structural Concrete at $1000- per -Cu. Yd. for 7 CY = $7000. [(1.6ft)(.8ft)(144ft)] /27 = 6.8 CY. Low Speed Traffic Control at $1475- per -Day for 8 Day(s) = $11800. 2 days removal 6 days installation.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_16.272_L_1.JPG

Barrier ID:	**YELL-0014-16.299-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	41.70

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	GALVANIZED STEEL
Blockout Type:	STEEL	**Length (ft.):**	202
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.3
Height (In.):	25.0	**Lateral Offset (In.):**	52.0	**Road Grade (%):**	0.40

Physical Condition

Barrier	**Alignment and Height:**	The alignment is off by 6 to 12 in for 24 ft. 135ft was within 1in of the 27-in design height 24ft was 1-3in below and 43ft was 4in below.
	Breaking and Cracking:	43ft of bent/torn rail and 11 bent posts.
	Missing Elements:	18 missing blocks.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	Rail is bent on both end treatments.
	Missing Elements:	Missing bolts throughout end treatments.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0014-16.299-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	41.70

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$7101
Brief Workorder:	Raise 67-ft of barrier up to the 27-in design height replace 43-ft of rail 11 posts 18 blocks and missing bolts.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 67 LF = $670. Raise 67-ft of barrier up to the 27-in design height. Replace Rail at $25- per -Lin. Ft. for 43 LF = $1075. Replace 43-ft of rail. Replace Post at $100- per -Each for 11 Post(s) = $1100. Replace bent posts. Replace Block at $30- per -Each for 18 Block(s) = $540. Replace missing blocks. Labor at $60- per -Hour for 2 Hrs = $120. Replace missing bolts. Low Speed Traffic Control at $1475- per -Day for 2 Day(s) = $2950.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_16.299_L_1.JPG

Barrier ID:	**YELL-0014-16.694-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	34.50

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	GALVANIZED STEEL
Blockout Type:	STEEL	**Length (ft.):**	389
Speed Limit (MPH):	45	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BURIED END	**Is Beg. End Trtmt Crashhworthy?:**	YES	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.3
Height (In.):	24.2	**Lateral Offset (In.):**	24.2	**Road Grade (%):**	6.90

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 250-ft was within 1-in of the 27-in design height 139-ft was between 1 and 3-in below.
	Breaking and Cracking:	41ft of w-beam is bent and torn; 4 posts are broken and bent.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0014-16.694-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	34.50

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$4851
Brief Workorder:	Raise 139-ft of barrier up to the 27-in design height replace 41-ft of rail 4 posts and 4 blocks.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 139 LF = $1390. Raise 139-ft of barrier up to the 27-in design height. Replace Rail at $25- per -Lin. Ft. for 41 LF = $1025. Replace 41-ft of rail. Replace Post at $100- per -Each for 4 Post(s) = $400. Replace bent posts. Replace Block at $30- per -Each for 4 Block(s) = $120. Replace broken blocks Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_16.694_L_1.JPG

Barrier ID:	**YELL-0014-16.766-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	8.60

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	NON-TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	GALVANIZED STEEL
Blockout Type:	STEEL	**Length (ft.):**	81
Speed Limit (MPH):	45	**Placement with Respect to Road:**	NON-TRAFFIC BARRIER
Hazard Behind Barrier:	N/A		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	N/A	**Is Barrier Crashworthy?:**	N/A
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.3
Height (In.):	26.0	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	Few minor dents in top of guard rail.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0014-16.766-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	8.60

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_16.766_L_1.JPG

Barrier ID:	**YELL-0014-16.781-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	22.70

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	GALVANIZED STEEL
Blockout Type:	STEEL	**Length (ft.):**	98
Speed Limit (MPH):	45	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	HIGH		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	76.3
Height (In.):	26.2	**Lateral Offset (In.):**	38.7	**Road Grade (%):**	4.30

Physical Condition

Barrier	**Alignment and Height:**	Alignment is off by 6-12in for 60ft. 65ft was within 1-in of the 27-in design height and 33ft was 1-3in below.
	Breaking and Cracking:	27ft of damaged rail.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0014-16.781-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	22.70

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$3025
Brief Workorder:	Raise 60-ft of barrier up to the 27-in design height correct alignment and replace 27-ft of rail.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 60 LF = $600. Raise 60-ft of barrier up to the 27-in design height and correct alignment. Replace Rail at $25- per -Lin. Ft. for 27 LF = $675. Replace 27-ft of rail. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_16.781_L_1.JPG

Barrier ID:	**YELL-0014-16.927-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	41.70

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	GALVANIZED STEEL
Blockout Type:	STEEL	**Length (ft.):**	304
Speed Limit (MPH):	45	**Placement with Respect to Road:**	INSIDE OF CURVE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	73.6
Height (In.):	23.2	**Lateral Offset (In.):**	27.7	**Road Grade (%):**	6.90

Physical Condition

Barrier	**Alignment and Height:**	The alignment is between 6 to 12 in off for the barrier length. The height is 3 to 5 in below the design height of 27 ines for the barrier length.
	Breaking and Cracking:	112ft of damaged rail. 6 posts bent and broken away from rail.
	Missing Elements:	Missing bolts on 6 posts.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	The alignment is greater than 12 in off for the end sections and the height is 3-5in below the 27-in design height.
	Breaking and Cracking:	Severely bent rail.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0014-16.927-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	41.70

Repair Recommendations

Repair Action:	REPLACE	**FMSS Work Type:**	CAPITAL IMPROVEMENT	**Repair Cost:**	$25328
Brief Workorder:	Realign and raise 304-ft of barrier up to 27-in design height replace 2 end treatments 112-ft of rail and 6 posts.				
Workorder:	Replace Rail at $25- per -Lin. Ft. for 112 LF = $2800. Replace Post at $100- per -Each for 6 Post(s) = $600. Remove & Reset Guardrail at $25- per -Lin. Ft. for 304 LF = $7600. Remove Guardrail at $10- per -Lin. Ft. for 60 LF = $600. Remove both end treatments. W-beam flared 350 compliant at $3500- per -Each for 2 Unit(s) = $7000. Replace damaged end treatments. Low Speed Traffic Control at $1475- per -Day for 3 Day(s) = $4425.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_16.927_L_1.JPG

Barrier ID:	**YELL-0014-17.247-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	40.20

Barrier Description

Type:	W-BEAM STRONG POST	**Barrier Function:**	TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	GALVANIZED STEEL
Blockout Type:	STEEL	**Length (ft.):**	476
Speed Limit (MPH):	45	**Placement with Respect to Road:**	OUTSIDE OF CURVE
Hazard Behind Barrier:	EXTREME		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	TL-3	**Is Barrier Crashworthy?:**	YES
Beg. End Trtmt Type:	W-BEAM BCT	**Is Beg. End Trtmt Crashhworthy?:**	NO	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	W-BEAM BCT	**Ending End Trtmt Crashhworthy?:**	NO		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.0
Height (In.):	26.0	**Lateral Offset (In.):**	86.0	**Road Grade (%):**	4.80

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. 180-ft was within 1-in of the 27-in design height 72-ft was between 1 and 3-in below.
	Breaking and Cracking:	96ft of damaged rail.
	Missing Elements:	6 damaged blockouts and posts.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height is within 1-in of 27-in design height.
	Breaking and Cracking:	Bent rail.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0014-17.247-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	40.20

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$5913
Brief Workorder:	Raise 72-ft of barrier up to the 27-in design height replace 96-ft of rail 6 posts and 6 blocks.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 72 LF = $720. Raise 72-ft of barrier up to the 27-in design height. Replace Rail at $25- per -Lin. Ft. for 96 LF = $2400. Replace 96-ft of damaged rail. Replace Post at $100- per -Each for 6 Post(s) = $600. Replace galvanized posts. Replace Block at $30- per -Each for 6 Block(s) = $180. Replace steel blockouts. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_17.247_L_1.JPG

Barrier ID:	**YELL-0014-20.136-R**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	42.00

Barrier Description

Type:	STONE MASONRY WITHOUT CONCRETE CORE WALL	**Barrier Function:**	NON-TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	206
Speed Limit (MPH):	35	**Placement with Respect to Road:**	NON-TRAFFIC BARRIER
Hazard Behind Barrier:	N/A		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	N/A	**Is Barrier Crashworthy?:**	N/A
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	18.1	**Post Spacing (In.):**	0.0
Height (In.):	15.8	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 8-13in below the 24-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0014-20.136-R**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/12/2009	**Barrier Rating:**	42.00

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$201520
Brief Workorder:	Raise guardwall 11-in. Remove and reset 206-ft of stone masonry guardwall on concrete footer to design height of 24-in.				
Workorder:	Remove & Reset Stone Masonry Guardwall at $250- per -Cu. Ft. for 618 CF = $154500. [(2ft)(1.5ft)(206ft)] = 618 CF. Structural Concrete at $1000- per -Cu. Yd. for 11 CY = $11000. [(1.5ft)(.9ft)(206ft)] /27 = 10.3 CY. Low Speed Traffic Control at $1475- per -Day for 12 Day(s) = $17700. 3 days removal 9 days installation.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_20.136_R_1.JPG

Barrier ID:	**YELL-0014-20.137-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	43.70

Barrier Description

Type:	STONE MASONRY WITHOUT CONCRETE CORE WALL	**Barrier Function:**	NON-TRAFFIC
Barrier Material:	STONE	**Post Material:**	N/A
Blockout Type:	N/A	**Length (ft.):**	232
Speed Limit (MPH):	45	**Placement with Respect to Road:**	NON-TRAFFIC BARRIER
Hazard Behind Barrier:	N/A		

Barrier Crashworthiness

Appropriate Test Level:	TL-2	**Barrier Test Level:**	N/A	**Is Barrier Crashworthy?:**	N/A
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	19.0	**Post Spacing (In.):**	0.0
Height (In.):	14.0	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 7-12in below the 24-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0014-20.137-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	43.70

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$237518
Brief Workorder:	Raise guardwall 10-in. Remove and reset 232-ft of stone masonry guardwall on concrete footer to design height of 24-in.				
Workorder:	Remove & Reset Stone Masonry Guardwall at $250- per -Cu. Ft. for 743 CF = $185750. [(2ft)(1.6ft)(232ft)] = 742.4 CF. Structural Concrete at $1000- per -Cu. Yd. for 11 CY = $11000. [(1.6ft)(.8ft)(232ft)] /27 = 10.9 CY. Low Speed Traffic Control at $1475- per -Day for 13 Day(s) = $19175. 3 days removal 10 days installation.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_20.137_L_1.JPG

Barrier ID:	**YELL-0014-21.362-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	11.10

Barrier Description

Type:	OTHER: LOG RAIL ON LOG POSTS	**Barrier Function:**	TRAFFIC
Barrier Material:	LOG/TIMBER/WOOD	**Post Material:**	WOOD
Blockout Type:	N/A	**Length (ft.):**	80
Speed Limit (MPH):	15	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	LOW		

Barrier Crashworthiness

Appropriate Test Level:	TL-1	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	24	**Width (In.):**	12.0	**Post Spacing (In.):**	96.0
Height (In.):	23.0	**Lateral Offset (In.):**	24.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was within 1-in of the assumed 24-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0014-21.362-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	11.10

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_21.362_L_1.JPG

Barrier ID:	**YELL-0014-21.380-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	11.10

Barrier Description

Type:	OTHER: LOG RAIL ON LOG POSTS	**Barrier Function:**	TRAFFIC
Barrier Material:	OTHER: LOG	**Post Material:**	WOOD
Blockout Type:	N/A	**Length (ft.):**	120
Speed Limit (MPH):	15	**Placement with Respect to Road:**	TANGENT
Hazard Behind Barrier:	LOW		

Barrier Crashworthiness

Appropriate Test Level:	TL-1	**Barrier Test Level:**	NCW	**Is Barrier Crashworthy?:**	NO
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	20	**Width (In.):**	12.0	**Post Spacing (In.):**	96.0
Height (In.):	23.0	**Lateral Offset (In.):**	30.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was within 1-in of the assumed 24-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	
	Breaking and Cracking:	
	Missing Elements:	
	Corrrosion and Weathering:	

Barrier ID:	**YELL-0014-21.380-L**		
Route Name:	SOUTH ENTRANCE ROAD		
Inspection Date:	10/08/2009	**Barrier Rating:**	11.10

Repair Recommendations

Repair Action:	NO ACTION	**FMSS Work Type:**	N/A	**Repair Cost:**	$0
Brief Workorder:	N/A				
Workorder:					

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0014: SOUTH ENTRANCE ROAD

Barrier Condition Photos

YELL_0014_21.380_L_1.JPG

Barrier ID:	**YELL-0904D-0.000-P1**		
Route Name:	GRANT SERVICE STATION PARKING		
Inspection Date:	10/12/2009	**Barrier Rating:**	8.80

Barrier Description

Type:	W-BEAM WEAK POST	**Barrier Function:**	NON-TRAFFIC
Barrier Material:	WEATHERING STEEL/CORTEN	**Post Material:**	WOOD
Blockout Type:	N/A	**Length (ft.):**	29
Speed Limit (MPH):	15	**Placement with Respect to Road:**	NON-TRAFFIC BARRIER
Hazard Behind Barrier:	N/A		

Barrier Crashworthiness

Appropriate Test Level:	TL-1	**Barrier Test Level:**	TL-2	**Is Barrier Crashworthy?:**	N/A
Beg. End Trtmt Type:	NONE	**Is Beg. End Trtmt Crashhworthy?:**	N/A	**Approach Transition Type:**	NONE
Ending End Trtmt Type:	NONE	**Ending End Trtmt Crashhworthy?:**	N/A		

Average Measurements

Design Height (In.):	27	**Width (In.):**	0.0	**Post Spacing (In.):**	75.1
Height (In.):	24.0	**Lateral Offset (In.):**	0.0	**Road Grade (%):**	0.00

Physical Condition

Barrier	**Alignment and Height:**	Alignment acceptable. Height was 3 in below the 27-in design height.
	Breaking and Cracking:	One post with 2-in wide vertical crack for entire post.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.
End Treatments	**Alignment and Height:**	Alignment acceptable. Height was 3 in below the 27-in design height.
	Breaking and Cracking:	No breaking or cracking observed.
	Missing Elements:	No missing elements observed.
	Corrrosion and Weathering:	No corrosion or weathering observed.

Barrier ID:	**YELL-0904D-0.000-P1**		
Route Name:	GRANT SERVICE STATION PARKING		
Inspection Date:	10/12/2009	**Barrier Rating:**	8.80

Repair Recommendations

Repair Action:	REPAIR	**FMSS Work Type:**	DEFERRED MAINTENANCE	**Repair Cost:**	$1942
Brief Workorder:	Raise 29-ft of barrier up to the 27-in design height.				
Workorder:	Adjust Guardrail at $10- per -Lin. Ft. for 29 LF = $290. Raise 29ft of barrier up to the 27-in design height. Low Speed Traffic Control at $1475- per -Day for 1 Day(s) = $1475.				

2008 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Yellowstone National Park

ROUTE 0904D: GRANT SERVICE STATION PARKING

Barrier Condition Photos

Condition photos are not available for YELL-0904D-0.000-P1.

Appendix A
Summary of GIP Definitions and Assessment

Yellowstone National Park

Federal Lands Highway
Road Inventory Program

Appendix A:
Guardwall/Rail Inventory Program (GIP)
EXPLANATION OF REPORT TERMS

The Guardwall/rail Inventory Program (GIP) was commissioned by WASO to identify deferred maintenance related to barriers in National Parks that have more than one mile of guardwall or guardrail. GIP was designed jointly by the NPS and FHWA and the inventory process records both static characteristics of the barrier (e.g., length, height, etc.) as well as dynamic information about the condition of the barrier.

Barriers that traverse bridges are not included in this inventory, these barriers are covered in FHWA's Bridge Inventory Program (BIP); however, barriers that are approaches to bridges were part of this inventory.

The following discussion highlights each of the elements found in the reports.

Static Barrier Characteristics

BARRIER TYPE

Refers to both the design and the construction materials used:

- W-Beam, Strong Post
- W-Beam, Weak Post
- Thrie Beam/Modified Thrie Beam
- Box Beam
- Steel-Backed Timber, w/ Blockout
- Steel-Backed Timber, w/o Blockout
- Steel-Backed Log Rail
- High Tension Cable
- Three-Strand Cable
- Stone Masonry, w/o Concrete Core Wall
- Stone Masonry, w/ Concrete Core Wall
- Random Rubble Cavity Wall
- Concrete Barrier
- Concrete, with Simulated Stone Face
- W-Beam (Double Face), Strong Post
- Steel-Backed Timber (Double Face)
- Other: *Completed by field crew*

BARRIER MATERIAL

The type of material of which the barrier is composed:

- Cable
- Concrete
- Galvanized Steel
- Log/Timber/Wood
- Steel-Backed Timber/Log
- Weathering Steel/Corten
- Stone
- Other: *Completed by field crew*

LENGTH

The longitudinal distance between the beginning and end of the barrier. It should include the length of end treatments in the overall length of the barrier. For roadside barriers, this can be calculated from the start and end locations.

BARRIER FUNCTION: Traffic or Non-Traffic Barrier.
Due to the different GIP assessment criteria of barriers based on their intended use, barriers were classified as being either traffic barriers or non-traffic barriers.

> *Traffic barriers* are physical devices intended to keep vehicles or people from straying into dangerous or off-limits areas. For the purpose of this inventory and assessment, a traffic barrier is categorized as roadside hardware placed longitudinally, excluding pedestrian railing and fencing.
>
> *Non-traffic barriers* provide a physical delineation between public access areas and restricted or protected areas in locations such as a parking lot, viewpoint or turnout. Non-traffic barriers which inhibit access of vehicles are included in this report; non-traffic barriers which only inhibit access of pedestrians or bicyclists are not included. For the purpose of this inventory, non-traffic barriers are guidewalls and guiderails. Note: rocks, stones, boulders, fences or curbs were excluded from this inventory.

There are instances in parks where a single barrier can switch between being classified as a traffic barrier and a non-traffic barrier. Such instances typically occur at pullouts, where a traffic barrier along the road will continue through the pullout without interruption. In such instances, the traffic barrier and non-traffic barrier were assessed using different criteria. Due to the different criteria, the GIP database was designed to record the traffic barrier and non-traffic barrier as two distinct barriers, even though to the eye, they appear as one barrier. Other instances where a single barrier is split into multiple barriers would be when the barrier is placed continuously along two legs of an intersection, so that one portion of the barrier may be on one road and the remaining portion of the barrier is on a different road.

POST MATERIAL
The type or material that the barrier's supporting posts are made of:

- Galvanized Steel
- Wood
- Corten
- Other: *Completed by field crew*
- N/A

BLOCKOUT TYPE

The type of blockout or of what it is comprised:

- Wood
- Plastic
- Steel
- N/A

BARRIER PLACEMENT WITH RESPECT TO ROADWAY
To identify the roadway alignment the barrier is located upon:

- Tangent
- Inside of Curve
- Both Inside and Outside of Curve
- Outside of Curve

POSTED SPEED LIMIT
The posted speed limit of the roadway section.

HAZARD BEHIND BARRIER

A qualitative description of the severity of the hazard behind the barrier:

- Low
- Medium
- High
- Extreme

APPROPRIATE TEST LEVEL (TL) FOR ROAD

Based on the posted speed limit, the NCHRP 350 Crashworthiness test level appropriate for the roadway.

- TL-1, 30 mph and lower
- TL-2, 35-45 mph
- TL-3, 50 mph and higher

BARRIER TEST LEVEL (TL)

A traffic barrier is crashworthy if it was successfully crash tested under *NCHRP Report 350* at speeds along the park road or parkway or if it was accepted through analysis by FHWA, based on similarity to other crashworthy critical design element features. Non-traffic barriers are classified at N/A.

- TL-1
- TL-2
- TL-3
- No
- N/A – Non-Traffic Barrier

IS BARRIER CRASHWORTHY

This compared the appropriate crashworthy test level required for the posted speed limit to the barrier's test level.

- Yes
- No

BEGINNING END TREATMENT TYPE

An end treatment is safety hardware that mitigates impacts to the ends of a barrier. Most common end treatments are for w-beam systems. Note that stonemasonry barriers typically do not have end treatments.

The beginning end treatment is based on the travel lane closest to the barrier. A vehicle traveling in the lane closest to the barrier will encounter the barrier's beginning end treatment first. It is not based on the RIP primary direction. Identifies the barrier's beginning end treatment type:

- W-Beam Flared 350 Compliant
- W-Beam Tangent 350 Complaint
- W-Beam Buried End
- W-Beam Trailing End/CRG
- W-Beam BCT, Flared
- W-Beam, Turn Down
- SBT/Log, Flared
- SBT/Log, Buried
- Median Treatments
- Box Beam
- Cable
- Crash Cushions/Attenuator
- Other: *Completed by field crew*
- None

IS BEGINNING END TREATMENT CRASHWORTHY

Identifies if the barrier's beginning end treatment (based on direction of travel for the travel lane closest to barrier) is crashworthy, based on NCHRP-350.

- Yes
- No
- N/A

APPROACH TRANSITION TYPE

A transition is safety hardware designed to be placed between two different types of barrier. Most common transition types are between bridge rail and w-beam systems.

This identifies the barrier's transition type:

- Bridge Rail, W-Beam
- Bridge Rail, SBT
- Rigid W-Beam, W-Beam
- Rigid SBT (Wall), SBT
- Concrete/Masonry, W-Beam
- Concrete/Masonry, SBT
- Concrete/Masonry, Thrie Beam
- Other: *Completed by field crew*
- None

ENDING END TREATMENT TYPE

The ending end treatment is based on the travel lane closest to the barrier. A vehicle traveling in the lane closest to the barrier will encounter the barrier's ending end treatment last, after passing the rest of the barrier. It is not based on the RIP primary direction. Identifies the barrier's ending end treatment type:

- W-Beam Flared 350 Compliant
- W-Beam Tangent 350 Complaint
- W-Beam Buried End
- W-Beam Trailing End/CRG
- W-Beam BCT, Flared
- W-Beam, Turn Down
- SBT/Log, Flared
- SBT/Log, Buried
- Median Treatments
- Box Beam
- Cable
- Crash Cushions/Attenuator
- Other: *Completed by field crew*
- None

IS ENDING END TREATMENT CRASHWORTHY

Identifies if the barrier's ending end treatment (based on direction of travel for the travel lane closest to barrier) is crashworthy, based on NCHRP-350.

- Yes
- No
- N/A

BARRIER DESIGN HEIGHT

Identifies the barrier's original "as-built" design height:

- 27-in, W-beam, Steel-Backed Timber, Stone Masonry w/ Concrete Core Wall
- 24-in, Stone Masonry w/o Concrete Core Wall, Log on Log
- 20-in, Timber on Wood Posts, Timber on Concrete Posts, Timber on Granite Posts
- 18/24-in, Crenellated Stone Masonry Barrier
- 18/24-in, Dry Stack Stone Wall
- 31-in, Steel-Backed Log
- 32-in, Jersey Barrier

AVERAGE MEASUREMENTS

Minimum of three measurements taken on each barrier.

First measurement approximately 50-ft from the beginning of the barrier, measured from the extreme ends of the barrier's end treatment/transition. Do not take a measurement along the end treatment
Measure and record measurement every 200-ft thereafter for the run of barrier

Last measurement approximately 50-ft from the end of the barrier. Do not take a measurement along the end treatment
If a barrier is less than 300-ft, even say 45-ft, a minimum of three measurements were still taken.

AVERAGE WIDTH

The width of the barrier. Only recorded for guardwalls; not guardrail.

AVERAGE POST SPACING

The spacing of the barrier's (not the end treatments') posts. Only recorded for guardrails; not guardwalls or non-traffic barriers.

AVERAGE BARRIER HEIGHT

The average barrier height. If the barrier has crenellations, the height is measured in the non-crenellated sections of the barrier. If the average lateral offset is less than or equal to 4-ft, average barrier height is measured from the roadway; if the average lateral offset is greater than 4-ft, average barrier height is measured at the barrier face.

AVERAGE LATERAL OFFSET

Determine the average distance between the barrier and the edge of roadway. If a white edgeline is present on the roadway, average lateral offset is measured from the outside edge of the white line to the barrier face. If no white edgeline is present, average lateral offset is measured from the edge of pavement to the barrier face.

AVERAGE ROAD GRADE and UPHILL OR DOWNHILL

Determine an average roadway grade at each barrier location, based on the direction of travel in the lane closest to the barrier.

DYNAMIC BARRIER CHARACTERISTICS – CONDITION ASSESSMENT NARRATIVES

Field crews were directed to write a narrative of the barrier's physical condition. To keep consistency between field crews, all narratives were based on severity and distress criteria, which were developed jointly by the NPS and FHWA. Condition assessments were based on barrier type and can be found directly after this description of report elements.

BARRIER ALIGNMENT/HEIGHT

Narrative completed by field crew describing the barrier's alignment and height. Height comments are based on the barrier's original "as-built" design height.

BARRIER BREAKING/CRACKING

Narrative completed by field crew describing any barrier breaking or cracking found during the inspection.

BARRIER MISSING ELEMENTS

Narrative completed by field crew describing any barrier missing elements encountered during the inspection.

BARRIER CORROSION/WEATHERING

Narrative completed by field crew describing and corrosion or weathering issues associated with the barrier.

END TREATMENTS ALIGNMENT/HEIGHT

Narrative completed by field crew describing the barrier end treatment's alignment and height, when present. Height comments are based on the end treatment's original "as-built" design height.

END TREATMENTS BREAKING/CRACKING

Narrative completed by field crew describing any barrier end treatment's breaking or cracking found during the inspection.

END TREATMENTS MISSING ELEMENTS

Narrative completed by field crew describing any barrier end treatment missing elements encountered during the inspection.

END TREATMENTS CORROSION/WEATHERING

Narrative completed by field crew describing and corrosion or weathering issues associated with the barrier's end treatments.

BARRIER PHOTOGRAPHS

During the inspection, the field crews photographed the beginning end (based on the closest lane's direction of travel) of each barrier. Additional photographs were taken of any unusual deficiencies encountered. Up to two photographs of the barrier are included in this report.

CONDITION AND SEVERITY DISTRESS TABLES

Due to the extreme number of possible conditions of the barrier, transition and end treatment, the following descriptions and matrices are guidelines created to help classify the condition of the element. While the distinction between good and fair is needed, the distinction between fair and poor is much more important since this is the threshold that defines if the element is slightly compromised or is not functional.

In all likelihood, according to these guidelines different portions of an element (most likely a barrier) may be classified differently; however, a single classification will need to be provided for the element. The survey team will use their professional judgment to determine this single classification. The single classification of each element should be considered an index value that provides a general indicator of overall performance, but not necessarily indicate that a specific treatment is warranted. The specific work order that is prepared based on the observed deficiencies will be a much more definitive indicator of the appropriate treatment based on existing distresses. The overall condition will be used as part of the risk assessment tool to evaluate the risk to driver safety associated with the physical condition of the barrier.

GOOD

The barrier performs as intended. The barrier is in fairly straight alignment but may have some small amount that is slightly out of alignment. While the height of the barrier may vary over its run, the height is relatively consistent and is close to its original "as-built" design height. Minor cracks may be visually observed on some the posts, though these cracks are neither long nor deep and the only hardware missing are isolated nuts and bolts. Minor surface corrosion on small portions of the surface is visible but there is no decay associated with connections.

The end treatment performs as intended. The end treatment is in good alignment and tension is acceptable. While the end treatment may exhibit some dents, there are no cracked rails, posts, blocks or any missing elements. Corrosion and erosion, while present, are at a minimum.

In general, all distresses observed, either in isolation or in combination, do not seriously affect the ability of the element to serve the intended functions of protecting drivers from a roadside hazard and/or contributing to the cultural value of the roadway corridor. Keep in mind that "intended function" is a relative term. In many cases, older designs were "intended" to protect drivers but would not be considered fully functional in that regard by today's standards.

FAIR

The barrier is slightly compromised. The barrier is noticeably out of alignment and the height along the run of barrier varies considerably. Cracks and broken elements are visible from the roadside. The barrier may be missing elements, such as nuts, bolts, blockouts or even a post. Surface corrosion is visible on a fair amount of the barrier but connections will still provide element interlock. Decay and minor erosion, while not always visible, may begin to reduce element strength and individual post stability.

The end treatment is slightly compromised. The end treatment may be somewhat out of alignment, have low cable anchor tension or isolated broken or cracked rail, posts or blocks. Corrosion and erosion are evident.

In general, the distresses observed, either in isolation or combination, may generate unpredictable outcomes related to the functions of the element stated above.

POOR

The barrier is not functional. The barrier will not function as intended. Any of the following could mean that the barrier is in poor condition: The barrier has fallen out of alignment or its height varies greatly from the designed height. Cracks and broken elements are visible from the roadside. The barrier is missing several elements, such as nuts, bolts, blockouts or consecutive posts. Corrosion, causing structural compromise is significant and obvious. Erosion around posts will reduce the barrier's strength and capacity.

The end treatment is not functional. The end treatment does not function as intended. There is no tension in the cable anchor. A significant portion of the end treatment has broken, cracked or dented elements. Elements are missing and corrosion or erosion is significant.

In general, the distresses observed clearly illustrate the inability of the element to perform the intended functions.

CONDITION AND SEVERITY DISTRESS TABLES – BARRIERS

Condition and Severity Distress Table for Semi-Rigid Barriers (including barriers with posts, rail elements and blocks).

	GOOD	FAIR	POOR
Alignment/Design Height			
	• Alignment off by less than 6”	• Alignment off by 6”-12”	• Alignment off by more than 12”
	• Within 1” of ***design height***	• Less than 3” lower than ***design height***	• Greater than 3” lower than ***design height***
Breaking/Cracking, an member, post or rail – due to impact loading			
	• Metal – no twisting/bending, tears or cracking	• Metal – no cracking or tearing (but minor twisting/bending is ok)	• Metal – any cracks or tears
	• Wood – no impact related cracking	• Wood – maybe cracked but retains original cross section	• Wood – cracks or tears that deform original section
	• Isolated broken blocks	• Two Consecutive broken blocks	• Consecutive broken blocks (three or more consecutive)
Missing Elements			
	• No bolts and nuts missing	• One or two bolt/nut missing at one rail/rail connection	• Three or more bolts/nuts missing at one rail/rail connection
	• n/a	• Two consecutive missing blocks	• Three or more consecutive missing blocks
	• n/a	• n/a	• One missing rail element or post
Corrosion/Decay/Weathering, all posts, rails and blocks – due to aging			
	• Loss of 5% or less of cross section	• Loss of 5% to 50% of cross section	• Loss of 50% or more of cross section
	• Erosion (less than 8” of post exposed below original groundline)	• Erosion around posts (8” or more of post exposed below original groundline) for one	• Erosion around consecutive posts (more than 8” of post exposed below original groundline)

Condition and Severity Distress Table for Rigid Concrete Barriers (including pre-cast).

	GOOD	FAIR	POOR
Alignment/Design Height			
	• Alignment off by less than 6”	• Alignment off by 6”-12”	• Alignment off by more than 12”
	• Within 1” of *design height*	• Less than 3” lower than *design height*	• Greater than 3” lower than *design height*
Breaking/Cracking– due to impact loading			
	• Minor cracks (less than ¼”) present	• Cracking present ¼” or greater but no displacement or discontinuity in face	• Barrier displaced and/or discontinuous
	• n/a	• Pieces broken from barrier 3” deep or less without exposing rebar	• Cracking exposes rebar
	• n/a	• n/a	• Pieces broken from face greater than 3” deep
Missing Elements			
	• n/a	• n/a	• n/a
Corrosion/Decay/Weathering – due to aging			
	• Surface corrosion on less than 5% of the run	• Surface corrosion on between 5-25% of the run	• Surface corrosion on more than 25% of the run
	• n/a	• Spalling 3” deep or less without exposing rebar	• Spalling greater than 3” deep
	• Erosion (less than 8” below groundline) around base	• Erosion (8” or more below groundline) around base	• Erosion (8” or more below groundline)
	• n/a	• Less than 50% undermined (less than half barrier width)	• 50% or more undermined (less than half barrier width)

Condition and Severity Distress Table for Rigid Stone/Masonry Barriers (including all types of stone or masonry barriers).

	GOOD	FAIR	POOR
Alignment/Design Height			
	• Alignment (off by less than 6”)	• Alignment (off by 6”-12”)	• Alignment (off by more than 12”)
	• Within 3” of *design height*	• Between 3.1 - 6” lower than *design height*	• Greater than 6.1” lower than *design height*
Breaking/Cracking – due to impact loading			
	• Minor cracks (less than ¼”) present	• Cracks, less than ½” present	• Cracks greater than ½” present
		• Stones broken/displaced extending less than 1/3 of width of barrier	• Stones broken/displaced extending 1/3 width or more through the barrier
Missing Elements			
	• n/a	• n/a	• n/a
Corrosion/Decay/Weathering – due to aging			
	• Cracks in mortar joints 1/4” or less and/or single loose or missing stones	• Mortar joints deteriorated resulting in two - three loose or missing adjacent stones (without impact)	• Mortar joints deteriorated resulting in more than three continuous/adjacent loose or missing stones (without impact)
	• Erosion (less than 8” below groundline) around base	• Erosion (8” or more below groundline) around base	• Erosion (8” or more below groundline)
	• n/a	• Less than 50% undermined (less than half barrier width)	• 50% or more undermined (less than half barrier width)

Condition and Severity Distress Table for Flexible Barriers, (including cable barriers and weak-post systems designed without blocks).

	GOOD	FAIR	POOR
Alignment/Tension/Design Height			
	• No bent posts	• Bent posts; one to three consecutive posts	• Bent posts; four or more consecutive posts
	• Cable has tension	• Cable under-tensioned/sagging	• No cable tension
	• Less than 1” too low	• 1-3” too low	• Greater than 3” too low
Breaking/Cracking			
	• No cracked or broken posts	• One to three isolated broken posts	• Four or more consecutive broken posts
	• n/a	• Cable frayed	• Cable broken or severed
Missing Elements			
	• No bolts and nuts missing at anchors	• n/a	• Bolts and nuts missing or loose at anchors
	• n/a	• n/a	• Any missing posts or cable for any length of run
Corrosion/Decay/Weathering – due to aging			
	• Loss of 5% or less of cable cross section	• Loss of 5% to 15% of cable cross section	• Loss of 15% or more of cross section
	• Erosion (less than 8” of post exposed below original groundline)	• Erosion around one post (8” or more of post exposed below original groundline)	• Erosion around consecutive posts (more than 8” of post exposed below original groundline)

CONDITION AND SEVERITY DISTRESS TABLES – END TREATMENTS

Condition and Severity Distress Table for Flexible End Treatments, (including cable end terminals).

	GOOD	FAIR	POOR
Alignment/Tension			
	• Alignment off by less than 4”	• Alignment off by 4”-8”	• Alignment off by more than 8”
	• Adequate cable tension	• Low cable anchor tension	• No cable anchor tension
Breaking/Cracking – due to impact loading			
	• No broken or cracked elements	• Minor cable fraying but still with adequate tension	• Broken or cracked cables or posts
	• No damage to posts, cable or anchor	• Slight damage to posts without cracking or tearing (*but minor twisting/bending on isolated posts is OK)*	• Cable broken or severed on any cable
Missing Elements			
	• No bolts and nuts missing at anchors; No missing cables	• n/a	• Any missing element (post, cable, bolts, nuts, or anchor)
Corrosion/Decay/Weathering – due to aging			
	• Loss of 5% or less of cable cross section	• Loss of 5% to 15% of cable cross section	• Loss of 15% or more of cross section
	• Connections weathered but still provide element interlock on less than 5% of the end treatment	• Connections weathered but still provide element interlock on between 5% to 15% of the end treatment	• Connections weathered but still provide element interlock on more than 15% of the end treatment

Condition and Severity Distress Table for Semi-Rigid End Treatments, including Flared and Tangent

	GOOD	FAIR	POOR
Alignment/Tension			
	• Alignment of flares and offsets off by less than 4”	• Alignment of flares and offsets off by 4”-8”	• Alignment of flares and offsets off by more than 8”
	• Within 1” of ***design height***	• Less than 3” lower than ***design height***	• Greater than 3” lower than ***design height***
For *Aesthetic Barriers* (i.e. – SBT and SBL guardrail) that do not have crashworthy terminals:	• Approach barrier terminals are buried, anchored, and flared away from the travel lane	• Approach barrier terminals are buried, anchored, and flared away from the travel lane	• Approach barrier ends are NOT buried, anchored, nor flared away from the travel lane
Breaking/Cracking – due to impact loading			
	• Metal – no twisting/bending, tears or cracking	• Metal – no cracking or tearing (but minor twisting or bending is ok)	• Metal – any cracks or tears
	• Wood – no impact related cracking	• Wood – maybe cracked but retains original cross section	• Wood – cracks or tears that deform original section
	• No broken blocks	• One broken block	• Two consecutive broken blocks
Missing Elements			
	• No missing elements, including breakaway cables and struts	• Isolated bolts, nuts, or blocks loose on non-consecutive posts	• Any missing element, including blocks, rails, posts cables, or struts
	• No bolts, nuts, or blocks missing or loose	• Breakaway strut present but vertical height off by more than 2”	• Missing nuts / bolts on consecutive posts
Corrosion/Decay/Weathering – due to aging			
	• Surface corrosion / decay / connections weathered with a loss of 5% or less of cross section of interlocking elements	• Surface corrosion / decay / connections weathered with between 5-25% loss of cross section along transition interlocking elements	• Surface corrosion / decay / connections weathered with more than 25% loss of cross section along transition interlocking elements
	• Erosion (less than 8” of post exposed below original groundline)	• Erosion around 1 post (8” or more of post exposed below original groundline)	• Erosion around consecutive posts (8” or more of post exposed below original groundline)

SPECIFIC RISK ELEMENTS

The potential risk to a motorist after a vehicle impacts a traffic barrier depends on the crashworthiness of the traffic barrier as well as traffic exposure factors. Variables relating to the roadside, the traffic barrier's crashworthiness and traffic data include the following:

ADT. The number of vehicles (in both directions) that travel the roadway on which the traffic barrier is located.

Barrier Crashworthy. A traffic barrier is crashworthy if it was successfully crash tested under NCHRP Report 350 at speeds along the park road or parkway or if it was accepted through analysis by FHWA, based on similarity to other crashworthy critical design element features. If crashworthy, the appropriate test level also needs to be recorded. For crashworthy barriers, the barrier test level will be compared to the test level appropriate for the roadway (based solely on posted speed limit). The intent is to record situations in which a crashworthy barrier of a lower test level is installed on a roadway which should have a barrier of a higher test level.

Barrier Height. Determined from barrier height as collected in the physical condition assessment. The database will compare this value to the NCHRP test level height that is appropriate for the posted speed of the road and barrier type.

End Treatment Crashworthy. An end treatment is crashworthy if it has been successfully crash tested. This is for the approach end treatment, which is defined as the end treatment which a vehicle will first pass when traveling on the same side of the road as the barrier.

Existing Roadway Features. The list of roadway features is limited to the following, all of which have a documented history of reducing the number of crashes, and are found later in the GIP as possible countermeasures.

Centerline pavement markings	Grooved pavement surface
Edgeline pavement markings	Delineators on curve and tangent
Wider centerline	Chevrons
Wider edgeline	Warning sign
Centerline rumble strips	Flashing beacon on warning sign
Shoulder rumble strips	Lighting
Barrier reflectors	Speed feedback sign

Factored Crash Rate. The average annual number of crashes (on the overall road and by barrier segment), over the last 5 years. If the road has an ADT of less than 1000, evaluate a minimum of
7 to 10 years of crash data, if available.

Lateral Offset of Barrier from Edge of Traveled Way. The distance from the edge of traveled way to the face of the barrier is useful for determining impact to asset during different types of construction. Two or three measurements will be taken – beginning, middle and end of barrier run (not including the end treatments) – and the average will be used.

Posted Speed Limit. The posted speed limit(s) of the roadway section.

Roadway Grade and Uphill or Downhill. Is refers to the grade of the roadway, in the direction of travel closest to the barrier.

Severity of the Hazard behind Barrier. A rating system based on photos will be used to rate the severity of the hazard behind the barrier. Choices include:

- Low
- Medium
- High
- Extreme

RISK ASSESSMENT AND RISK SCORE

The following table shows the variables relating to the overall roadway safety in the vicinity of barriers. In addition, the table illustrates the range of values considered for each variable and associated levels of risk. For categorization purposes, variables have been placed into one of three categories: segment, site or barrier variables. The "Associated Risk" column identifies the relative risk posed by each variable. This looks at the relative risk of the each variable itself and is only a cursory evaluation.

A Risk Score or Rating ("Barrier Rating" on Tier 3 Barrier page) was created for each barrier based on the table values. The level of risk tolerated is dependent on the category of road, which will be discussed in subsequent pages.

Once the inventory has been conducted, a total risk value can be assigned to each barrier. A comparison of the relative risk to an acceptable risk threshold will be performed in order to analyze the overall risk of a given barrier.

Variable and Associated Levels of Risk

VARIABLE	RANGE	ASSOCIATED RISK
SEGMENT VARIABLES		
ADT	0 – 1000	0.0
	1001 – 4000	2.9
	4001 – 8000	5.7
	8001 – 20,000	7.1
	20,001 and greater	8.6
Crash Factor	0	0.0
	0.1 – 5.0	4.2
	5.1 – 20.0	8.7
	20.1 – 30.0	17.1
	30.1 – 75.0	25.8
	75.1 and greater	34.2
Posted Speed Limit	15 – 25 mph	0.0
	30 – 40 mph	4.3
	45 and higher	8.6
SITE VARIABLES		
Barrier Placement w/ Respect to Roadway Geometry	Tangent	0.0
	Inside of curve	2.9
	Both inside and outside of curve	8.6
	Outside of curve	8.6
Severity of Hazard behind the Barrier	Low severity	2.6
	Medium severity	5.1
	High severity	6.9
	Extreme severity	8.6
Longitudinal Length of Barrier	1 – 250-ft	0.0
	251 – 750-ft	2.9
	751 – ft and greater	5.7
Lateral Offset of Barrier from Edge of Traveled Way	4.1 – ft and greater	0.0
	2 – 4-ft	2.9
	less than 2-ft	5.7
Roadway Grade	Uphill/level/downgrade less than 3%	0.0
	Mild downgrade (3 – 6%)	4.3
	Steep downgrade (greater than 6%)	8.6
BARRIER VARIABLES		
Actual Barrier Height (compared to test level height)	0 – 1-in lower	0.0
	1.1 – 4-in lower	4.4
	4.1 – 7-in lower	12.9
	7.1 – 12-in lower	19.4
	12.1-in and greater lower	21.5
Dynamic Barrier Condition Rating (based on design height)	0 – 25	0.0
	26 – 200	4.4
	201 – 400	8.6
	401 – 600	12.9
	601 – 800	17.1
	801 and above	21.5
Barrier Conformance with Current Crashworthiness Criteria	Yes	0.0
	No	5.7
	Maximum Total Possible Risk Score	**100**

REPLACEMENT/REPAIR STRATEGIES

Information is integrated by combining static data on barrier type, materials, dimensions, etc. with the condition and risk assessments, and the asset management roadway categories (which include cultural and historic resource considerations) to come up with actionable repair strategies for barriers. In addition, repair costs are accounted for so that estimates can be made for repair actions identified. Costed repair estimates, or work orders, then form the basis for estimating deferred maintenance associated with roadside barriers.
Repair recommendations generated by this assessment are intended to provide an estimated cost of deferred maintenance of barriers. As such, the evaluation is not rigorous and may be changed when a more detailed review and assessment at a project level is completed. In addition, any repairs or replacements that are recommended by this inventory and assessment process must be vetted through a project selection, planning and design process, including compliance with the National Historic Preservation Act (NHPA) and the National Environmental Policy Act (NEPA).

Many park barriers are located in harsh environments where freeze-thaw cycles, avalanche impacts, surface erosion, rockfall and vehicle impacts damage them; consequently, they are showing signs of fatigue, at times serious. Whenever possible, historic barriers are repaired or rehabilitated in place so that the historic significance can be preserved; however, removal or reconstruction, which is typically the least preferred alternative, is at times necessary.

Barrier deficiencies can generally be categorized into one of two categories:

- Barriers that pose an unacceptable risk to the traveling public (as determined by the risk assessment methods described in Chapter Seven and including standards found in NCHRP Report 350), or
- Damaged barriers, due to either crash impacts, other loadings (e.g., snow / avalanche, etc) or deteriorated parts (from age / weathering).

Outside of the national park system, barriers that do not meet NCHRP Report 350 crashworthiness standards are typically removed and a barrier of a crashworthy design is constructed in its place. However given the sensitive natural and cultural environments found within the national park system, deficient barriers not meeting national crashworthiness standards may warrant no action, particularly where risk is low.

The type of repair strategy is often dependent on the barrier deficiency and its cultural context. Typically barriers that do not meet current crashworthiness criteria may be replaced while damaged or deteriorated barriers can be repaired. However, under unique situations found in certain national parks and as evaluated using the risk assessment and asset management roadway categories, some barriers that do not meet current crashworthiness criteria may warrant no action being taken for their replacement or repair.

Risk assessment and asset management roadway categories are integrated in the following table, which establishes different risk thresholds within each roadway category. In essence, a higher level of risk will be tolerated in Asset Management Roadway Category A, as demonstrated by the higher risk threshold (90), while less risk will be tolerated in Roadway Category B (70) and even less risk in Roadway Category C (50).

Asset Management Roadway Categories, Risk Thresholds and Treatment Recommendations.

ASSET MANAGEMENT ROADWAY CATEGORY	RISK THRESHOLD	PROGRAM-LEVEL TREATMENT RECOMMENDATION
A	90-100	1. Identify measures other than barrier replacement that could be taken to reduce risk (including engineering countermeasures). 2. Corrective action (including reconstruct/replacement, if necessary) needed to reduce risk below 90.
	Below 90	1. Identify measures that could be taken to reduce risk (including engineered countermeasures). 2. Identify repairs needed to improve physical condition/maintain historic integrity. 3. When condition is good and risk is acceptable, no action is necessary.
B	70-100	1. Identify measures that could be taken to reduce risk (including engineered countermeasures). 2. Corrective action (including reconstruct/replacement, if necessary) needed to reduce risk below 70.
	Below 70	1. Identify measures that could be taken to reduce risk (including engineered countermeasures). 2. Identify repairs needed to improve physical condition/maintain historic integrity. 3. When condition is good and risk is acceptable, no action is necessary.
C	50-100	1. Identify measures that could be taken to reduce risk (including engineered countermeasures). 2. Corrective action (including reconstruct/replacement, if necessary) needed to reduce risk below 50.
	Below 50	1. Identify measures that could be taken to reduce risk (including engineered countermeasures). 2. Identify repairs needed to improve physical condition/maintain historic integrity. 3. When condition is good and risk is acceptable, no action is necessary.

Fourteen engineering countermeasures have been specifically selected for use with the GIP risk assessment tool, and are show in the next table. This is an all-inclusive list of available countermeasures for the risk assessment toll; countermeasures not on the list should not be considered.

The concept of employing countermeasures is evident with barriers that have a risk score just above the risk threshold. For such barriers, installing countermeasures should reduce the future number of crashes by a given amount, based on the countermeasure. Depending on the factored crash rate, reducing the number of crashes will lower the overall risk score. Thus, barriers that were classified as “reconstruct/replace” may be able to be reclassified as “repair”.

The decision to include any of the engineering countermeasures can be done only when the risk score is over the risk threshold by three points or less. When countermeasures are employed to reduce the risk score, they must be based on engineering judgment. The GIP database will allow the user to select up to three countermeasures to reduce the risk score under the threshold, based on crash reduction factors from the FHWA publication “Desktop Reference for Crash Reduction Factors” FHWA-SA-07-015.

Proposed Countermeasures.

COUNTERMEASURE	CRASH REDUCTION FACTOR
Speed Feedback Signs	0.46
Flashing Beacons On Warning Signs	0.30
Centerline Pavement Marking	0.30
Lighting	0.25
Chevrons	0.20
Warning Signs	0.20
Barrier Reflectors	0.16
Grooved Pavement Surface	0.15
Edgeline Pavement Marking	0.12
Shoulder Rumble Strips	0.12
Delineators on Curve and Tangent	0.05
Centerline Rumble Strips	0.04
Wider Edgeline	0.02
Wider Centerline	0.02

Maintaining Barriers As Is

Individual barrier elements and roadside conditions are interrelated. Sometimes, barrier deficiencies will be obvious and the best course of action is apparent; however, in context sensitive environments barrier deficiencies may be marginal and a decision will be based on judgment.

If risk is low (as determined by the assessment of variables such as traffic speeds, volumes), it may be acceptable for an historical or culturally significant barrier that does not meet current crashworthiness standards to remain until changes in risk factors would require an upgrading.

If the maintaining barrier as is alternative is the preferred choice through this approach, low cost mitigation measures may be considered to improve safety, such as improving roadside delineation (e.g., pavement markings / rumble strip(e)s, etc.), improving visibility (e.g., advance warning signs, increased sign size, etc.), upgrading the roadway shoulder, or improving skid resistance of the road surface. Although these measures will not reduce crash severity of an errant vehicle impact, these improvements have been tried or proven to reduce the frequency or probability of a vehicle striking the barrier.

Barrier Repair

If a barrier has been damaged due to a crash or there are parts that have deteriorated due to age or weathering but the majority of the barrier meets current crashworthiness standards and is functionally sound, repairing the system can be considered a viable option. Examples of these improvements include replacing damaged timber rail, removing a corroded, weathered steel post and replacing with new, upgraded guardrail blockouts to meet standards on high speed facilities or repointing, resetting or replacing loose or missing stones on the concrete corewalls of stone masonry guardwalls. Pursuing a repair approach should be the first consideration for Roadway Category A and B road assets.

For barriers that do not meet crashworthiness criteria but are functionally sound and have been determined good candidates to be maintained as-is based on the risk assessment and application of asset management roadway categories, repair could include measures such as repointing deteriorated masonry, re-setting or replacing loose, broken or missing stones, restoring walls to their original height (by adding a concrete footing, for example), restoring or improving drainage through or under walls or restoring wall foundations. Alterations to improve safety may also be considered, such as adding or changing end treatments or other mitigation measures as mentioned above.

For historic, stone masonry barriers that have a risk score below the threshold, it is possible that portions of the barrier need to be removed and reset in order increase the height of the barrier. The following guidelines are provided to assist in determining when this should be done and to what height the barrier should be rebuilt:

1. If all or a portion of stone masonry guardwall has a deficient height based upon the Severity Description Charts, that is, at worst, within the fair category, do not raise it. (Other work besides raising the barrier can be specified.)

2. If a portion of a stone masonry guardwall has a deficiency in height based upon the Severity Description Charts, considered "poor" (assumed typically to be less than 18-in) write a work order to raise the poor segment to the height of the adjacent barrier with a non-poor height.

3. If the entire stone masonry guardwall is in poor condition due to height based upon the Severity Description Charts– write a work order to raise the entire segment to its design height (assumed typically to be 24-in).

For aesthetic barrier systems used on many park roads and parkways, there is not a sufficient bid history database for estimating costs to repair or replace individual elements of the system, such as posts or rail. Usually repair of an aesthetic barrier system, such as steel-backed timber guardrail consists of removing and resetting the post or rail section or raising the guardrail to meet standard height requirements.

Barrier Replacement/Reconstruction

If the risk analysis, including the application of asset management roadway categories, indicates the barrier poses an unacceptable safety risk, the first step should be an analysis to determine if there are mitigating measures that can be applied to reduce the risk to an acceptable level without the need to reconstruct the barrier. A second step is to determine if the barrier is needed. If it is practical to eliminate the shielded hazard (by removal, relocation or redesign) removal of the barrier should be considered. However, if the shielded hazard cannot be eliminated or if it is determined inappropriate to remove the barrier (e.g., it is historically significant and/or contributes to the historical or aesthetic significance of the associated road, district or landscape), reconstruction or replacement of the barrier to meet current criteria for crashworthiness may be the appropriate recommended treatment.

The typical reconstruction option used by the NPS for stone masonry guardwalls is to document then dismantle the existing barrier, construct a concrete core and build a stone masonry veneer around the concrete core using the original wall materials and using stone masonry designs that are compatible with the historic road, district or landscape. A number of concrete core stone masonry barrier types have been designed for use in national parks, including 18-in, 22-in, 24-in and 27-in barriers; however, not all have been crash tested or otherwise determined to meet current criteria for crashworthiness.

WORK ORDERS

Work order preparation is essentially determining and documenting the repair actions needed to correct the deficiencies observed during the condition assessment. Barriers are relatively simple structures so this determination can be made by trained inspectors. Keep in mind that this is not a design environment and that more rigorous analysis (if needed) may change the work that is actually performed. The intent of this effort is to prepare a credible estimate of deferred maintenance that may or may not be directly actionable. Simple repairs and/or those that require no compliance with environmental policies (which may be a large percentage of the work orders) can probably be executed without modification.

Once a repair strategy is determined, a cost must be developed for the proposed action. Work orders will be classified as being either deferred maintenance or capital improvement. This classification is based on the type of work recommended, as defined below.

Definition: *Deferred Maintenance* can be classified as repair or replace in kind. Work done to the barrier does not include any upgrading.

Definition: *Capital Improvement* can be classified as upgrading existing barrier. Typically the upgrade will be from a non-crashworthy to a crashworthy device. Other examples of capital improvements would be the addition of a curb to improve drainage or the inclusion of any countermeasure.

There are four types of work:

- No Action
- Monitor
- Repair
- Replace

"No Action" – if risk is low (based on the GIP risk score), a barrier that does not meet current crashworthy performance standards may be acceptable to remain until changes in risk factors would require upgrading.

"Monitor" – if risk is low (based on the GIP risk score), a barrier that does not meet current crashworthy performance standards may be acceptable to remain until changes in risk factors would require upgrading, however, if conditions exist that the park should monitor (e.g., erosion), then "monitor" can be selected as a recommended action.

"Repair" – considered when a barrier damaged by impact deteriorated due to age/weathering and the barrier is functionally sound in a low risk environment. The goal is to bring the barrier back to its "new" condition.

"Replacement/Reconstruction" – when a barrier poses an unacceptable safety risk:

1. If the risk score is less than 3 points above the risk threshold, determine if countermeasures can reduce risk so the barrier can be repaired.
2. Determine if the barrier is warranted and either shielded hazard or barrier itself can be removed (only when barrier NOT considered historically/culturally significant)

For all barrier repair/replace/reconstruction recommendations, the NPS will vet the recommendations through a project selection, planning and design process, including compliance with:

National Historic Preservation Act (NHPA)
National Environmental Policy Act (NEPA)

Aesthetic barriers are commensurate with an approved crashworthy design for the specific conditions at the barrier site as the basis for selecting a crashworthy structure. Types of barriers are generally selected based on emulating the existing types of barriers in the park.