

MEVE WIP Report

NPS Retaining Wall Inventory Program Mesa Verde National Park



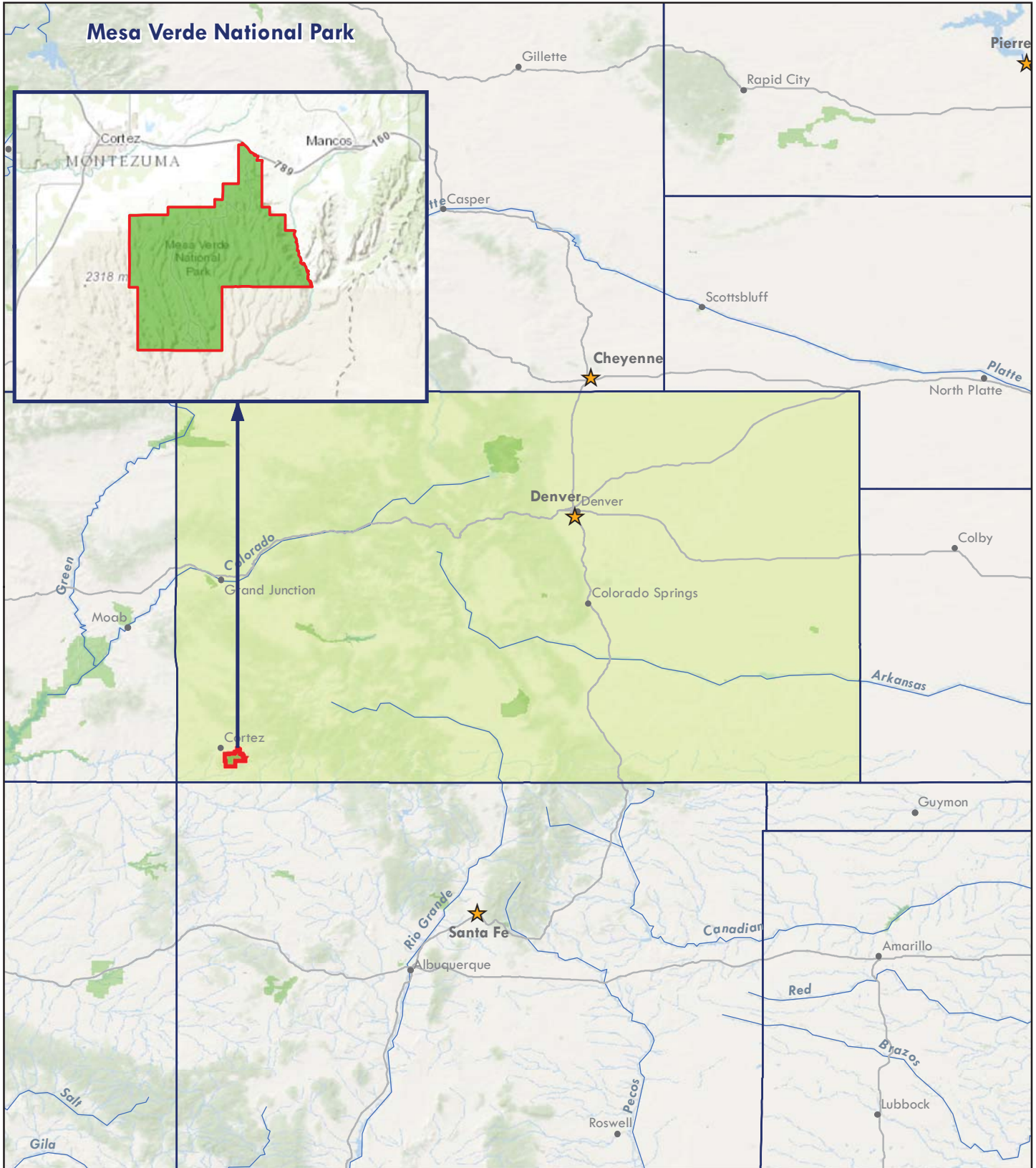
**Federal Lands Highway
Road Inventory Program**

Prepared By:

**Federal Highway Administration
Eastern Federal Lands Highway Division
Road Inventory Program (RIP)**

**Data Collection Date: December 2006
Report Date: October 2015**

Mesa Verde National Park in Colorado



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
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Introduction



Mesa Verde National Park



**Federal Lands Highway
Road Inventory Program**

Introduction

The Federal Lands Highway Division (FLH) of the Federal Highway Administration (FHWA), in partnership with the National Park Service (NPS), has conducted a retaining wall inventory and condition assessment as part of the NPS Retaining Wall Inventory Program (WIP). This inventory provides information to the NPS Facility Management Software System (FMSS) regarding such things as type, size and location of retaining structures, as well as the condition of these facilities and consequences of failure. In addition, when wall and/or adjacent element deficiencies are identified, repair recommendations and estimated costs are also provided, suitable for use as FMSS work orders.

The main intent of this effort is to determine the backlog of needs associated with retaining wall assets – equipment features ascribed to the “parent” roadway asset. Inventory and condition assessments (pavement only) for the roads themselves are conducted under the NPS Road Inventory Program (RIP). Prior to development of the WIP, the vast majority of retaining walls were not accounted for in FMSS. Based on WIP inventory work to date, NPS wall assets are valued at well over \$400M. A second and equally important intent of this effort is to inform and improve project selection, prioritization, and development activities and processes at NPS regions/parks, FLH Division offices and the NPS Denver Service Center.

In support of WIP, a comprehensive procedures manual (available at the following link: <http://www.cflhd.gov/programs/techDevelopment/geotech/WIP/>) was developed to document the data collection and management process, wall attribute and element definitions, and team member responsibilities for conducting retaining wall inventories and condition assessments. This manual was used for nearly 3,500 wall assessments initially conducted between 2007 and 2008 within 34 national parks. WIP is supported by several key components described in the procedures manual, including a comprehensive training program for field inspectors, an Oracle-based database for long-term data management, unique data collection forms, a supporting field guide, and a wall repair/replace cost estimate guide.

Ultimately, condition assessments for retaining wall structures are expressed as deferred maintenance costs, which are then divided by current year replacement costs to arrive at a “Facility Condition Index” (FCI). Coupling this condition prioritization index with an “Asset Priority Index” (API), which measures the feature’s importance to the mission of the park, capital asset investments are made more efficiently. This approach appropriately focuses maintenance and construction priorities on value, rather than solely on cost. Wall inventory condition and cost data are transferred from the WIP database to FMSS, the primary asset documentation, management and planning platform maintained at each park. In addition, wall data are also provided to the Road Inventory Program to update equipment assets associated with the parent roadway asset.

Initial inventories were conducted based on RIP Cycle 3 data, but future planning has ensured updates to WIP will occur simultaneously with RIP. For long-term data management purposes, the WIP database will be linked to the larger, parent RIP database and be updated under the responsibility of the RIP Database Administrator.

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 wall (Tier 3). Tier 1 presents park wall location maps and an overall park-specific summary narrative of the results of the wall inventory program. Tier 2 presents route overview maps with associated wall summary information. Tier 3 presents individual wall information in a three-page detailed format, including a photograph of each wall. Appendix A provides a condensed summary of wall inventory definitions and assessment categories to assist in reading this report.

Park Retaining Wall Location Maps



Mesa Verde National Park

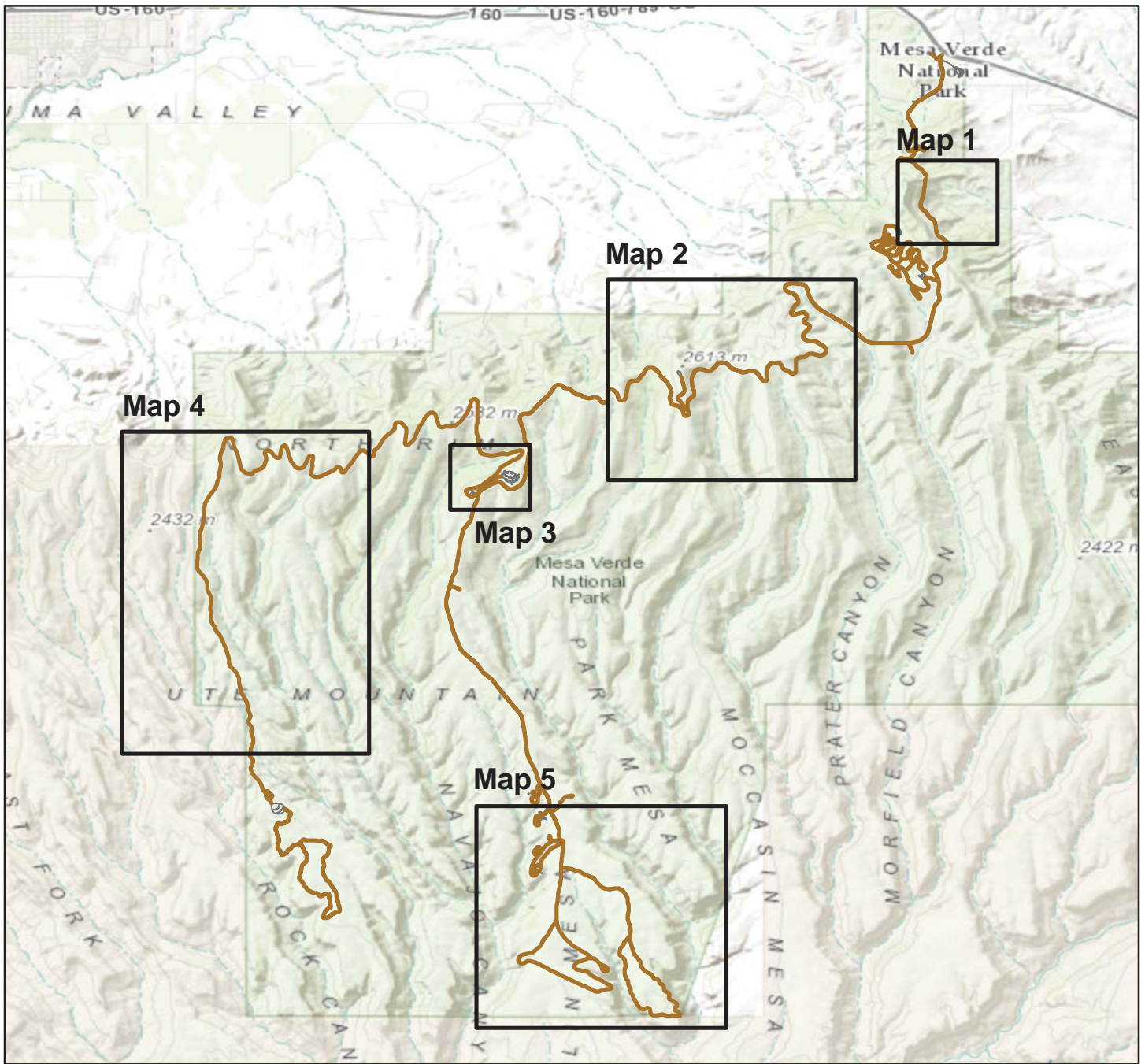


Federal Lands Highway
Road Inventory Program

Mesa Verde National Park

WALL 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



Mesa Verde National Park

WALL 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

● Wall Locations

— RIP Collected Routes

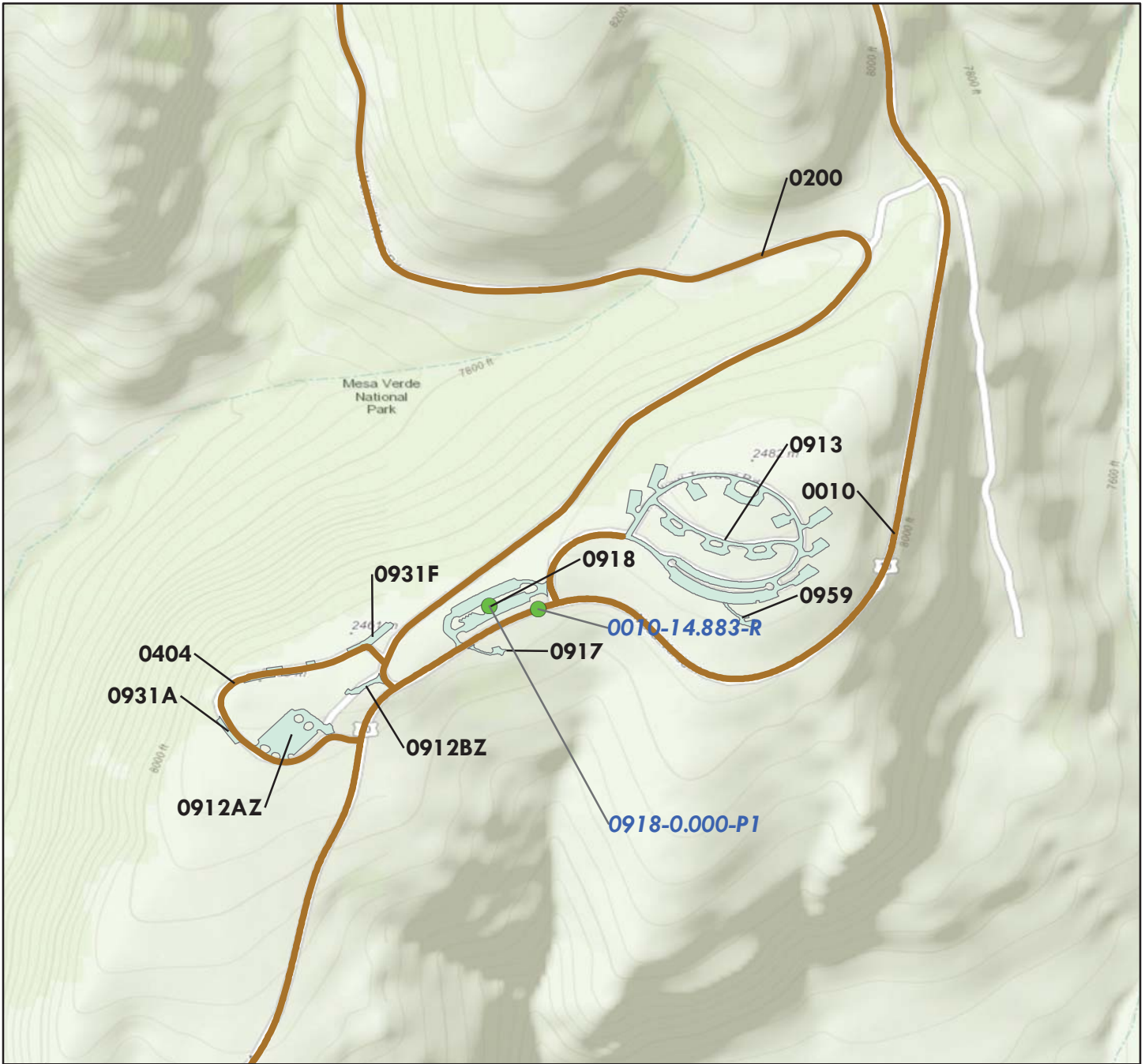
■ RIP Collected Parking



Mesa Verde National Park

WALL 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

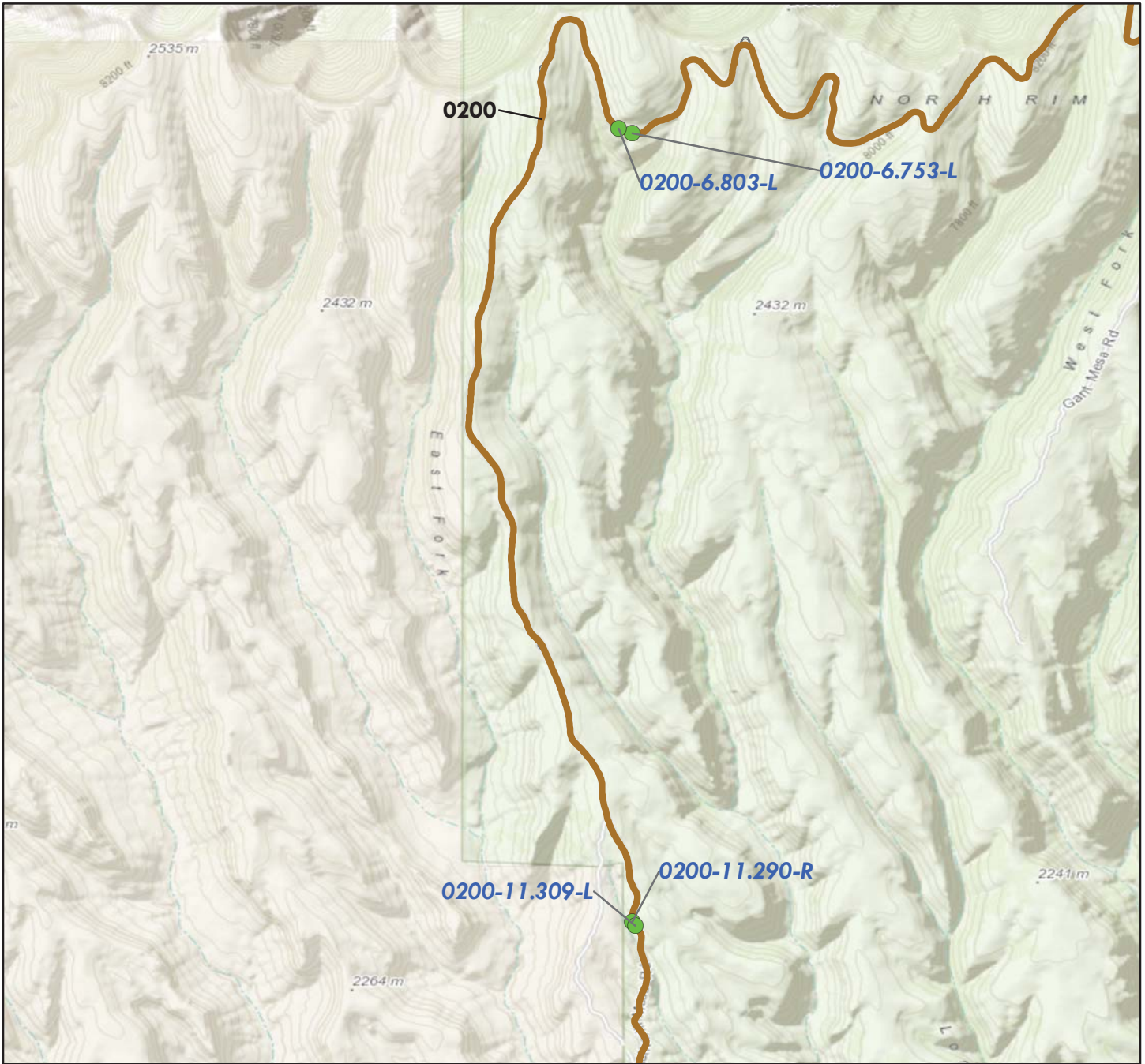
- Wall Locations
- RIP Collected Routes
- RIP Collected Parking



Mesa Verde National Park

WALL 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

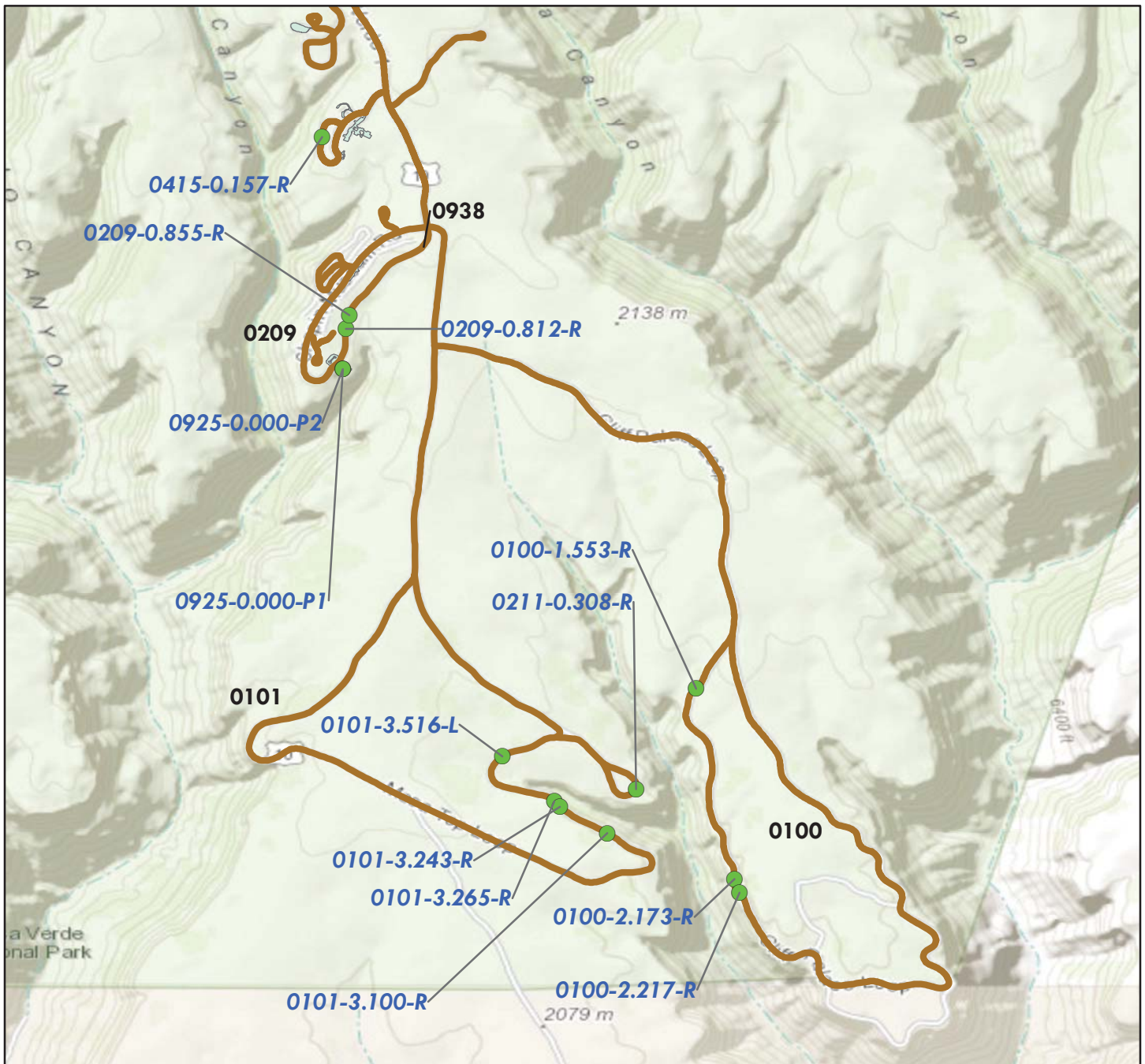
- Wall Locations
- RIP Collected Routes



Mesa Verde National Park

WALL LOCATION MAP

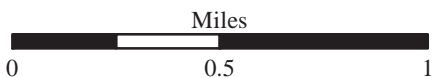
Map 5



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

● Wall Locations

— RIP Collected Routes



Tier 1 Park Retaining Wall Overview



Mesa Verde National Park



Federal Lands Highway
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Parkwide Summary: Mesa Verde National Park

Initial retaining wall inspections were conducted at Mesa Verde National Park in 2006, and encompassed all known retaining wall structures associated with Park roadways - including structure's retaining cuts and fills, as well as qualifying headwalls at culverts. For the purposes of the assessment, walls must be a minimum of 4 feet in maximum height of retained earth and greater than 6 feet in maximum height for culvert headwalls. This does not include the height of parapet or guardwall above a retaining wall. In general, guardwall or parapets are not included in this assessment, but were inspected for Mesa Verde National Park in 2009 under a separate effort as part of the Guardwall/Rail Inventory Program (GIP). A report for GIP is available under separate cover.

All paved roadways and parking areas listed in the RIP Route Identification Report were inspected for walls. Occasionally, unpaved routes not in RIP were inventoried due to their future programmatic addition at the park, which was a decision made on site specific to each park.

The following tables provide an overview of the findings of this inspection and assessment effort. In all, 37 walls were inventoried on the routes listed below.

Table 1: Number of Walls by Route

Route Number	Route Name	No. of Walls
0010	ENTRANCE ROAD	19
0100	BALCONY HOUSE / CLIFF PALACE ROAD	3
0101	MESA TOP ROAD	4
0200	WETHERILL MESA ROAD	4
0209	HEADQUARTERS LOOP ROAD	2
0211	SUN TEMPLE ROAD	1
0415	WHITE HOUSE RESIDENCE ROAD	1
0918	VISITOR CENTER PARKING	1
0925	SIDE HEADQUARTERS AND POST OFFICE PARKING	2

The following table shows the number of walls broken out by seven possible categories of basic wall function.

Table 2: Number of Walls by Wall Function

Wall Function	No. of Walls
FW - Fill Wall	35
HW - Head Wall	2

The following table shows the primary wall types that were inventoried and assessed. There are 24 possible primary wall types, which are summarized in Appendix A.

Table 3: Number of Walls by Primary Wall Type

Primary Wall Type	No. of Walls
AH, Anchor - Tieback H-Pile	9
BM, Bin - Metal	2
CL, Cantilever - Concrete	4
CM, Crib - Metal	1
GD, Gravity - Dry Stone	11
GM, Gravity - Mortared Stone	3
MW, MSE - Welded Wire Face	7

The following table shows the number of walls by one of six categories of recommended action along with associated 2007 costs and the number of walls that are in each recommended action category. The majority of walls have a recommendation of *No Action* or *Monitor*; work orders were created for all other recommended actions.

Table 4: Number of Walls by Recommended Action and Associated 2007 Cost

Recommended Action	2007 Repair Costs*	No. of Walls
No Action	\$0	28
Monitor	\$0	0
Maintenance	\$21,997	9
Repair Elements	\$0	0
Replace Elements	\$0	0
Replace Wall	\$0	0
Totals	\$21,997	37

*2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

The following table categorizes the number of walls 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 walls are listed by individual wall in Tier 3 of this report.

Table 5: Number of Walls Grouped by Associated 2007 Cost

Cost Range*	No. of Walls
\$0	28
\$1 - \$25,000	9
\$25,001 - \$50,000	0
\$50,001 - \$100,000	0
\$100,001 - \$250,000	0
\$250,001 - \$500,000	0
\$500,001 - \$1,000,000	0
\$1,000,001 - \$2,000,000	0
\$2,000,001 - \$3,000,000	0
\$3,000,001 - \$4,000,000	0
Total Number of Walls	37

*2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Routine inspection and performing the noted maintenance will greatly aid in the continued performance of all walls at Mesa Verde National Park. Work orders for walls needing maintenance generally included items such as replacing missing stones, replacing mortar, filling voids at the top or bottom of fill walls, and clearing vegetation.

Work orders for walls needing localized element repairs generally included items such as adding riprap protection to the wall foundation, replacing missing sections of dry stone walls, replacing culverts, grouting voids in walls, and patching/restoring roadway pavement. While decaying mortar generally does not threaten wall stability in the near term, grout repair will extend the life of these walls.

Work orders for walls needing major repairs (replace elements or replace wall) generally include items such as foundation repair or replacement, fill voids, repair roadway shoulder, replace or extend retaining wall in either height or length, rebuild failed segments of walls, repair elements across 50% or more of the wall, remove and recompact backfill material, add scour protection (typically with riprap, concrete, or rock fill), and remove/reset culvert headwalls. Due to the large unit items associated with major repairs, recommendations vary by specific wall and are presented in Tier 3 of this report.

WIP identified 55 critically deficient walls nationally based on wall ratings less than 49 (poor/critical overall condition). The following table presents the walls in Mesa Verde National Park that are on this list and have been elevated to the Park Regional Coordinators in a Regional Park Summary Memorandum. Generally, these are walls with major repair element recommendations that may be a priority for repair work in your park.

Table 6: Number of Walls by Route

Wall Identification	Failure Consequence⁽¹⁾	Wall Rating⁽²⁾	Recommended Action⁽³⁾	2007 Repair Costs⁽⁴⁾
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No critically deficient walls.

Notes: 1) Low consequence of failure and/or no recommended action may indicate repairs are not needed.

2) Wall ratings listed range from 0-49 (Poor/Critical).

3) Information was prepared for project planning purposes only. Actual repair work order scopes and actual costs will need to be evaluated based on current pay item unit prices for specific locations.

4) 2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Tier 2 Route Retaining Wall Overview



Mesa Verde National Park



Federal Lands Highway
Road Inventory Program

Mesa Verde National Park

ROUTE 0010: 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

Retaining Wall Condition Legend – Wall Condition Rating

Critical / Poor (0 - 49)

Fair (50 - 69)

Good to Excellent (70 - 100)

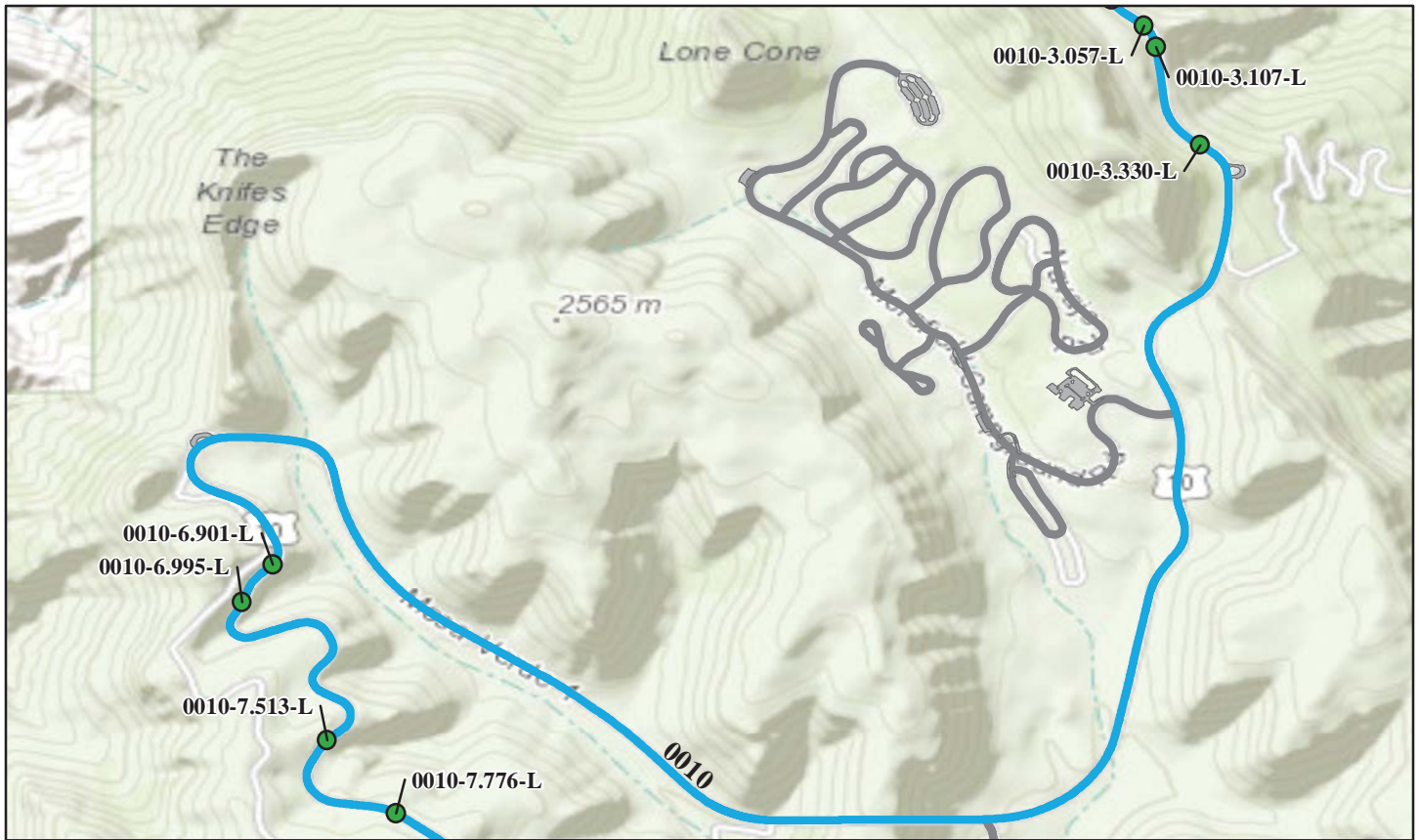
No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
MEVE-0010-2.526-L 12/11/2006	735	105	Anchor - Tieback H-Pile	Fill Wall	89	\$0.00
MEVE-0010-2.576-L 12/12/2006	2,128	152	Anchor - Tieback H-Pile	Fill Wall	97	\$0.00
MEVE-0010-2.649-L 12/12/2006	1,287	117	Anchor - Tieback H-Pile	Fill Wall	81	\$1,500.00
MEVE-0010-2.727-L 12/12/2006	14,448	1,032	Anchor - Tieback H-Pile	Fill Wall	83	\$5,175.00
MEVE-0010-2.982-L 12/12/2006	2,379	183	Anchor - Tieback H-Pile	Fill Wall	96	\$0.00

*2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: 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

Retaining Wall Condition Legend – Wall Condition Rating

Critical / Poor (0 - 49)

Fair (50 - 69)

Good to Excellent (70 - 100)

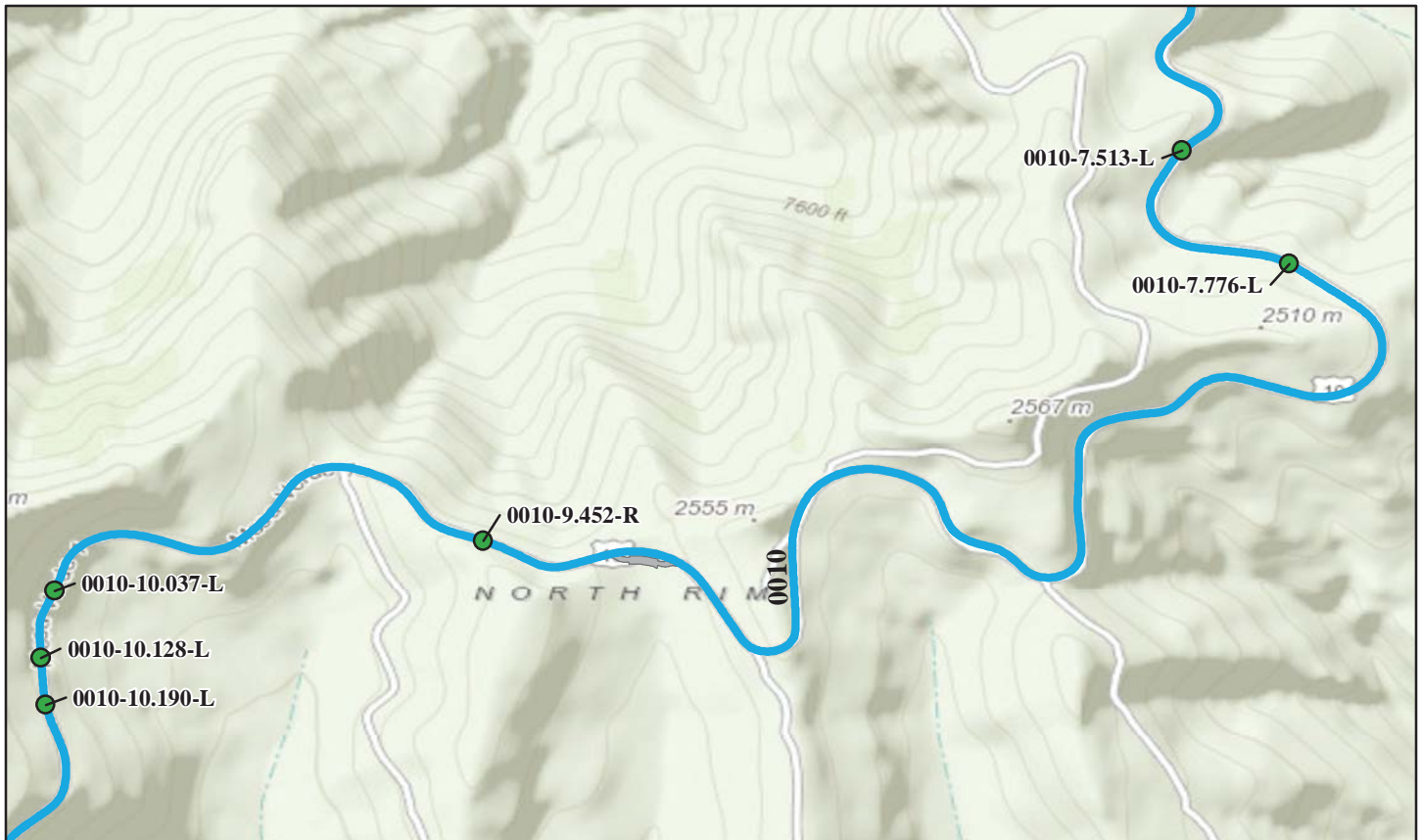
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Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
MEVE-0010-3.057-L 12/12/2006	940	94	Anchor - Tieback H-Pile	Fill Wall	98	\$0.00
MEVE-0010-3.107-L 12/12/2006	4,925	197	Anchor - Tieback H-Pile	Fill Wall	84	\$4,065.00
MEVE-0010-3.330-L 12/12/2006	10,404	867	Anchor - Tieback H-Pile	Fill Wall	80	\$6,275.00
MEVE-0010-6.901-L 12/12/2006	525	175	MSE - Welded Wire Face	Fill Wall	83	\$2,140.00
MEVE-0010-6.995-L 12/12/2006	315	105	MSE - Welded Wire Face	Fill Wall	84	\$0.00

*2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: 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

Retaining Wall Condition Legend – Wall Condition Rating

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Fair (50 - 69)

Good to Excellent (70 - 100)

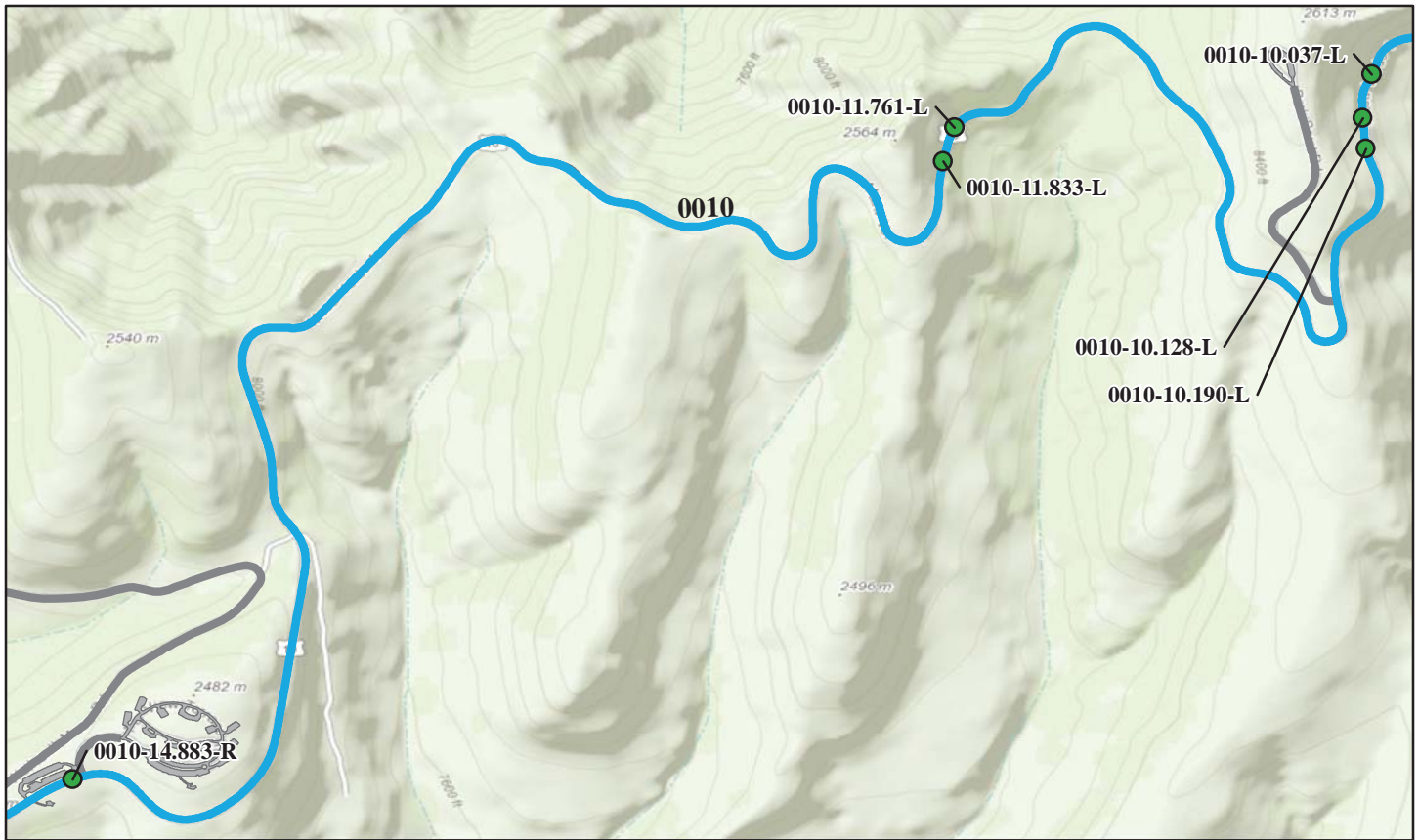
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Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
MEVE-0010-7.513-L 12/13/2006	144	48	Crib - Metal	Fill Wall	80	\$400.00
MEVE-0010-7.776-L 12/12/2006	2,160	180	Anchor - Tieback H-Pile	Fill Wall	86	\$1,642.00
MEVE-0010-9.452-R 12/12/2006	630	35	Gravity - Mortared Stone	Fill Wall	88	\$0.00
MEVE-0010-10.037-L 12/12/2006	846	282	MSE - Welded Wire Face	Fill Wall	83	\$0.00
MEVE-0010-10.128-L 12/12/2006	801	267	MSE - Welded Wire Face	Fill Wall	83	\$0.00

*2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: 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

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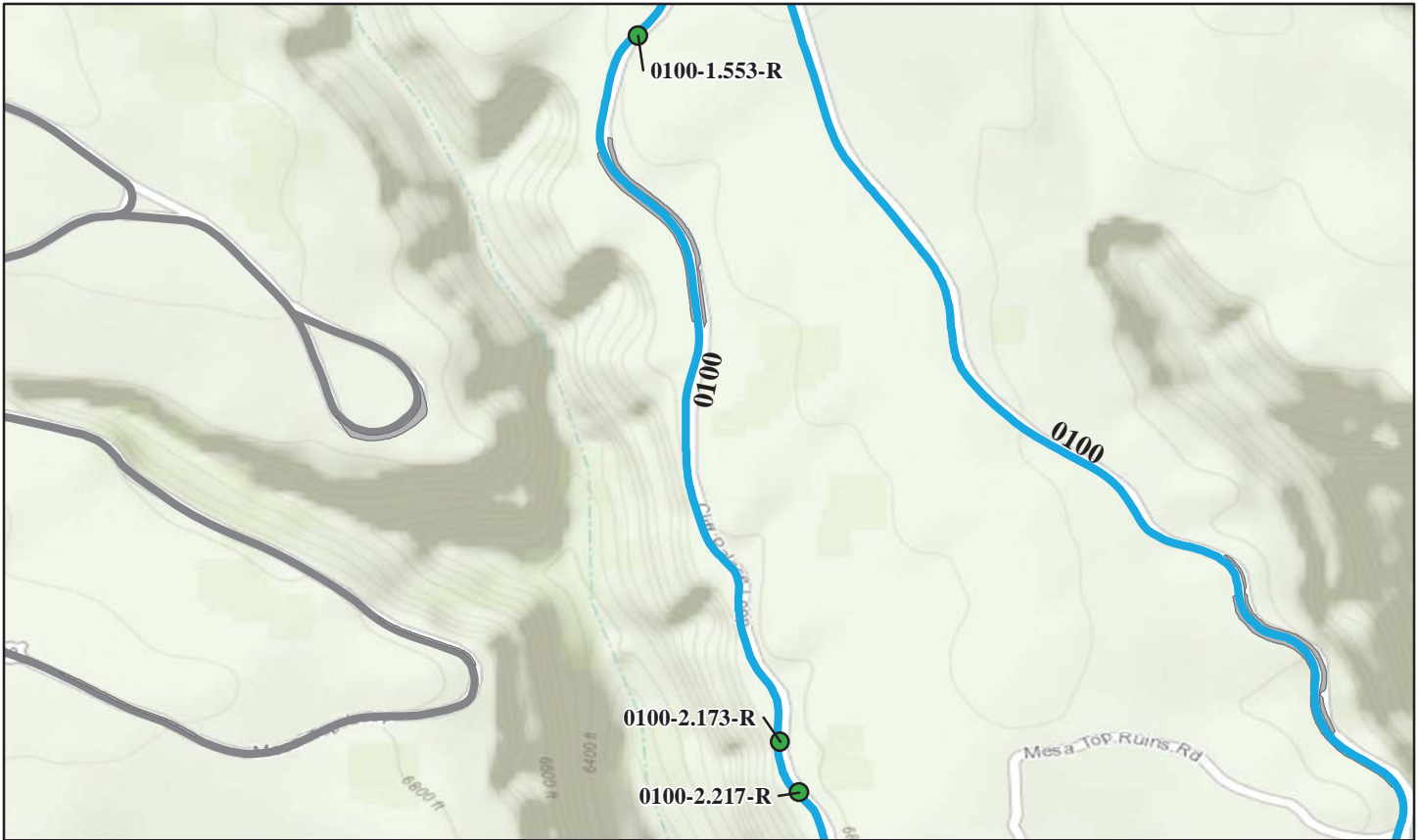
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Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
MEVE-0010-10.190-L 12/12/2006	450	150	MSE - Welded Wire Face	Fill Wall	83	\$0.00
MEVE-0010-11.761-L 12/12/2006	615	205	MSE - Welded Wire Face	Fill Wall	83	\$0.00
MEVE-0010-11.833-L 12/12/2006	870	290	MSE - Welded Wire Face	Fill Wall	84	\$0.00
MEVE-0010-14.883-R 12/12/2006	2,528	316	Cantilever - Concrete	Fill Wall	85	\$0.00

*2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0100: BALCONY HOUSE / CLIFF PALACE 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

Retaining Wall Condition Legend – Wall Condition Rating

Critical / Poor (0 - 49)

Fair (50 - 69)

Good to Excellent (70 - 100)

No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
MEVE-0100-1.553-R 12/13/2006	418	209	Gravity - Dry Stone	Fill Wall	83	\$0.00
MEVE-0100-2.173-R 12/13/2006	472	118	Gravity - Dry Stone	Fill Wall	83	\$0.00
MEVE-0100-2.217-R 12/13/2006	29	6	Gravity - Mortared Stone	Head Wall	89	\$400.00

*2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0101: MESA TOP 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

Retaining Wall Condition Legend – Wall Condition Rating

Critical / Poor (0 - 49)

Fair (50 - 69)

Good to Excellent (70 - 100)

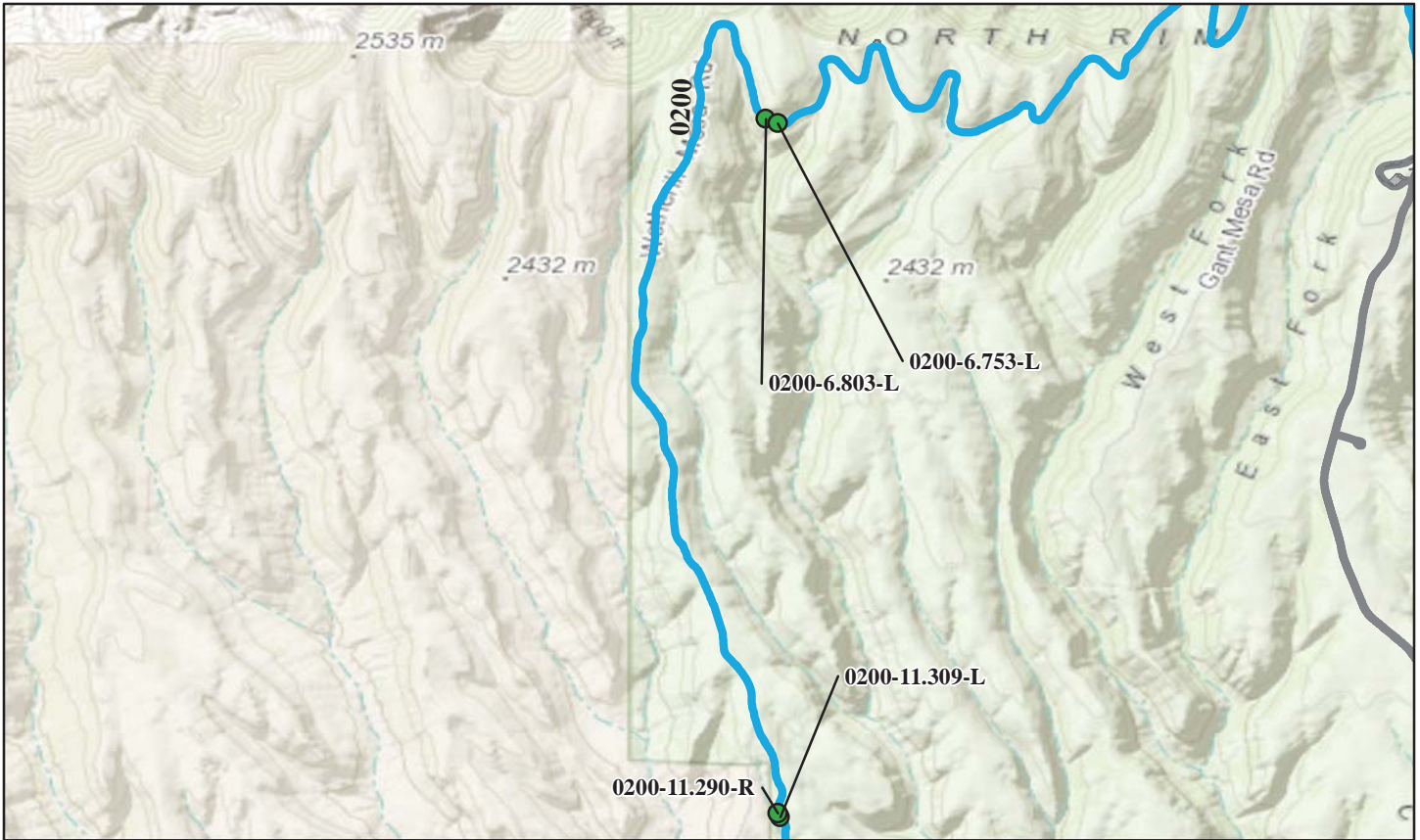
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Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
MEVE-0101-3.100-R 12/13/2006	696	174	Gravity - Dry Stone	Fill Wall	87	\$0.00
MEVE-0101-3.243-R 12/13/2006	252	63	Gravity - Dry Stone	Fill Wall	90	\$0.00
MEVE-0101-3.265-R 12/13/2006	738	246	Gravity - Dry Stone	Fill Wall	90	\$0.00
MEVE-0101-3.516-L 12/13/2006	60	12	Gravity - Mortared Stone	Head Wall	80	\$400.00

*2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0200: WETHERILL MESA 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

Retaining Wall Condition Legend – Wall Condition Rating

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Fair (50 - 69)

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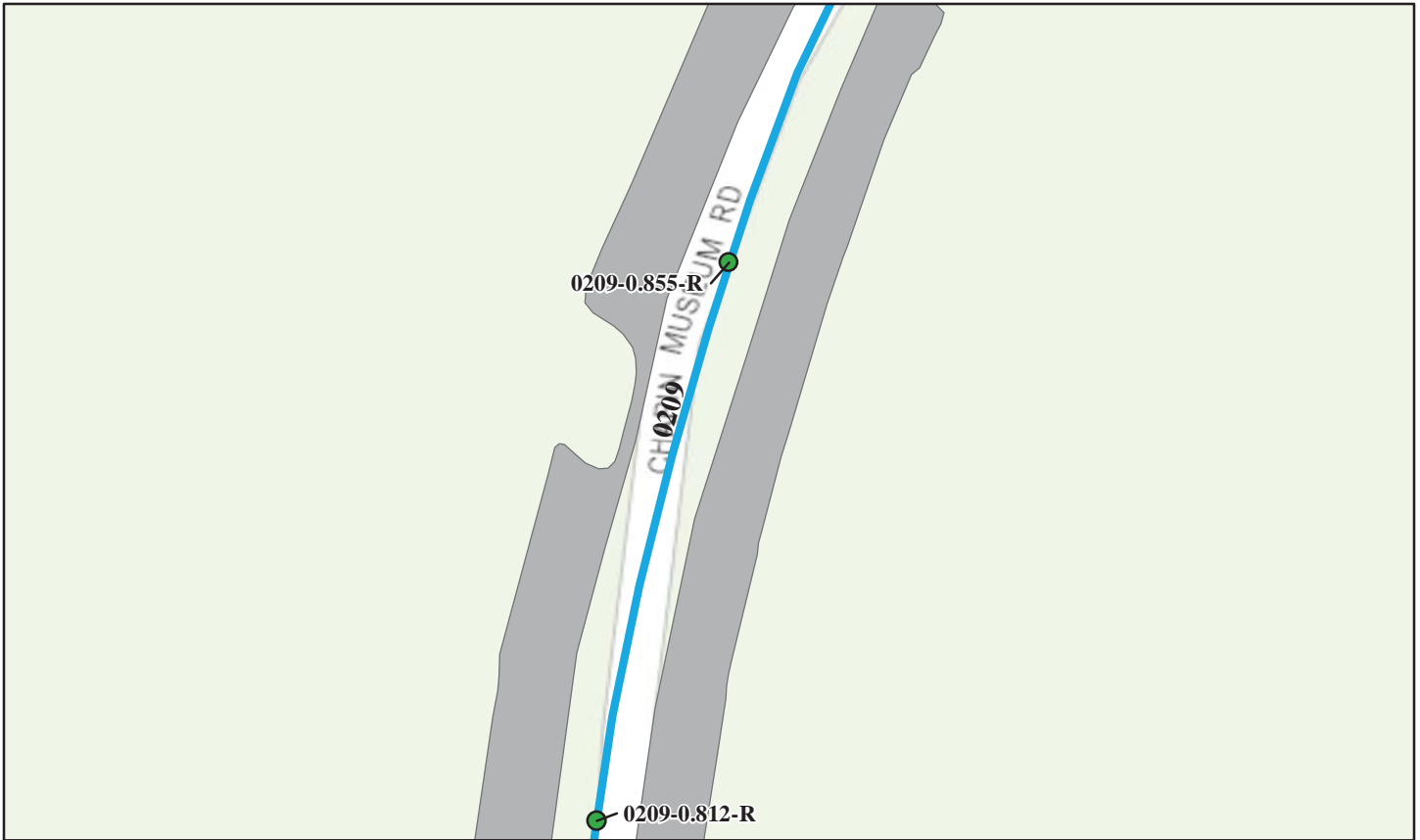
No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
MEVE-0200-6.753-L 12/14/2006	1,728	144	Bin - Metal	Fill Wall	84	\$0.00
MEVE-0200-6.803-L 12/14/2006	1,540	154	Bin - Metal	Fill Wall	84	\$0.00
MEVE-0200-11.290-R 12/14/2006	420	70	Cantilever - Concrete	Fill Wall	90	\$0.00
MEVE-0200-11.309-L 12/14/2006	396	99	Cantilever - Concrete	Fill Wall	89	\$0.00

*2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0209: HEADQUARTERS LOOP 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

Retaining Wall Condition Legend – Wall Condition Rating

Critical / Poor (0 - 49)

Fair (50 - 69)

Good to Excellent (70 - 100)

No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
MEVE-0209-0.812-R 12/13/2006	285	95	Gravity - Dry Stone	Fill Wall	79	\$0.00
MEVE-0209-0.855-R 12/13/2006	658	94	Gravity - Dry Stone	Fill Wall	76	\$0.00

*2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0211: SUN TEMPLE 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

Retaining Wall Condition Legend – Wall Condition Rating

Critical / Poor (0 - 49)

Fair (50 - 69)

Good to Excellent (70 - 100)

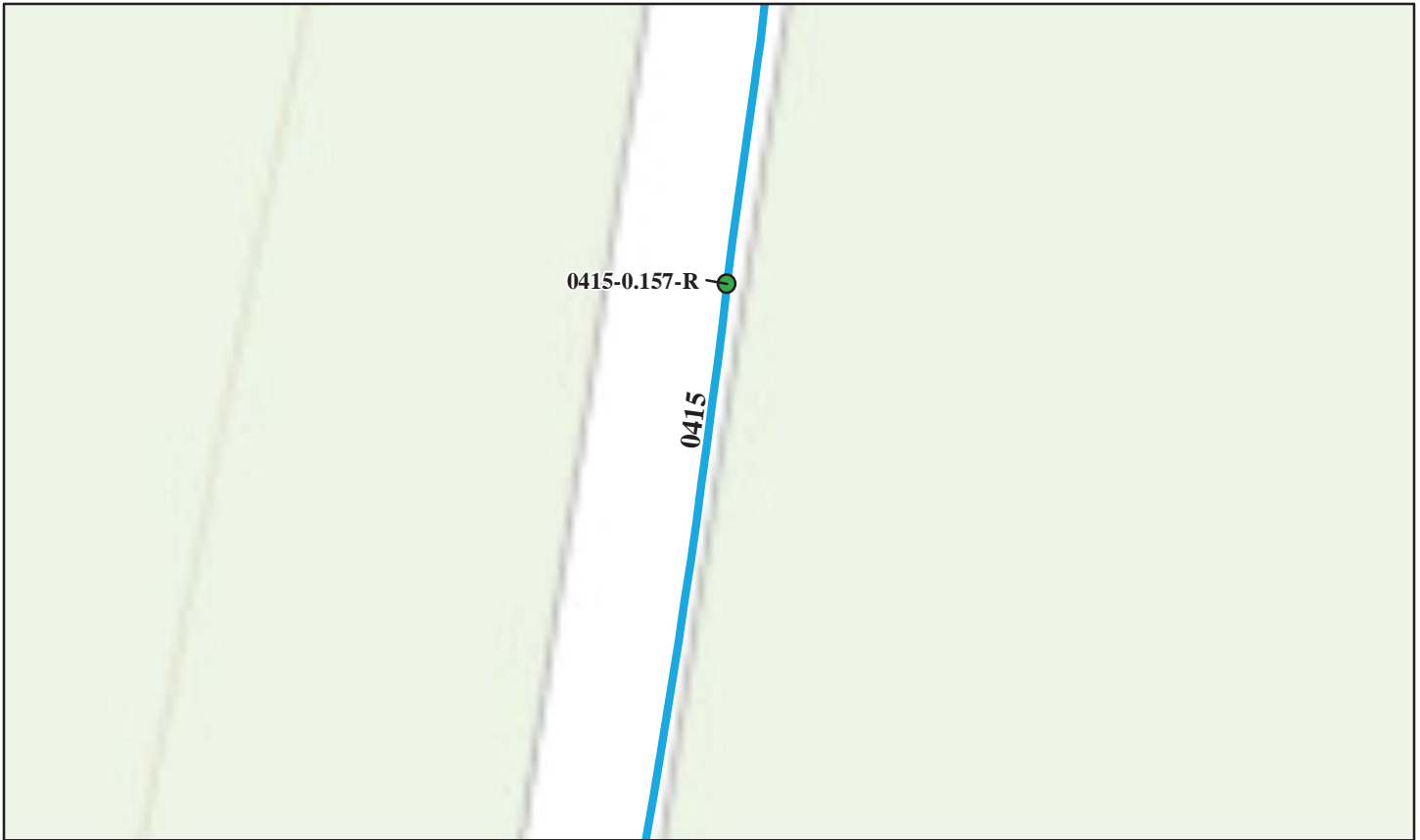
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Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
MEVE-0211-0.308-R 12/13/2006	1,456	182	Gravity - Dry Stone	Fill Wall	83	\$0.00

*2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0415: WHITE HOUSE RESIDENCE 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

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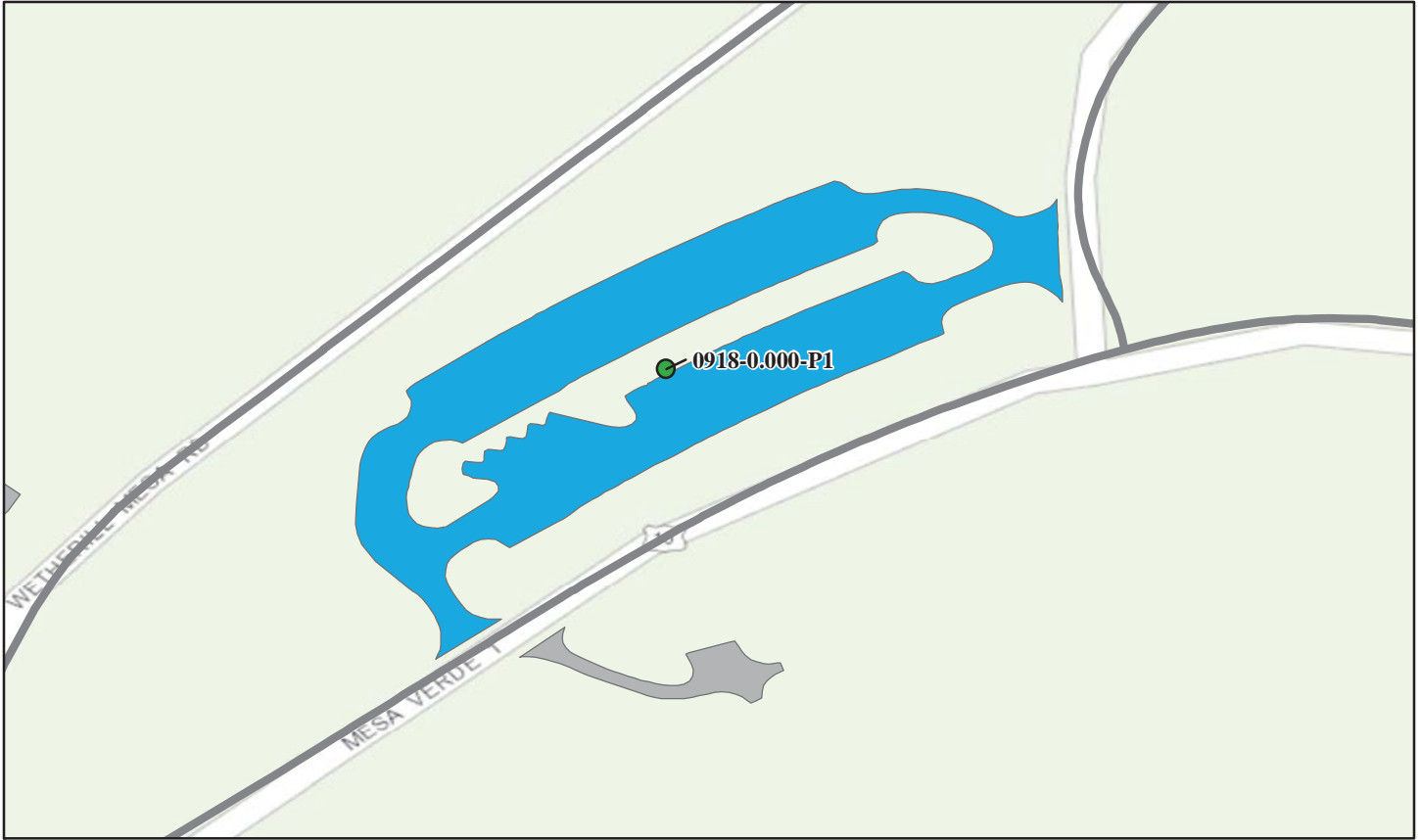
No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
MEVE-0415-0.157-R 12/13/2006	190	38	Gravity - Dry Stone	Fill Wall	77	\$0.00

*2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0918: VISITOR CENTER PARKING



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

Retaining Wall Condition Legend – Wall Condition Rating

Critical / Poor (0 - 49)

Fair (50 - 69)

Good to Excellent (70 - 100)

No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
MEVE-0918-0.000-P1 12/12/2006	1405	281	Cantilever - Concrete	Fill Wall	90	\$0.00

*2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0925: SIDE HEADQUARTERS AND POST OFFICE PARKING



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

Retaining Wall Condition Legend – Wall Condition Rating

Critical / Poor (0 - 49)

Fair (50 - 69)

Good to Excellent (70 - 100)

No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
MEVE-0925-0.000-P1 12/13/2006	340	85	Gravity - Dry Stone	Fill Wall	82	\$0.00
MEVE-0925-0.000-P2 12/13/2006	80	16	Gravity - Dry Stone	Fill Wall	79	\$0.00

*2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Tier 3 Retaining Wall Details



Mesa Verde National Park



Federal Lands Highway
Road Inventory Program

Wall ID:	MEVE-0010-2.526-L		
Route Name:	ENTRANCE ROAD		
Inspection Date:	December 11, 2006	Approximate Year Built:	1988
*Wall Rating:	89	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Anchor - Tieback H-Pile
Surface Treatment:	Other - Wood Preservative (Cu)	Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Soldier Pile Wall with Timber Lagging, Second-Generation Style		

Wall Measurements

Wall Length (ft.):	105	Face Area (sq.):	735
Average Wall Height (ft.):	7	Face Angle (deg.):	85
Maximum Wall Height (ft.):	9	Vertical Offset (ft.):	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Wall is in excellent condition and functioning as intended	9
ANCHOR HEADS 8.00	Minor staining, wall elements fully bearing against retained units w/o distortion	9
LAGGING 8.00	Isolated evidence of element cracking, minimal cracking w/o loss of function	9
PILES AND SHAFTS 8.00	No evidence of corrosion, no evidence of element cracking, no signs of distortion or deflection, no wall elements are missing	9
ROAD/SIDEWALK/SHOULDER 0.50	Road, limited visibility due to snow cover, limited cracking in outward tire lane, which may be typical of entire roadway	8
DOWNSLOPE 0.50	Steep, but low visibility due to snow cover, no signs of erosion associated with retaining wall	9
LATERAL SLOPE 0.50	Steep, but low visibility due to snow cover, no signs of erosion associated with retaining wall	9
TRAFFIC BARRIER/FENCE 0.50	Guardrail shows no distress due to retaining wall displacement	10
VEGETATION 1.00	Minor, isolated rabbit brush at toe and upslope; does not appear to impact wall performance	7

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: ENTRANCE ROAD

Retaining Wall Condition Photos



MEVE_0010_2.526_L_1.jpg



MEVE_0010_2.526_L_2.jpg

Wall ID:	MEVE-0010-2.576-L		
Route Name:	ENTRANCE ROAD		
Inspection Date:	December 12, 2006	Approximate Year Built:	2004
*Wall Rating:	97	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Anchor - Tieback H-Pile
Surface Treatment:	Other - Wood Preservative (Cu & Zn)	Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Timber Lagging Soldier Pile Wall, 3rd Generation		

Wall Measurements

Wall Length (ft.):	152	Face Area (sq.):	2128
Average Wall Height (ft.):	14	Face Angle (deg.):	85
Maximum Wall Height (ft.):	15	Vertical Offset (ft.):	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Wall is in excellent condition, relatively new and functioning as intended	10
LAGGING 8.00	Isolated evidence of minor cracking without loss of function	9
ANCHOR HEADS 8.00	Minor staining, wall elements fully bearing against retained units without distortion	10
PILES AND SHAFTS 8.00	Relatively new, few signs of distress	10
DOWNSLOPE 0.50	Approximately 15ft-wide bench in front of retaining wall, low visibility below due to snow cover, minor signs of erosion associated with retaining wall, no observed impact on retaining wall	9
LATERAL SLOPE 0.50	Steep slope, low visibility due to snow cover, no signs of erosion or impact to retaining wall	9
ROAD/SIDEWALK/SHOULDER 0.50	Road shows no signs of distress due to retaining wall	9
TRAFFIC BARRIER/FENCE 0.50	Guardrail shows no distress due to retaining wall displacement	10

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: ENTRANCE ROAD

Retaining Wall Condition Photos



MEVE_0010_2.576_L_1.jpg



MEVE_0010_2.576_L_2.jpg

Wall ID:	MEVE-0010-2.649-L		
Route Name:	ENTRANCE ROAD		
Inspection Date:	December 12, 2006	Approximate Year Built:	1980
*Wall Rating:	81	Maintenance Action:	Maintenance

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Anchor - Tieback H-Pile
Surface Treatment:	Other - Wood Preservative (Cu)	Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Timber Lagging Soldier Pile Wall with Walers, 1st Generation		

Wall Measurements

Wall Length (ft.):	117	Face Area (sq.):	1287
Average Wall Height (ft.):	11	Face Angle (deg.):	85
Maximum Wall Height (ft.):	14	Vertical Offset (ft.):	-1

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition with need of minor repairs, functioning as intended	8
ANCHOR HEADS 8.00	Minor surficial corrosion, minor cracking, isolated areas of paint missing	8
LAGGING 8.00	Isolated minor timber deformation (at 2 locations), not impacting the function	8
PILES AND SHAFTS 8.00	Minor surficial corrosion, minor cracking, isolated areas of paint missing	8
ROAD/SIDEWALK/SHOULDER 0.50	Road has minor cracking in outbound lane parallel to slope	8
CULVERT 0.50	No issues or obvious signs of distress, appears to function properly	9
DOWNSLOPE 0.50	Approximately 5-ft wide bench before moderate slope, no signs of significant erosion, minor vegetation, low visibility due to snow cover	9
LATERAL SLOPE 0.50	No signs of significant erosion, minor vegetation, low visibility due to snow cover	9
TRAFFIC BARRIER/FENCE 0.50	Guardrail shows no signs of distress	9

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	Surface treatment (painting) of walers: 400ft ² painting walers @ \$1/ft ² = \$400. 20 hrs labor @ \$55/hr=\$1100, TOTAL=\$1500
Repair Cost:	\$1,500

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: ENTRANCE ROAD

Retaining Wall Condition Photos



MEVE_0010_2.649_L_1.jpg



MEVE_0010_2.649_L_2.jpg

Wall ID:	MEVE-0010-2.727-L		
Route Name:	ENTRANCE ROAD		
Inspection Date:	December 12, 2006	Approximate Year Built:	1988
*Wall Rating:	83	Maintenance Action:	Maintenance

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Anchor - Tieback H-Pile
Surface Treatment:	Other - Wood Preservative (Cu)	Secondary Wall Type:	Anchor - Tieback H-Pile
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Soldier Pile and Timber Lagging Tieback Wall, 2nd Generation (1988) and 3rd Generation (2004)		

Wall Measurements

Wall Length (ft.):	1032	Face Area (sq.):	14448
Average Wall Height (ft.):	14	Face Angle (deg.):	90
Maximum Wall Height (ft.):	18	Vertical Offset (ft.):	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition, minor maintenance painting needed, functioning as intended	8
ANCHOR HEADS 8.00	Isolated lower anchor heads have minor corrosion, functioning as intended	8
PILES AND SHAFTS 8.00	No signs of distortion or distress, needs spot painting and routine maintenance	8
LAGGING 8.00	Isolated locations of distortion, no observed cracking, functioning as intended	9
ROAD/SIDEWALK/SHOULDER 0.50	Road- limited visibility due to snow cover, minor cracking	8
CULVERT 0.50	Good condition, functioning as intended	9
DOWNSLOPE 0.50	Wide bench in areas, then steep slope - low visibility due to snow cover, no signs of erosion	9
LATERAL SLOPE 0.50	Low visibility due to snow cover, no signs of erosion	9
TRAFFIC BARRIER/FENCE 0.50	Guardrail shows no signs of distress due to retaining wall displacement	10

Repair Recommendations

Failure Consequence:	MODERATE		
Recommendation Narrative:	Repaint 85 piles in old section: 14ft ht +2.5 ft service area = 35 ft2 x85 = 2,975 ft2 @\$1/ft2 = \$2,975 labor hours @\$55/hr = \$2,200. TOTAL=\$5,175	40	
Repair Cost:	\$5,175		

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: ENTRANCE ROAD

Retaining Wall Condition Photos



MEVE_0010_2.727_L_1.jpg



MEVE_0010_2.727_L_2.jpg

Wall ID:	MEVE-0010-2.982-L		
Route Name:	ENTRANCE ROAD		
Inspection Date:	December 12, 2006	Approximate Year Built:	2004
*Wall Rating:	96	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Anchor - Tieback H-Pile
Surface Treatment:	Other - Wood Preservative (Cu)	Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Soldier Pile and Timber Lagging Tieback Wall, 3rd Generation		

Wall Measurements

Wall Length (ft.):	183	Face Area (sq.):	2379
Average Wall Height (ft.):	13	Face Angle (deg.):	85
Maximum Wall Height (ft.):	15	Vertical Offset (ft.):	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent condition, functioning as intended, minor erosion below wall should be monitored.	10
PILES AND SHAFTS 8.00	Occasional short sections of piles unpainted at base of wall, no signs of corrosion, functioning as intended	9
ANCHOR HEADS 8.00	Functioning as intended	10
LAGGING 8.00	Functioning as intended	10
ROAD/SIDEWALK/SHOULDER 0.50	Road shows no signs of distress, partially covered with snow	10
TRAFFIC BARRIER/FENCE 0.50	Guardrail shoos no signs of distress due to retaining wall displacement	10
DOWNSLOPE 1.00	Approximately 15-ft wide bench, followed by steep slope, first 15-20 feet of bench is eroded, but not impacting wall function, should be monitored	7
LATERAL SLOPE 1.00	No signs of erosion or impacts on the retaining wall	7

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: ENTRANCE ROAD

Retaining Wall Condition Photos



MEVE_0010_2.982_L_1.jpg



MEVE_0010_2.982_L_2.jpg

Wall ID:	MEVE-0010-3.057-L		
Route Name:	ENTRANCE ROAD		
Inspection Date:	December 12, 2006	Approximate Year Built:	2004
*Wall Rating:	98	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Anchor - Tieback H-Pile
Surface Treatment:	Other - Wood Preservative (Cu)	Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Soldier Pile and Timber Lagging Tieback Wall, 3rd Generation		

Wall Measurements

Wall Length (ft.):	94	Face Area (sq.):	940
Average Wall Height (ft.):	10	Face Angle (deg.):	85
Maximum Wall Height (ft.):	13	Vertical Offset (ft.):	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Excellent, like new condition, functioning as intended	10
LAGGING 8.00	Functioning as intended, no signs of distress	9
ANCHOR HEADS 8.00	Functioning as intended, no signs of distress	10
PILES AND SHAFTS 8.00	No signs of distress	10
DOWNSLOPE 0.50	Approximately 5-ft bench, steep slope below, no signs of erosion, limited visibility due to snow cover	10
LATERAL SLOPE 0.50	Steep slope, no signs of erosion or impact on the retaining wall, limited visibility due to snow cover	10
ROAD/SIDEWALK/SHOULDER 0.50	Road shows no signs of distress, some snow and ice cover	10
TRAFFIC BARRIER/FENCE 0.50	Guardrail shows no signs of distress due to retaining wall displacement	10

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: ENTRANCE ROAD

Retaining Wall Condition Photos



MEVE_0010_3.057_L_1.jpg



MEVE_0010_3.057_L_2.jpg

Wall ID:	MEVE-0010-3.107-L		
Route Name:	ENTRANCE ROAD		
Inspection Date:	December 12, 2006	Approximate Year Built:	1980
*Wall Rating:	84	Maintenance Action:	Maintenance

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Anchor - Tieback H-Pile
Surface Treatment:	Other - Wood Preservative (Cu)	Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Soldier Pile and Timber Lagging Tieback Wall, 1st Generation		

Wall Measurements

Wall Length (ft.):	197	Face Area (sq.):	4925
Average Wall Height (ft.):	25	Face Angle (deg.):	85
Maximum Wall Height (ft.):	33	Vertical Offset (ft.):	-1

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition, minor corrosion	8
ANCHOR HEADS 8.00	Minor superficial corrosion, not affecting performance, functioning as intended	8
PILES AND SHAFTS 8.00	Minor corrosion not affecting performance	8
LAGGING 8.00	Isolated cracking, no distortion, performance as intended	9
DOWNSLOPE 0.50	Approximately 40-ft wide bench, no erosion observed, limited visibility due to snow cover	10
LATERAL SLOPE 0.50	No erosion observed, limited visibility due to snow cover	10
ROAD/SIDEWALK/SHOULDER 0.50	Roadway no signs of distress, limited visibility due to snow cover	10
TRAFFIC BARRIER/FENCE 0.50	Guardrail not affected by retaining wall, no signs of distress	10

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	Repaint piles and walers: 26 walers x 40 ft ² /each= 1040 ft ² @\$1/ft ² = \$1040. 22 piles x 25 ft ht x 1.5 ft = 825 ft ² @\$1/ft ² = \$825. 40 labor hrs @\$55/hr = \$2200. TOTAL=\$4065
Repair Cost:	\$4,065

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: ENTRANCE ROAD

Retaining Wall Condition Photos



MEVE_0010_3.107_L_1.jpg



MEVE_0010_3.107_L_2.jpg

Wall ID:	MEVE-0010-3.330-L		
Route Name:	ENTRANCE ROAD		
Inspection Date:	December 12, 2006	Approximate Year Built:	1980
*Wall Rating:	80	Maintenance Action:	Maintenance

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Anchor - Tieback H-Pile
Surface Treatment:	Other - Wood Preservative (Cu)	Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Soldier Pile and Timber Lagging Tieback Wall with Walers, 1st Generation		

Wall Measurements

Wall Length (ft.):	867	Face Area (sq.):	10404
Average Wall Height (ft.):	12	Face Angle (deg.):	85
Maximum Wall Height (ft.):	36	Vertical Offset (ft.):	-5

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Wall is in good condition, needs minor repairs and routine maintenance, but performing as intended	8
ANCHOR HEADS 8.00	Minor isolated corrosion of anchor heads; walers need paint, but are functioning as intended	8
LAGGING 8.00	Generally good condition, two broken at one bent location that will require routine maintenance, at one other location, 5 timbers in upper edge need replacement	8
PILES AND SHAFTS 8.00	Minor isolated corrosion, minor corrosion at base of piles, which needs paint, functioning as intended	8
LATERAL SLOPE 0.50	Steep, but low visibility due to snow cover, no signs of erosion associated with retaining wall	9
ROAD/SIDEWALK/SHOULDER 0.50	Road, limited visibility due to snow cover, no observed distress in roadway	9
TRAFFIC BARRIER/FENCE 0.50	Guardrail shows no distress due to retaining wall displacement	10
DOWNSLOPE 1.00	Steep, but low visibility due to snow cover, signs of erosion associated with retaining wall	6

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	Repaint Piles & Walers at old (highest) section (timber replacement NOT included): 35 walersx40ft2/each=1400 ft2@\$1/ft2=\$1,400. 35 pilesx30ft longx1.5ft wide = 1,575@\$1/ft2= \$1,575. 60 labor hrs @\$55/hr = \$3,300. TOTAL=\$6,275
Repair Cost:	\$6,275

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: ENTRANCE ROAD

Retaining Wall Condition Photos



MEVE_0010_3.330_L_1.jpg



MEVE_0010_3.330_L_2.jpg

Wall ID:	MEVE-0010-6.901-L		
Route Name:	ENTRANCE ROAD		
Inspection Date:	December 12, 2006	Approximate Year Built:	1984
*Wall Rating:	83	Maintenance Action:	Maintenance

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	MSE - Welded Wire Face
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Hilfiker MSE Wire-basket faced Wall		

Wall Measurements

Wall Length (ft.):	175	Face Area (sq.):	525
Average Wall Height (ft.):	3	Face Angle (deg.):	85
Maximum Wall Height (ft.):	4	Vertical Offset (ft.):	-3

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition with minor toe erosion, need curb replacement at top of wall to channel water away from retaining wall	9
WALL FOUNDATION MATERIAL 8.00	Foundation on firm soil, no signs of settlement, functioning as intended	9
WIRE/GEOSYNTHETIC FACING 8.00	Minor corrosion of wires, performing as intended, hardware wire appears to have minor corrosion	8
LATERAL SLOPE 0.50	Limited visibility due to snow cover, no observed erosion impacting the retaining wall	9
TRAFFIC BARRIER/FENCE 0.50	Guardrail is in good condition, no distress related to retaining wall	9
CURB/BERM/DITCH 1.00	Asphalt curbing missing in places, needs replacement	5
DOWNSLOPE 1.00	Minor erosion, no bench, steep slope, does not appear to impact wall function, slope not vegetated, limited visibility due to snow cover	7
ROAD/SIDEWALK/SHOULDER 1.00	Road outbound lane shows settlement and rutting, has patching at top of wall, may indicate minor settlement of retaining wall	7

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	Replace curb 50 ft linear asphalt curb: Materials 60902 concrete curb item @\$30/linear ft. 50ft x\$30/ft = \$1,500. 8 hrs labor @ \$55/hr = \$440. +10%mob= \$200. TOTAL=\$2,140
Repair Cost:	\$2,140

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: ENTRANCE ROAD

Retaining Wall Condition Photos



MEVE_0010_6.901_L_1.jpg



MEVE_0010_6.901_L_2.jpg

Wall ID:	MEVE-0010-6.995-L		
Route Name:	ENTRANCE ROAD		
Inspection Date:	December 12, 2006	Approximate Year Built:	1984
*Wall Rating:	84	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	MSE - Welded Wire Face
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Hilfiker MSE wire-basket faced Wall		

Wall Measurements

Wall Length (ft.):	105	Face Area (sq.):	315
Average Wall Height (ft.):	3	Face Angle (deg.):	85
Maximum Wall Height (ft.):	40	Vertical Offset (ft.):	-4

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition with minor signs of distress and no signs of settlement	8
WALL FOUNDATION MATERIAL 8.00	Good bedrock foundation, no observed base, no signs of distress	9
WIRE/GEOSYNTHETIC FACING 8.00	Minor corrosion of mesh, very little on baskets, functioning as intended, difficult access with steep lateral slopes	8
DOWNSLOPE 0.50	Minor erosion, very steep, scarce limited vegetation, limited visibility due to snow cover	8
LATERAL SLOPE 0.50	Steep, no signs of erosion or impact related to retaining wall	9
TRAFFIC BARRIER/FENCE 0.50	Guardrail no signs of distress related to the retaining wall	9
ROAD/SIDEWALK/SHOULDER 0.50	Road - new pavement overlay, no signs of distress	10

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: ENTRANCE ROAD

Retaining Wall Condition Photos



MEVE_0010_6.995_L_1.jpg



MEVE_0010_6.995_L_2.jpg

Wall ID:	MEVE-0010-7.513-L		
Route Name:	ENTRANCE ROAD		
Inspection Date:	December 13, 2006	Approximate Year Built:	1970
*Wall Rating:	80	Maintenance Action:	Maintenance

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Crib - Metal
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Galvanized Metal Crib Wall		

Wall Measurements

Wall Length (ft.):	48	Face Area (sq.):	144
Average Wall Height (ft.):	3	Face Angle (deg.):	80
Maximum Wall Height (ft.):	5	Vertical Offset (ft.):	-10

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Wall performing as intended, no distress	7
WALL FOUNDATION MATERIAL 8.00	No signs of distortion or movement	9
BIN OR CRIB 8.00	Minor to no corrosion or cracking, minor deformation of crib joints, minor loss of galvanization	8
UPSLOPE 0.50	Minor surficial erosion	8
DOWNSLOPE 0.50	Gentle downslope with no distress	9
LATERAL SLOPE 0.50	No sign of erosion or failure	9
ROAD/SIDEWALK/SHOULDER 0.50	Road no pavement distress	9
TRAFFIC BARRIER/FENCE 0.50	Guardrail about 30ft above wall, no signs of distress	9
VEGETATION 1.00	Trees growing out of face of wall	5

Repair Recommendations

Failure Consequence:	LOW
Recommendation Narrative:	Removal of small trees in wall face: <\$500
Repair Cost:	\$400

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: ENTRANCE ROAD

Retaining Wall Condition Photos



MEVE_0010_7.513_L_1.jpg



MEVE_0010_7.513_L_2.jpg

Wall ID:	MEVE-0010-7.776-L		
Route Name:	ENTRANCE ROAD		
Inspection Date:	December 12, 2006	Approximate Year Built:	1990
*Wall Rating:	86	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Fill Wall	Primary Wall Type:	Anchor - Tieback H-Pile
Surface Treatment:	Other - Wood Preservative (Cu)	Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Soldier Pile and Timber Lagging Tieback Wall, Single anchor per soldier pile		
Wall Measurements			
Wall Length (ft.):	180	Face Area (sq.):	2160
Average Wall Height (ft.):	12	Face Angle (deg.):	85
Maximum Wall Height (ft.):	13	Vertical Offset (ft.):	-5
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition, minor corrosion of piles and anchor heads (needs paint), wall functioning as intended		8
WALL FOUNDATION MATERIAL 8.00	Covered, no settlement or signs of distress from base, base appears to be near bedrock		10
ANCHOR HEADS 8.00	Minor corrosion on all anchor heads, not impacting function of retaining wall, needs paint		8
PILES AND SHAFTS 8.00	Minor corrosion on all piles, piles appear not to be painted, not impacting function of retaining wall, needs paint		8
LAGGING 8.00	Isolated movement at the top of the lagging, should add 1 timber to top (erosion at top)		9
DOWNSLOPE 0.50	Approximately 30-ft wide bench with minor vegetation,		10
LATERAL SLOPE 0.50	No erosion impacting retaining wall		10
Repair Recommendations			
Failure Consequence:	MODERATE		
Recommendation Narrative:	Paint piles and anchor heads: 24 piles - 1.5ft wide x 12 ft ht = 432 ft ² @\$1/ft ² =\$432. 22 anchor heads x 5 ft ² /anchor head = 110ft ² @\$1/ft = \$100. 20 hrs labor x\$55/hr = \$1,100. TOTAL= \$1642		
Repair Cost:	\$1,642		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Mesa Verde National Park

ROUTE 0010: ENTRANCE ROAD

Retaining Wall Condition Photos



MEVE_0010_7.776_L_1.jpg



MEVE_0010_7.776_L_2.jpg

Wall ID:	MEVE-0010-9.452-R		
Route Name:	ENTRANCE ROAD		
Inspection Date:	December 12, 2006	Approximate Year Built:	1960
*Wall Rating:	88	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Mortared Stone Gravity Wall, 1 ft blocks stacked 3 high		

Wall Measurements

Wall Length (ft.):	35	Face Area (sq.):	630
Average Wall Height (ft.):	18	Face Angle (deg.):	80
Maximum Wall Height (ft.):	20	Vertical Offset (ft.):	3

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition, no missing elements, no signs of distress	8
WALL FOUNDATION MATERIAL 8.00	Appears to be keyed into bedrock	10
STONE MASONRY 8.00	Rock stone with little or no cracking, none missing, mortar ok, difficult visibility due to snow cover, appears to function as intended	8
DOWNSLOPE 0.50	Rock outcrop/ Bedrock	10
LATERAL SLOPE 0.50	Rock outcrop/Bedrock, no impact	10
ROAD/SIDEWALK/SHOULDER 0.50	Road 2yrs old, no signs of distress from retaining wall, partially covered with snow and ice	10
TRAFFIC BARRIER/FENCE 0.50	Guardrail 2 yrs old, like new, no distress observed	10

Repair Recommendations

Failure Consequence:	LOW
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: ENTRANCE ROAD

Retaining Wall Condition Photos



MEVE_0010_9.452_R_1.jpg

Wall ID:	MEVE-0010-10.037-L		
Route Name:	ENTRANCE ROAD		
Inspection Date:	December 12, 2006	Approximate Year Built:	1984
*Wall Rating:	83	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	MSE - Welded Wire Face
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Hilfiker Wire-basket faced MSE Wall		

Wall Measurements

Wall Length (ft.):	282	Face Area (sq.):	846
Average Wall Height (ft.):	3	Face Angle (deg.):	85
Maximum Wall Height (ft.):	4	Vertical Offset (ft.):	-3

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good, performing as intended, no signs of distress or deficiencies	8
WALL FOUNDATION MATERIAL 8.00	Likely on good soils, not observed due to snow cover, no signs of distress	9
WIRE/GEOSYNTHETIC FACING 8.00	Minor corrosion on mesh, very little on baskets, functioning as intended, no bulging or settlement observed	8
ROAD/SIDEWALK/SHOULDER 0.50	Minor roadway cracking and settlement	8
CULVERT 0.50	Edge drain to culvert (one at each end of wall), functioning as intended, not impacting wall	9
DOWNSLOPE 0.50	Minor erosion, steep, limited visibility due to snow cover	9
LATERAL SLOPE 0.50	No observed impact	9
TRAFFIC BARRIER/FENCE 0.50	No signs of distress related to retaining wall	9
CURB/BERM/DITCH 1.00	Curb functional, with raveling at interface with asphalt overlay, minor cracking	7

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: ENTRANCE ROAD

Retaining Wall Condition Photos



MEVE_0010_10.037_L_1.jpg



MEVE_0010_10.037_L_2.jpg

Wall ID:	MEVE-0010-10.128-L		
Route Name:	ENTRANCE ROAD		
Inspection Date:	December 12, 2006	Approximate Year Built:	1984
*Wall Rating:	83	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	MSE - Welded Wire Face
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Hilfiker Wire-Basket Faced MSE Wall		

Wall Measurements

Wall Length (ft.):	267	Face Area (sq.):	801
Average Wall Height (ft.):	3	Face Angle (deg.):	85
Maximum Wall Height (ft.):	4	Vertical Offset (ft.):	-3

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good , performing as intended, no signs of distress or settlement	8
WALL FOUNDATION MATERIAL 8.00	Low visibility due to snow cover, likely good soil, no signs of settlement or distress	9
WIRE/GEOSYNTHETIC FACING 8.00	Minor corrosion on mesh, very little on baskets, functioning as intended, no bulging or settlement	8
ROAD/SIDEWALK/SHOULDER 0.50	Roadway minor longitudinal cracking	8
DOWNSLOPE 0.50	Steep, minor rabbit brush vegetation, stable, limited visibility due to snow cover	9
LATERAL SLOPE 0.50	No impact	9
TRAFFIC BARRIER/FENCE 0.50	Guardrail no rotation or distress due to retaining wall	9
CURB/BERM/DITCH 1.00	Curb minor cracking in places	7

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: ENTRANCE ROAD

Retaining Wall Condition Photos



MEVE_0010_10.128_L_1.jpg



MEVE_0010_10.128_L_2.jpg

Wall ID:	MEVE-0010-10.190-L		
Route Name:	ENTRANCE ROAD		
Inspection Date:	December 12, 2006	Approximate Year Built:	1984
*Wall Rating:	83	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	MSE - Welded Wire Face
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Hilfiker Wire-Basket MSE Wall		

Wall Measurements

Wall Length (ft.):	150	Face Area (sq.):	450
Average Wall Height (ft.):	3	Face Angle (deg.):	85
Maximum Wall Height (ft.):	4	Vertical Offset (ft.):	-3

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Performing as intended, no signs of distress or settlement	8
WALL FOUNDATION MATERIAL 8.00	Likely good soil, nor signs of settlement or distress, limited visibility due to snow cover	9
WIRE/GEOSYNTHETIC FACING 8.00	Minor corrosion on mesh, very little on baskets, functioning as intended, no signs of bulging or settlement	8
ROAD/SIDEWALK/SHOULDER 0.50	Minor Roadway longitudinal cracking	8
DOWNSLOPE 0.50	Steep with minor vegetation, stable, limited visibility due to snow cover	9
LATERAL SLOPE 0.50	No impact, limited visibility due to snow cover	9
TRAFFIC BARRIER/FENCE 0.50	Guardrail no rotation or settlement, no distress or impact on retaining wall	9
CURB/BERM/DITCH 1.00	Curb minor cracking in places	7

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: ENTRANCE ROAD

Retaining Wall Condition Photos



MEVE_0010_10.190_L_1.jpg

Wall ID:	MEVE-0010-11.761-L		
Route Name:	ENTRANCE ROAD		
Inspection Date:	December 12, 2006	Approximate Year Built:	1984
*Wall Rating:	83	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	MSE - Welded Wire Face
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Hilfiker Wire-Basket Faced MSE Wall		

Wall Measurements

Wall Length (ft.):	205	Face Area (sq.):	615
Average Wall Height (ft.):	3	Face Angle (deg.):	85
Maximum Wall Height (ft.):	4	Vertical Offset (ft.):	-4

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good, performing as intended, no signs of distress or settlement	8
WALL FOUNDATION MATERIAL 8.00	Likely good soil base, no signs of settlement or distress, limited visibility due to snow cover	9
WIRE/GEOSYNTHETIC FACING 8.00	Minor corrosion on mesh, little on baskets, functioning as intended, no evidence of settlement	8
ROAD/SIDEWALK/SHOULDER 0.50	Minor roadway longitudinal cracking	8
VEGETATION 0.50	Minor brush vegetation growing at top and bottom of wall, does not appear to impact wall	8
DOWNSLOPE 0.50	Steep with moderate oak brush vegetation, no wall distortion observed, limited visibility due to snow cover	9
LATERAL SLOPE 0.50	No impact	9
TRAFFIC BARRIER/FENCE 0.50	Guardrail no rotation or settlement, no distress or impact on retaining wall	9
CURB/BERM/DITCH 1.00	Curb raveling at top, minor isolated cracking and degradation	7

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: ENTRANCE ROAD

Retaining Wall Condition Photos



MEVE_0010_11.761_L_1.jpg



MEVE_0010_11.761_L_2.jpg

Wall ID:	MEVE-0010-11.833-L		
Route Name:	ENTRANCE ROAD		
Inspection Date:	December 12, 2006	Approximate Year Built:	1984
*Wall Rating:	84	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	MSE - Welded Wire Face
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Hilfiker Wire-Basket Faced MSE Wall		

Wall Measurements

Wall Length (ft.):	290	Face Area (sq.):	870
Average Wall Height (ft.):	3	Face Angle (deg.):	85
Maximum Wall Height (ft.):	4	Vertical Offset (ft.):	-3

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good, performing as intended, no signs of distress and minor indication of settlement	8
WALL FOUNDATION MATERIAL 8.00	Likely good soil base, no signs of settlement or distress, limited visibility due to snow cover	9
WIRE/GEOSYNTHETIC FACING 8.00	Minor corrosion in mesh, little on baskets, functioning as intended, no evidence of settlement, limited visibility due to snow cover	8
ROAD/SIDEWALK/SHOULDER 0.50	Road minor longitudinal cracking, minor rutting, possibly older overlay, minor signs of settlement or wall distress	8
VEGETATION 0.50	Minor vegetation in wall	8
DOWNSLOPE 0.50	Steep with heavy vegetation of oak brush, no wall impacts observed, limited visibility due to snow cover	9
LATERAL SLOPE 0.50	No impact observed, limited visibility due to snow cover	9
TRAFFIC BARRIER/FENCE 0.50	Guardrail no rotation or settlement observed, no impact on retaining wall	9

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: ENTRANCE ROAD

Retaining Wall Condition Photos



MEVE_0010_11.833_L_1.jpg



MEVE_0010_11.833_L_2.jpg

Wall ID:	MEVE-0010-14.883-R		
Route Name:	ENTRANCE ROAD		
Inspection Date:	December 12, 2006	Approximate Year Built:	1970
*Wall Rating:	85	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Cantilever - Concrete
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Concrete Cantilever wall with exposed aggregate facing		

Wall Measurements

Wall Length (ft.):	316	Face Area (sq.):	2528
Average Wall Height (ft.):	8	Face Angle (deg.):	90
Maximum Wall Height (ft.):	15	Vertical Offset (ft.):	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good, minor cracking and spalling may need routine maintenance, functioning as intended	9
WALL FOUNDATION MATERIAL 8.00	No signs of distress, limited visibility due to snow cover	9
CONCRETE 8.00	Minor longitudinal cracking outside construction joints, minor spalling at tunnel, approximately 2 inch offset at top of wall at tunnel joint, function not impacted, recommend routine maintenance at spalling areas near tunnel (may continue to deteriorate)	8
TRAFFIC BARRIER/FENCE 0.50	Metal rail at top, no signs of distress due to retaining wall	9
UPSLOPE 0.50	Flat, no observed distress, limited visibility due to snow cover	9

Repair Recommendations

Failure Consequence:	LOW
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0010: ENTRANCE ROAD

Retaining Wall Condition Photos



MEVE_0010_14.883_R_1.jpg



MEVE_0010_14.883_R_2.jpg

Wall ID:	MEVE-0100-1.553-R		
Route Name:	BALCONY HOUSE / CLIFF PALACE ROAD		
Inspection Date:	December 13, 2006	Approximate Year Built:	1923
*Wall Rating:	83	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Gravity - Dry Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Sandstone Rockery		

Wall Measurements

Wall Length (ft.):	209	Face Area (sq.):	418
Average Wall Height (ft.):	2	Face Angle (deg.):	85
Maximum Wall Height (ft.):	4	Vertical Offset (ft.):	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Overall good shape, no significant or noticeable distress	8
WALL FOUNDATION MATERIAL 8.00	Shallow soil to bedrock	9
PLACED STONE 8.00	Slight to moderately weathered sandstone, good condition	8
DOWNSLOPE 0.50	Gentle slope, shallow bedrock	8
LATERAL SLOPE 0.50	No signs of distress	8
ROAD/SIDEWALK/SHOULDER 0.50	Road no distress due to wall, recent chipseal	8
VEGETATION 1.00	Some vegetation along caprock	7

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park
ROUTE 0100: BALCONY HOUSE / CLIFF PALACE ROAD

Retaining Wall Condition Photos



MEVE_0100_1.553_R_1.jpg



MEVE_0100_1.553_R_2.jpg

Wall ID:	MEVE-0100-2.173-R		
Route Name:	BALCONY HOUSE / CLIFF PALACE ROAD		
Inspection Date:	December 13, 2006	Approximate Year Built:	1923
*Wall Rating:	83	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Gravity - Dry Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Very crudely constructed rockery/ rock fill wall		

Wall Measurements

Wall Length (ft.):	118	Face Area (sq.):	472
Average Wall Height (ft.):	4	Face Angle (deg.):	60
Maximum Wall Height (ft.):	5	Vertical Offset (ft.):	-1

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Functioning good, no distress	8
WALL FOUNDATION MATERIAL 8.00	Bedrock at toe	9
PLACED STONE 8.00	Large Block sandstone, moderately durable	8
LATERAL SLOPE 0.50	No signs of distress	8
VEGETATION 0.50	Very minor, not affecting wall	8
CULVERT 0.50	18-inch CMP, functioning very well	9
DOWNSLOPE 0.50	Bedrock immediately below toe	9

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park
ROUTE 0100: BALCONY HOUSE / CLIFF PALACE ROAD

Retaining Wall Condition Photos



MEVE_0100_2.173_R_1.jpg



MEVE_0100_2.173_R_2.jpg

Wall ID:	MEVE-0100-2.217-R		
Route Name:	BALCONY HOUSE / CLIFF PALACE ROAD		
Inspection Date:	December 13, 2006	Approximate Year Built:	1940
*Wall Rating:	89	Maintenance Action:	Maintenance

Wall Description

Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone Mortared Headwall		

Wall Measurements

Wall Length (ft.):	6	Face Area (sq.):	29
Average Wall Height (ft.):	4	Face Angle (deg.):	90
Maximum Wall Height (ft.):	4	Vertical Offset (ft.):	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Excellent condition with no signs of distress	9
WALL FOUNDATION MATERIAL 8.00	Thin stable soil over shallow bedrock	9
STONE MASONRY 8.00	Slightly weathered cut sandstone, mortar in very good shape, no cracks or weathering	9
DOWNSLOPE 0.50	Gentle, shallow bedrock, no signs of distress or erosion	9
LATERAL SLOPE 0.50	No signs of distress or erosion	9
CULVERT 0.50	CMP in excellent shape	10
VEGETATION 1.00	Some shrubbery growing over the tops, needs removal	6

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	<\$500
Repair Cost:	\$400

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park
ROUTE 0100: BALCONY HOUSE / CLIFF PALACE ROAD

Retaining Wall Condition Photos



MEVE_0100_2.217_R_1.jpg



MEVE_0100_2.217_R_2.jpg

Wall ID:	MEVE-0101-3.100-R		
Route Name:	MESA TOP ROAD		
Inspection Date:	December 13, 2006	Approximate Year Built:	1923
*Wall Rating:	87	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Gravity - Dry Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Sandstone Rockery/ Dry Stacked Rock Wall		

Wall Measurements

Wall Length (ft.):	174	Face Area (sq.):	696
Average Wall Height (ft.):	4	Face Angle (deg.):	70
Maximum Wall Height (ft.):	5	Vertical Offset (ft.):	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good, no visible distress, functioning as intended	9
WALL FOUNDATION MATERIAL 8.00	Bedrock shallow, no signs of deformation, limited visibility due to snow cover	9
PLACED STONE 8.00	Native sandstone, crudely constructed, performing as intended	8
CULVERT 0.50	Open, no distress	9
DOWNSLOPE 0.50	41 ft long 1-2 ft high dry stacked wall below existing wall functioning fine	9
ROAD/SIDEWALK/SHOULDER 0.50	Road no pavement distress	9

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0101: MESA TOP ROAD

Retaining Wall Condition Photos



MEVE_0101_3.100_R_1.jpg

Wall ID:	MEVE-0101-3.243-R		
Route Name:	MESA TOP ROAD		
Inspection Date:	December 13, 2006	Approximate Year Built:	1923
*Wall Rating:	90	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Gravity - Dry Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Sandstone Rockery/ Dry Stacked Rock		

Wall Measurements

Wall Length (ft.):	63	Face Area (sq.):	252
Average Wall Height (ft.):	4	Face Angle (deg.):	80
Maximum Wall Height (ft.):	6	Vertical Offset (ft.):	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Performing well, no distress	9
WALL FOUNDATION MATERIAL 8.00	On shallow bedrock	9
PLACED STONE 8.00	Sound durable sandstone, no cracking	9
DOWNSLOPE 0.50	Gentle slope, shallow bedrock	9
LATERAL SLOPE 0.50	No sign of impact or distress	9
ROAD/SIDEWALK/SHOULDER 0.50	No pavement distress due to wall, minor transverse crack	9

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0101: MESA TOP ROAD

Retaining Wall Condition Photos



MEVE_0101_3.243_R_1.jpg



MEVE_0101_3.243_R_2.jpg

Wall ID:	MEVE-0101-3.265-R		
Route Name:	MESA TOP ROAD		
Inspection Date:	December 13, 2006	Approximate Year Built:	1940
*Wall Rating:	90	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Gravity - Dry Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Sandstone rockery/ dry stacked rock wall		

Wall Measurements

Wall Length (ft.):	246	Face Area (sq.):	738
Average Wall Height (ft.):	3	Face Angle (deg.):	80
Maximum Wall Height (ft.):	5	Vertical Offset (ft.):	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Performing as intended, no signs of distress	9
WALL FOUNDATION MATERIAL 8.00	Shallow bedrock, no distress	9
PLACED STONE 8.00	Sound rock, no cracks or spalling	9
DOWNSLOPE 0.50	Gentle slope, shallow bedrock	9
LATERAL SLOPE 0.50	No signs of distress	9
ROAD/SIDEWALK/SHOULDER 0.50	No roadway distress due to wall, minor transverse crack	9

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0101: MESA TOP ROAD

Retaining Wall Condition Photos



MEVE_0101_3.265_R_1.jpg



MEVE_0101_3.265_R_2.jpg

Wall ID:	MEVE-0101-3.516-L		
Route Name:	MESA TOP ROAD		
Inspection Date:	December 13, 2006	Approximate Year Built:	1923
*Wall Rating:	80	Maintenance Action:	Maintenance

Wall Description

Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone Masonry Headwall, inlet side		

Wall Measurements

Wall Length (ft.):	12	Face Area (sq.):	60
Average Wall Height (ft.):	5	Face Angle (deg.):	85
Maximum Wall Height (ft.):	5	Vertical Offset (ft.):	-1

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good, no signs of distress	8
WALL FOUNDATION MATERIAL 8.00	No signs of distress, limited visibility due to snow cover	8
STONE MASONRY 8.00	Cracked mortar, low to moderate	7
PLACED STONE 8.00	Sound sandstone	9
ROAD/SIDEWALK/SHOULDER 0.50	Road, no significant distress, minor transverse cracks from culvert	8
CULVERT 0.50	36inch CMP, good shape, functioning as intended	9

Repair Recommendations

Failure Consequence:	LOW
Recommendation Narrative:	<\$500
Repair Cost:	\$400

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0101: MESA TOP ROAD

Retaining Wall Condition Photos



MEVE_0101_3.516_L_1.jpg



MEVE_0101_3.516_L_2.jpg

Wall ID:	MEVE-0200-6.753-L		
Route Name:	WETHERILL MESA ROAD		
Inspection Date:	December 14, 2006	Approximate Year Built:	1970
*Wall Rating:	84	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Bin - Metal
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Metal Bin Wall		

Wall Measurements

Wall Length (ft.):	144	Face Area (sq.):	1728
Average Wall Height (ft.):	12	Face Angle (deg.):	80
Maximum Wall Height (ft.):	15	Vertical Offset (ft.):	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good, functioning as intended, minor maintenance	8
WALL FOUNDATION MATERIAL 8.00	No signs of settlement or bulging, likely shallow bedrock foundation, well vegetated, limited visibility due to snow cover	9
BIN OR CRIB 8.00	minor corrosion with minor holes and deterioration of surface facing panels throughout; functioning as intended, no corrosion of bolts	8
DOWNSLOPE 0.50	No bench, moderate to steep slope with small trees and stable vegetation, no indication of settlement, limited visibility due to snow cover	9
LATERAL SLOPE 0.50	Moderate to steep slope with vegetation, no impact on retaining wall	9
ROAD/SIDEWALK/SHOULDER 0.50	Road minor cracking, no distress or settlement associated with retaining wall	9
TRAFFIC BARRIER/FENCE 0.50	Guardrail no distress associated with retaining wall	9
VEGETATION 0.50	Minor grass at top of retaining wall	9

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park
ROUTE 0200: WETHERILL MESA ROAD

Retaining Wall Condition Photos



MEVE_0200_6.753_L_1.jpg



MEVE_0200_6.753_L_2.jpg

Wall ID:	MEVE-0200-6.803-L		
Route Name:	WETHERILL MESA ROAD		
Inspection Date:	December 14, 2006	Approximate Year Built:	1970
*Wall Rating:	84	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Bin - Metal
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Metal Bin Wall		

Wall Measurements

Wall Length (ft.):	154	Face Area (sq.):	1540
Average Wall Height (ft.):	10	Face Angle (deg.):	83
Maximum Wall Height (ft.):	11	Vertical Offset (ft.):	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good, functioning as intended, minor maintenance and monitoring	8
WALL FOUNDATION MATERIAL 8.00	No significant settlement or bulging, likely shallow bedrock, well vegetated, low visibility due to snow cover	9
BIN OR CRIB 8.00	Minor corrosion with minor holes and deterioration of surface facing panels, functioning as intended, no significant corrosion of bolts	8
DOWNSLOPE 0.50	No bench, moderate to steep slope with small trees	9
LATERAL SLOPE 0.50	Moderate to steep slope with moderate vegetation, no impact on retaining wall	9
ROAD/SIDEWALK/SHOULDER 0.50	Road minor cracking, no distress or settlement associated with retaining wall	9
TRAFFIC BARRIER/FENCE 0.50	Guardrail no distress associated with retaining wall	9
VEGETATION 0.50	Minor grass and small brush in retaining wall, no impact on function	9

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park
ROUTE 0200: WETHERILL MESA ROAD

Retaining Wall Condition Photos



MEVE_0200_6.803_L_1.jpg



MEVE_0200_6.803_L_2.jpg

Wall ID:	MEVE-0200-11.290-R		
Route Name:	WETHERILL MESA ROAD		
Inspection Date:	December 14, 2006	Approximate Year Built:	1923
*Wall Rating:	90	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Cantilever - Concrete
Surface Treatment:	Stain	Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Concrete Box Culvert (CBC) Wingwalls		

Wall Measurements

Wall Length (ft.):	70	Face Area (sq.):	420
Average Wall Height (ft.):	6	Face Angle (deg.):	90
Maximum Wall Height (ft.):	10	Vertical Offset (ft.):	-2

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good, functioning as intended	9
WALL FOUNDATION MATERIAL 8.00	Shallow bedrock at stream channel, minor settlement indicated by cracking at contact, no cracking in base slab, no cracking in box	9
CONCRETE 8.00	Low to moderate cracking at construction joints, minor oxidation on face, functioning as intended, minor spalling	9
VEGETATION 0.50	Minor brush and grass at toe of retaining wall, which may push out the wall, minor impact	8
CULVERT 0.50	No cracks in CBC 10ftx11ft, functioning as intended	9
LATERAL SLOPE 0.50	Low to moderate slopes, no impact	9
ROAD/SIDEWALK/SHOULDER 0.50	Road minor cracking, no impact from retaining wall	9
TRAFFIC BARRIER/FENCE 0.50	Guardrail no indication of movement from retaining wall	9
UPSLOPE 0.50	Moderate slope with large rocks, vegetated with brush and grass	9

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park
ROUTE 0200: WETHERILL MESA ROAD

Retaining Wall Condition Photos



MEVE_0200_11.290_R_1.jpg



MEVE_0200_11.290_R_2.jpg

Wall ID:	MEVE-0200-11.309-L		
Route Name:	WETHERILL MESA ROAD		
Inspection Date:	December 14, 2006	Approximate Year Built:	1923
*Wall Rating:	89	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Cantilever - Concrete
Surface Treatment:	Stain	Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Concrete Box Culvert (CBC) Wingwalls, outlet side		

Wall Measurements

Wall Length (ft.):	99	Face Area (sq.):	396
Average Wall Height (ft.):	4	Face Angle (deg.):	90
Maximum Wall Height (ft.):	10	Vertical Offset (ft.):	-3

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good, functioning as intended	9
WALL FOUNDATION MATERIAL 8.00	Bedrock likely at base, no signs of settlement or distress, limited visibility due to sediment cover (outlet side)	9
CONCRETE 8.00	Low to moderate cracking at the construction joints, minor oxidation at the face, minor spalling, functioning as intended	9
VEGETATION 0.50	Minor brush and grass at top of retaining wall, may push out the top of the wall, minor impact	8
CULVERT 0.50	No cracks in CBC 10ftx11ft, no impact	9
DOWNSLOPE 0.50	Stream channel, low slope with shallow bedrock and large boulders	9
LATERAL SLOPE 0.50	Moderate slope with large boulders, no impact	9
ROAD/SIDEWALK/SHOULDER 0.50	Road minor cracking, no impact from retaining wall	9
UPSLOPE 0.50	Moderate slope with grass, no impact	9

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park
ROUTE 0200: WETHERILL MESA ROAD

Retaining Wall Condition Photos



MEVE_0200_11.309_L_1.jpg



MEVE_0200_11.309_L_2.jpg

Wall ID:	MEVE-0209-0.812-R		
Route Name:	HEADQUARTERS LOOP ROAD		
Inspection Date:	December 13, 2006	Approximate Year Built:	1923
*Wall Rating:	79	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Gravity - Dry Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Sandstone Rockery		

Wall Measurements

Wall Length (ft.):	95	Face Area (sq.):	285
Average Wall Height (ft.):	3	Face Angle (deg.):	60
Maximum Wall Height (ft.):	5	Vertical Offset (ft.):	-1

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Functioning as intended, no visible distress	8
WALL FOUNDATION MATERIAL 8.00	Thin soil cover, shallow bedrock	9
PLACED STONE 8.00	Sandstone, slightly to moderately weathered, some voids, burrows	7
CULVERT 0.50	No visible but appears to function	8
ROAD/SIDEWALK/SHOULDER 0.50	Paved sidewalk, moderate severity transverse cracks, no pavement distress due to wall	8
TRAFFIC BARRIER/FENCE 0.50	Cedar rail fence, no distress due to wall	9
DOWNSLOPE 1.00	Minor erosion from CMP	7
VEGETATION 1.00	Heavy overgrown with brush and trees, does not appear to adversely affect wall	7

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park
ROUTE 0209: HEADQUARTERS LOOP ROAD

Retaining Wall Condition Photos



MEVE_0209_0.812_R_1.jpg



MEVE_0209_0.812_R_2.jpg

Wall ID:	MEVE-0209-0.855-R		
Route Name:	HEADQUARTERS LOOP ROAD		
Inspection Date:	December 13, 2006	Approximate Year Built:	1923
*Wall Rating:	76	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Gravity - Dry Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Sandstone rockery		

Wall Measurements

Wall Length (ft.):	94	Face Area (sq.):	658
Average Wall Height (ft.):	7	Face Angle (deg.):	60
Maximum Wall Height (ft.):	11	Vertical Offset (ft.):	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition, wall performing as intended, no noticeable distress	7
WALL FOUNDATION MATERIAL 8.00	Shallow bedrock	9
PLACED STONE 8.00	Slightly to moderately weathered sandstone, some voids	7
CULVERT 0.50	8-inch CMP, good condition	8
ROAD/SIDEWALK/SHOULDER 1.00	Paved sidewalk, transverse cracking, moderate severity, no impact on wall	7
TRAFFIC BARRIER/FENCE 1.00	Cedar fence, 3-rail, fair condition, post area split	7

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park
ROUTE 0209: HEADQUARTERS LOOP ROAD

Retaining Wall Condition Photos



MEVE_0209_0.855_R_1.jpg



MEVE_0209_0.855_R_2.jpg

Wall ID:	MEVE-0211-0.308-R		
Route Name:	SUN TEMPLE ROAD		
Inspection Date:	December 13, 2006	Approximate Year Built:	1940
*Wall Rating:	83	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Gravity - Dry Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Sandstone Rockery/ Dry Stack Rock Wall		

Wall Measurements

Wall Length (ft.):	182	Face Area (sq.):	1456
Average Wall Height (ft.):	8	Face Angle (deg.):	75
Maximum Wall Height (ft.):	12	Vertical Offset (ft.):	-1

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good, Functioning as intended	8
WALL FOUNDATION MATERIAL 8.00	Shallow Bedrock, no signs of distress	9
PLACED STONE 8.00	Moderately good sandstone, large blocks, crudely constructed	8
TRAFFIC BARRIER/FENCE 0.50	3ft high chain link fence, good condition, some paint flaking	8
DOWNSLOPE 0.50	Gentle slope, shallow bedrock	9
LATERAL SLOPE 0.50	No signs of distress	9
ROAD/SIDEWALK/SHOULDER 1.00	Parking lot shows some signs of minor distress, may be due to minor settlement, limited visibility due to snow cover	7

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0211: SUN TEMPLE ROAD

Retaining Wall Condition Photos



MEVE_0211_0.308_R_1.jpg



MEVE_0211_0.308_R_2.jpg

Wall ID:	MEVE-0415-0.157-R		
Route Name:	WHITE HOUSE RESIDENCE ROAD		
Inspection Date:	December 13, 2006	Approximate Year Built:	1923
*Wall Rating:	77	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Gravity - Dry Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Dry Stacked Sandstone Wall		

Wall Measurements

Wall Length (ft.):	38	Face Area (sq.):	190
Average Wall Height (ft.):	5	Face Angle (deg.):	55
Maximum Wall Height (ft.):	9	Vertical Offset (ft.):	-1

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition, functioning as intended, crudely built, no signs of movement or distress	8
WALL FOUNDATION MATERIAL 8.00	Immediately on top of bedrock, no signs of distress	8
PLACED STONE 8.00	Soft sandstone, not decomposed	7
DOWNSLOPE 0.50	Gentle slope to bedrock, no signs of distress	8
ROAD/SIDEWALK/SHOULDER 0.50	No signs of settlement or distress	8
LATERAL SLOPE 0.50	No signs of distress	9

Repair Recommendations

Failure Consequence:	LOW
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park
ROUTE 0415: WHITE HOUSE RESIDENCE ROAD

Retaining Wall Condition Photos



MEVE_0415_0.157_R_1.jpg



MEVE_0415_0.157_R_2.jpg

Wall ID:	MEVE-0918-0.000-P1		
Route Name:	VISITOR CENTER PARKING		
Inspection Date:	December 12, 2006	Approximate Year Built:	1970
*Wall Rating:	90	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Cantilever - Concrete
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Concrete Cantilever Wall with Exposed Aggregate Facing		

Wall Measurements

Wall Length (ft.):	281	Face Area (sq.):	1405
Average Wall Height (ft.):	5	Face Angle (deg.):	90
Maximum Wall Height (ft.):	10	Vertical Offset (ft.):	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good, minor cracking, functioning as intended	9
WALL FOUNDATION MATERIAL 8.00	No signs of distress, limited visibility due to snow cover	9
CONCRETE 8.00	Minor longitudinal cracking outside construction joint, no spalling observed, functioning as intended	9
ROAD/SIDEWALK/SHOULDER 0.50	Sidewalk, no signs of distress, limited visibility due to snow cover	9
TRAFFIC BARRIER/FENCE 0.50	Metal rail at top, no signs of distress	9

Repair Recommendations

Failure Consequence:	LOW
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park
ROUTE 0918: VISITOR CENTER PARKING

Retaining Wall Condition Photos



MEVE_0918_0.000_P1_1.jpg



MEVE_0918_0.000_P1_2.jpg

Wall ID:	MEVE-0925-0.000-P1		
Route Name:	SIDE HEADQUARTERS AND POST OFFICE PARKING		
Inspection Date:	December 13, 2006	Approximate Year Built:	1923
*Wall Rating:	82	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Gravity - Dry Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Cut Sandstone dry stacked wall, mortared on top 2 courses only (for roadway stability)		

Wall Measurements

Wall Length (ft.):	85	Face Area (sq.):	340
Average Wall Height (ft.):	4	Face Angle (deg.):	75
Maximum Wall Height (ft.):	6	Vertical Offset (ft.):	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition, wall functioning as intended, no visible signs of distress	8
WALL FOUNDATION MATERIAL 8.00	On shallow bedrock	9
PLACED STONE 8.00	Slight to moderate weathered cut sandstone blocks of uniform size, cap rock has very minor cracked corners	8
STONE MASONRY 8.00	Top 2 courses mortared only, minor cracks in grout, generally performing as intended	8
CULVERT 0.50	24-inch CMP in good condition	8
ROAD/SIDEWALK/SHOULDER 0.50	Road - no significant cracks due to wall, isolated minor block cracking of low severity	8
VEGETATION 0.50	Minor rabbit brush growing out of face, no apparent impact to performance of wall	8
DOWNSLOPE 0.50	On bedrock	9

Repair Recommendations

Failure Consequence:	LOW
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0925: SIDE HEADQUARTERS AND POST OFFICE PARKING

Retaining Wall Condition Photos



MEVE_0925_0.000_P1_1.jpg



MEVE_0925_0.000_P1_2.jpg

Wall ID:	MEVE-0925-0.000-P2		
Route Name:	SIDE HEADQUARTERS AND POST OFFICE PARKING		
Inspection Date:	December 13, 2006	Approximate Year Built:	1923
*Wall Rating:	79	Maintenance Action:	No Action

Wall Description

Wall Function:	Fill Wall	Primary Wall Type:	Gravity - Dry Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Large Block Sandstone Rockery		

Wall Measurements

Wall Length (ft.):	16	Face Area (sq.):	80
Average Wall Height (ft.):	5	Face Angle (deg.):	60
Maximum Wall Height (ft.):	6	Vertical Offset (ft.):	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition, wall performing as intended	8
WALL FOUNDATION MATERIAL 8.00	Thin soil mantle over bedrock	8
PLACED STONE 8.00	Moderately weathered sandstone block	8
DOWNSLOPE 0.50	Gentle slope over shallow bedrock	8
LATERAL SLOPE 0.50	Minor erosion, not affecting wall	8
ROAD/SIDEWALK/SHOULDER 1.00	Minor shoving along right edge of road, moderate severity longitudinal cracks	7
VEGETATION 1.00	Isolated brush in wall, does not appear to affect wall	7

Repair Recommendations

Failure Consequence:	LOW
Recommendation Narrative:	None
Repair Cost:	\$0

2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Mesa Verde National Park

ROUTE 0925: SIDE HEADQUARTERS AND POST OFFICE PARKING

Retaining Wall Condition Photos



MEVE_0925_0.000_P2_1.jpg



MEVE_0925_0.000_P2_2.jpg

Appendix A

Summary of WIP Definitions



Mesa Verde National Park



Federal Lands Highway
Road Inventory Program

Appendix A

Summary of WIP Definitions and Assessment Categories

Wall Naming Convention

Unique “Wall Identification” names were assigned to the retaining walls that were inventoried. The Wall Identification includes the Park Name, the RIP Route Number (e.g., **0013**), the beginning milepoint of a wall (e.g., **0.622**) and the side of the road the wall is located on (e.g., **L.**) relative to the primary direction of travel (direction of increasing mileposts). Thus, a typical wall identified would have the following format: **YOSE-0013-0.622-L.**

For roadways not in RIP, park-supplied route numbers were used or the convention RRR#. Similarly, for parking areas not in RIP, the park-supplied parking area number or the convention PPP# was used. Also for parking areas, walls are numbered in ascending order as they are encountered when traveling counterclockwise around the parking area (most common direction of traffic flow). Parking area walls are designated P1, P2, P3, etc. as new walls are encountered.

- NPS Retaining Wall Inventory Program Field Guide (WIFG)-

Retaining Wall Acceptance Criteria

- *All classes of paved roadways and parking areas included in the RIP Route Investigation Report and/or identified by park staff.
- *Walls must reside within the constructed roadway/parking area prism.
- *Maximum wall height, including only that portion actively retaining soil and/or rock, must be ≥ 4 ft. (>6ft for culvert headwalls).
- *Consider known/verifiable wall embedment in determining maximum retaining wall height. Include fully buried retaining structures.
- *Walls have an internal wall face angle $\geq 45^\circ$ ($\geq 1H:1V$ face slope ratio).
- *Include all walls where the intent is to support/protect the travelway, and where failure would require replacement with a retaining wall.

Definitions

Design Criteria	Measure of how well current design criteria are satisfied: None - Does not meet any known standards. Non-AASHTO - Does not meet AASHTO, but is consistent with other structures of its type/period with good performance. AASHTO - Apparently meets current AASHTO Geometric, Design, Materials, and Construction Standards.
Consequence of Failure	Low - No loss of roadway, no to low public risk, no impact to traffic during wall repair/replacement Moderate - Hourly to short-term closure of roadway, low-to-moderate public risk, multiple alternate routes available High - Seasonal to long-term loss of roadway, substantial loss-of-life risk, no alternate routes available
Action	Select from: No Action, Monitor, Maintenance, Repair Elements, Replace Elements, and Replace Wall
Weighting Factor	Weighting Factor to be applied to the Condition Rating (CR). When indicated on the Condition Assessment Input Form: WF=0.5 for CR=8-10; WF=1.0 for CR=4-7; and WF=5 for CR=1-3.
Data Reliability	Estimate of how well observed conditions represent wall performance, and if additional investigations may be warranted. 1-Poor Conditions cannot be sufficiently observed to rate element(s), warranting additional investigations to better define element performance and/or to determine the cause(s) or poor performance. 2-Good Observed conditions are sufficient to rate the conditions of wall element(s); however, additional investigations would be useful to better understand element performance. 3-Very Good Observed conditions clearly describe wall performance. Additional investigations are not needed.

Wall Function Codes

[FW] Fill Wall	[BW] Bridge Wall	[SW] Switchback Wall
[CW] Cut Wall	[HW] Head Wall	[SP] Slope Protection [FL] Flood Wall

Wall Type Codes

[AH] Anchor, Tieback H-Pile	[CC] Crib, Concrete	[MG] MSE, Geosynthetic Wrapped Face
[AM] Anchor, Micropile	[CM] Crib, Metal	[MP] MSE, Precast Panel
[AS] Anchor, Tieback Sheet Pile	[CT] Crib, Timber	[MS] MSE, Segmental Block
[BC] Bin, Concrete	[GB] Gravity, Concrete Block/ Brick	[MW] MSE, Welded Wire Face
[BM] Bin, Metal	[GC] Gravity, Mass Concrete	[SN] Soil Nail
[CL] Cantilever, Concrete	[GD] Gravity, Dry Stone	[TP] Tangent/ Secant Pile
[CP] Cantilever, Soldier Pile	[GG] Gravity, Gabion	[OT] Other, User Defined
[CS] Cantilever, Sheet Pile	[GM] Gravity, Mortared Stone	[NO] None

Architectural Facing Type Codes

[BV] Brick Veneer	[PF] Planted Face	[SS] Simulated Stone
[CO] Cementitious Overlay	[SC] Sculpted Shotcrete	[SV] Stone Veneer
[FF] Fractured Fin Concrete	[SH] Shotcrete (nozzle finish)	[TI] Timber
[FL] Formlined Concrete	[SM] Steel/Metal	[OT] Other, User Defined
[PC] Plain Concrete (float finish or light texture)	[SO] Stone	[NO] None

Surface Treatment Codes

[BG] Bush Gun (tool-textured concrete)	[PS] Preservative	[WS] Weathering Steel
[CA] Color Additive	[SE] Silane Sealer	[OT] Other, User Defined
[GL] Galvanized	[ST] Stain	[NO] None
[PA] Painted	[TR] Tar Coated	

Condition Ratings

Condition Ratings apply to all Primary and Secondary Wall Elements, and are intended to assist in consistently defining element **severity**, **extent**, and **repair/replace urgency** of wall element distresses.

9-10 (Excellent)	-Any defects are minor and are within normal range for <i>newly constructed or fabricated</i> elements. -Defects may include those typically caused from fabrication or construction.
7-8 (Good)	-Low-to-moderate extent of low severity distress. -Distress present does not significantly compromise the element function, nor is there significantly severe distress to major structural components of an element.
5-6 (Fair)	-High extent of low severity distress and/or low-to-medium extent of medium to high severity distress. -Distress present does not compromise element function, but lack of treatment may lead to impaired function/elevated risk of element failure in the near term.
3-4 (Poor)	-Medium-to-high extent of medium-to-high severity distress. -Distress present threatens element function, and strength is obviously compromised and/or structural analysis is warranted. -The element condition does not pose an immediate threat to wall stability and road closure is not necessary.
1-2 (Critical)	-Medium-to-high extent of high severity distress. -Element is no longer serving intended function. Element performance threatening overall stability of the wall at the time of inspection.

Wall Performance Condition Ratings

Performance	Evaluation of overall wall performance as indicated by observations not necessarily captured by observed distresses for specific elements, including global wall distresses (rotation, settlement, translation, displacement, etc.) and/or evidence of prior repairs that may further indicate component problems.	Good to Excellent - No observation of distresses not already captured by individual element condition assessment. No combination of element distresses indicating unseen problems or creating significant performance problems. No history of remediation or repair to wall or adjacent elements.
		Fair - Some observed global distress is not associated with specific elements. Some observation of element distress combinations that indicate wall component problems. Minor work on primary elements or major work on secondary elements has occurred improving overall wall function.
		Poor to Critical - Global wall rotation, settlement, and/or overturning is readily apparent. Combined element distresses clearly indicate serious stability problems with components or global wall stability. Major repairs have occurred to wall structural elements, though functionality has not improved significantly.

