SHEN
WIP Report

NPS Retaining Wall Inventory Program
Shenandoah 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: May 2007
Report Date: October 2015

Shenandoah National Park
in
Virginia

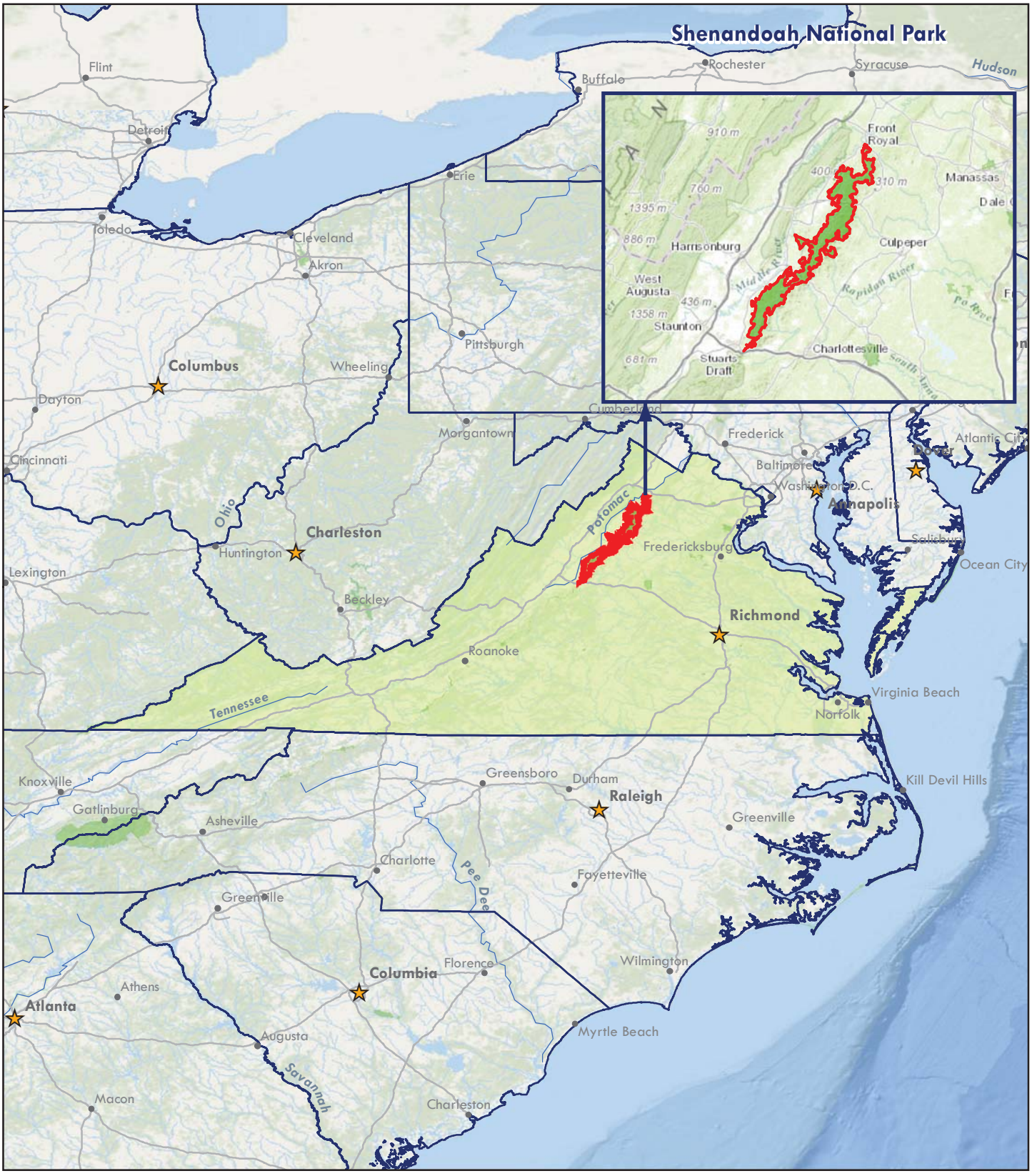

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Table of Contents

Introduction

Shenandoah 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

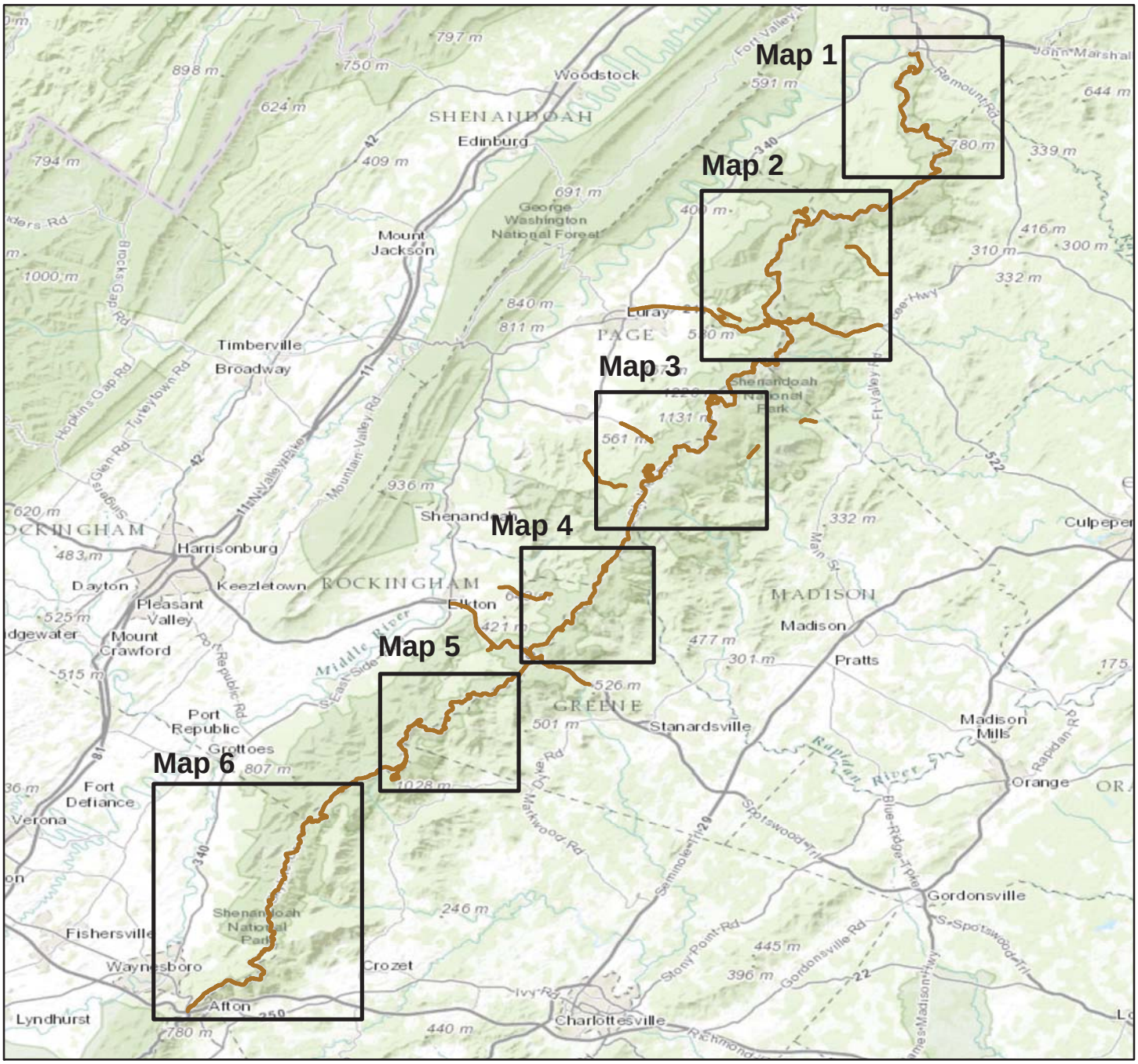
Shenandoah National Park

Federal Lands Highway
Road Inventory Program

Shenandoah 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

Miles

0 7 14

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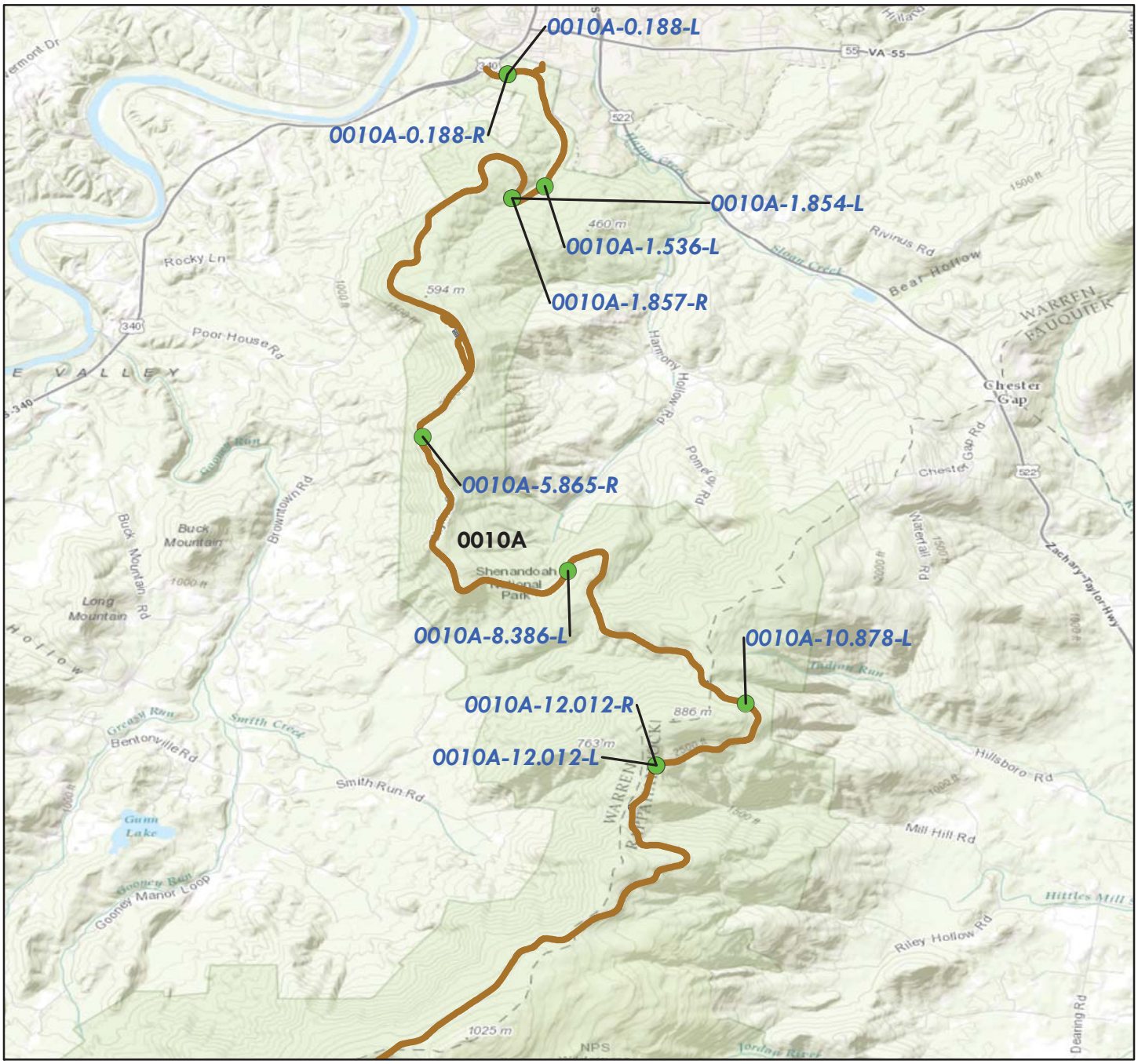
Shenandoah National Park

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

Miles

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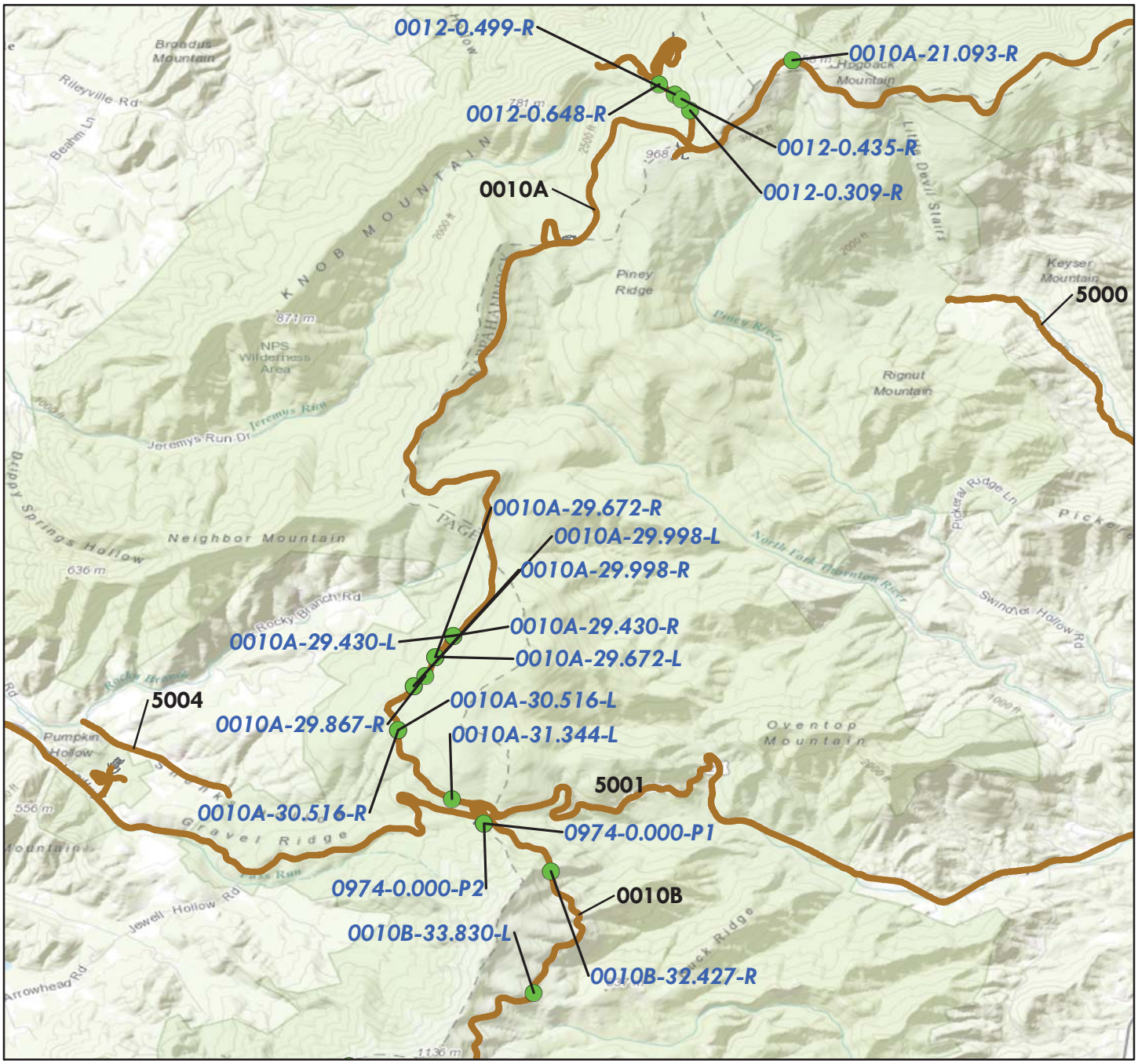
Shenandoah National Park

WALL LOCATION MAP

Map 2



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

Wall Locations

RIP Collected Routes

Miles

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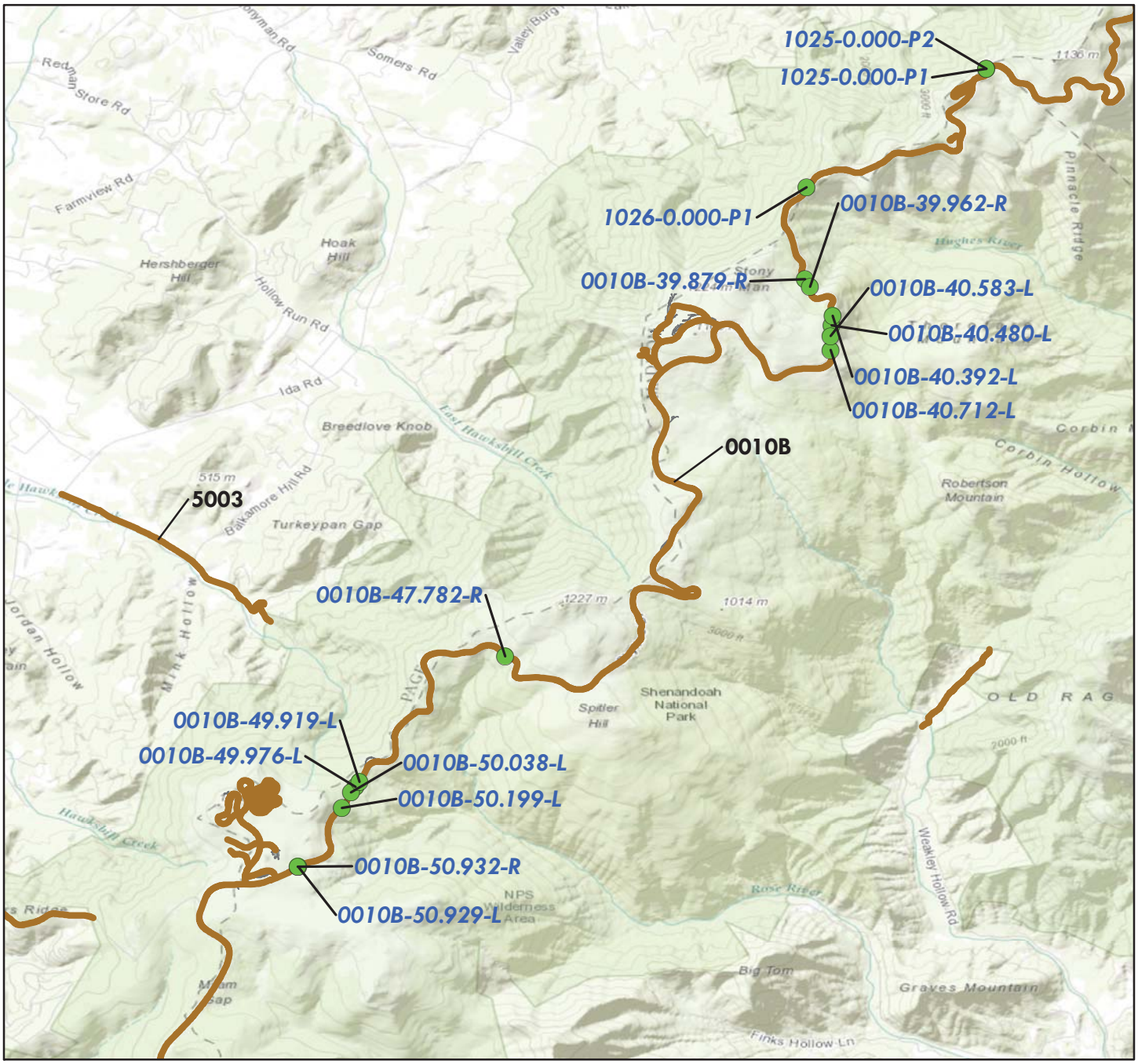
Shenandoah National Park

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

Miles

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Shenandoah 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

Miles

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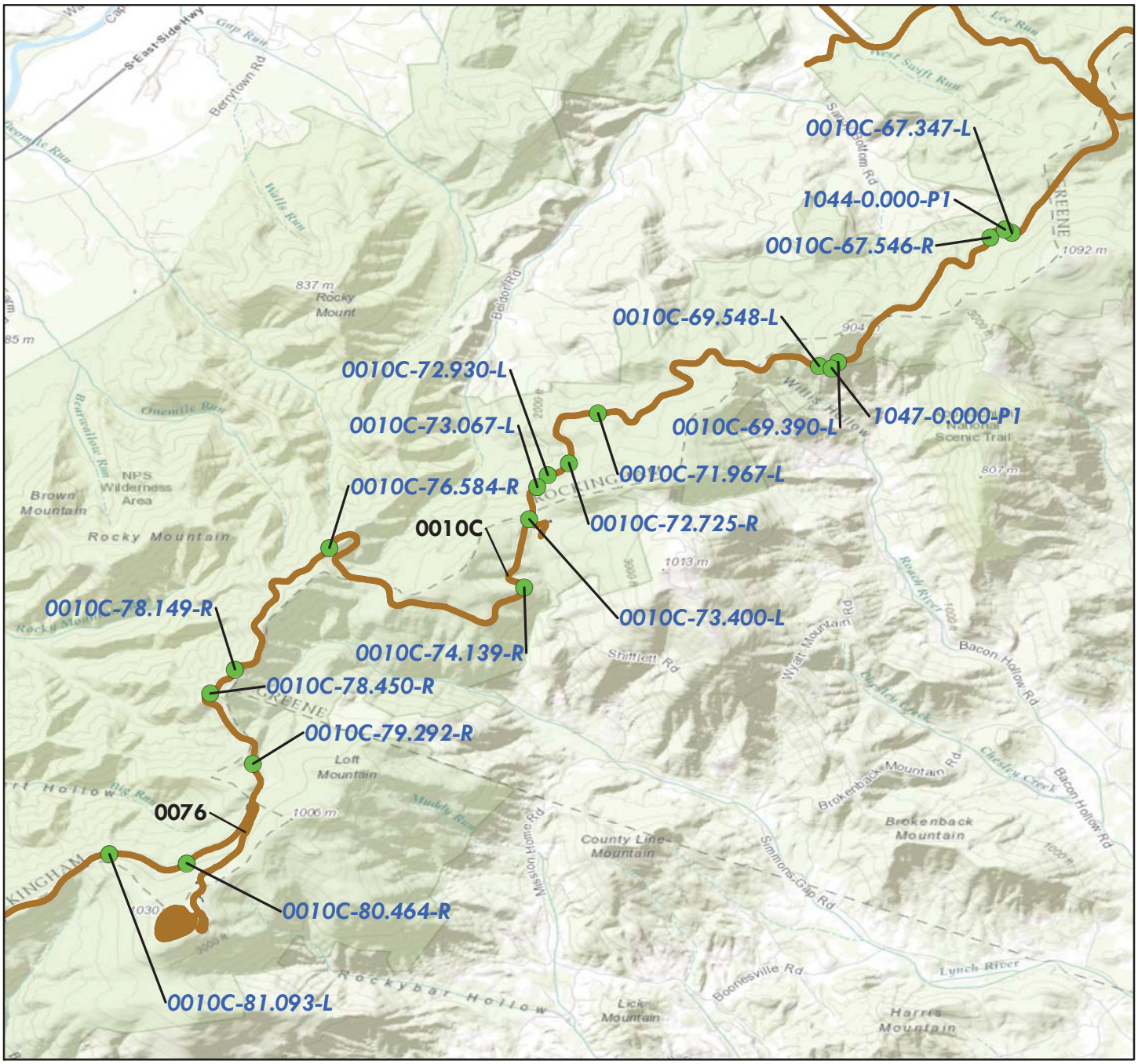
Shenandoah National Park

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

Miles

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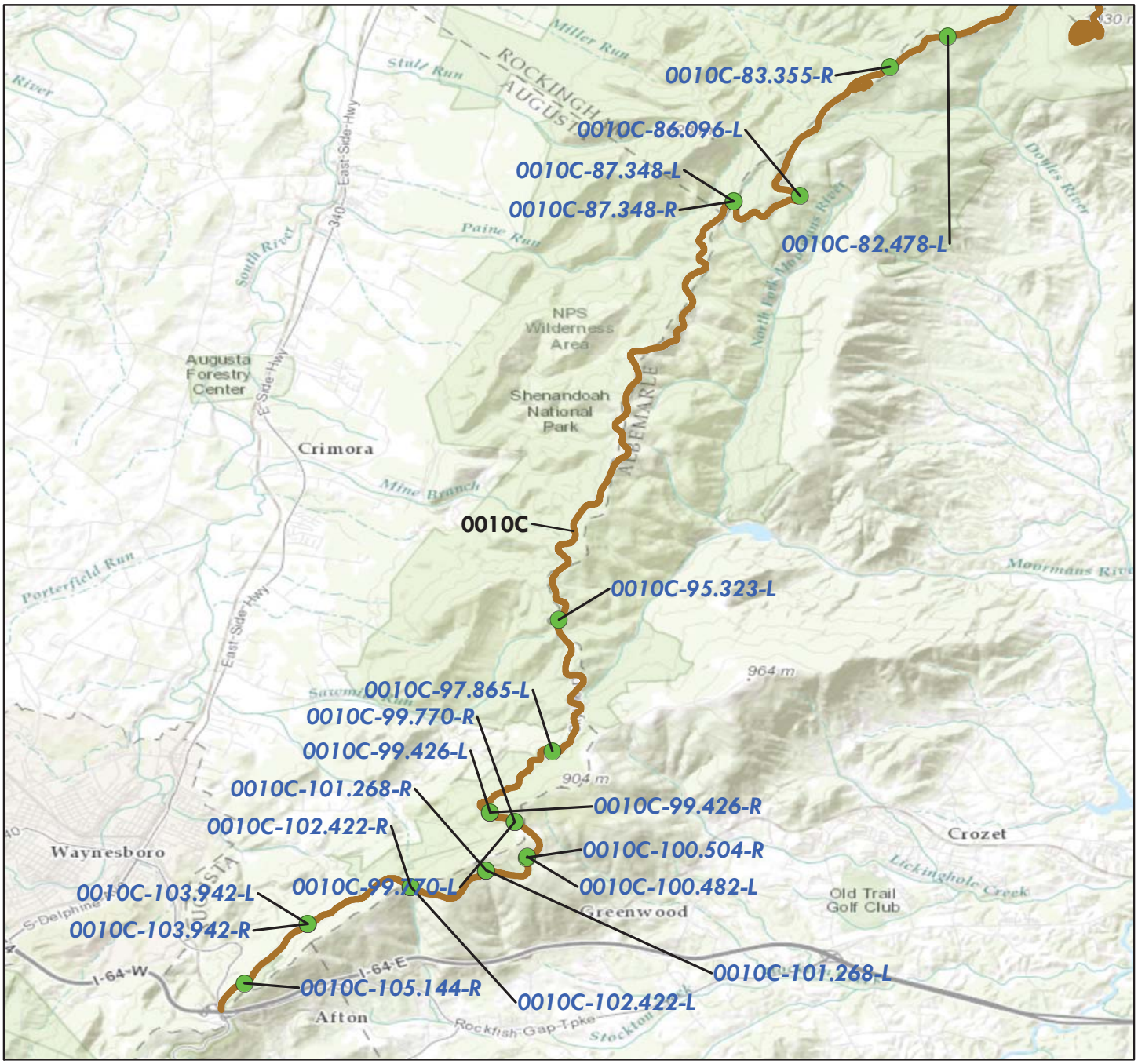
Shenandoah National Park

WALL LOCATION MAP

Map 6



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

Wall Locations

RIP Collected Routes

Miles

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Tier 1
Park Retaining Wall Overview

Shenandoah National Park

Federal Lands Highway
Road Inventory Program

Parkwide Summary: Shenandoah National Park

Initial retaining wall inspections were conducted at Shenandoah National Park in 2007, 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 Shenandoah National Park in 2010 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, 92 walls were inventoried on the routes listed below.

Table 1: Number of Walls by Route

Route Number	Route Name	No. of Walls
0010A	SKYLINE DRIVE (NORTH)	21
0010B	SKYLINE DRIVE (CENTRAL)	22
0010C	SKYLINE DRIVE (SOUTH)	36
0012	MATHEWS ARM ENTRANCE ROAD	4
0400	SNEAD FARM ROAD	1
0417	KEYSER RUN ROAD	1
0974	UPPER THORNTON GAP PARKING	2
1025	JEWELL HOLLOW OVERLOOK PARKING	2
1026	STONY MAN HUGHES OVERLOOK PARKING	1
1044	SWIFT RUN OVERLOOK PARKING	1
1047	BACON HOLLOW OVERLOOK PARKING	1

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
CW - Cut Wall	5
FW - Fill Wall	32
HW - Head Wall	53
SP - Slope Protection	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
CC, Crib - Concrete	8
CL, Cantilever - Concrete	2
GD, Gravity - Dry Stone	20
GM, Gravity - Mortared Stone	60
MW, MSE - Welded Wire Face	1
TT, Other -Timber Pile/Timber-Lagged Wall	1

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	77
Monitor	$0	0
Maintenance	$6,510	6
Repair Elements	$81,875	9
Replace Elements	$0	0
Replace Wall	$0	0
Totals	**$88,385**	**92**

*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	77
$1 - $25,000	14
$25,001 - $50,000	1
$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	**92**

*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 Shenandoah 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 mortor 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 Shenandoah 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)
SHEN-0010B-62.820-L	MODERATE	47	REPAIR ELEMENTS	$47,000

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.

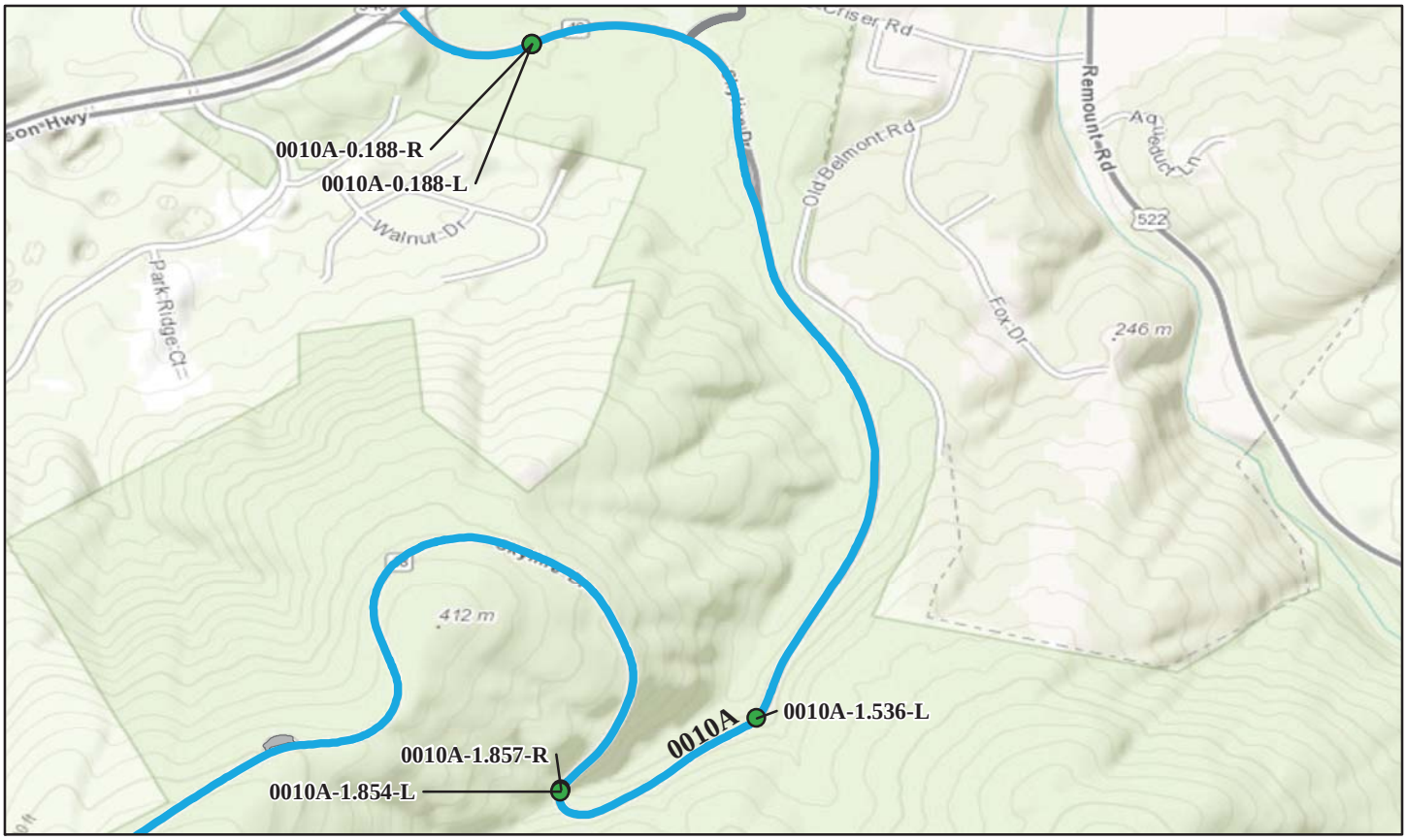
Tier 2
Route Retaining Wall Overview

Shenandoah National Park

Federal Lands Highway
Road Inventory Program

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)



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Retaining Wall Condition Legend – Wall Condition Rating

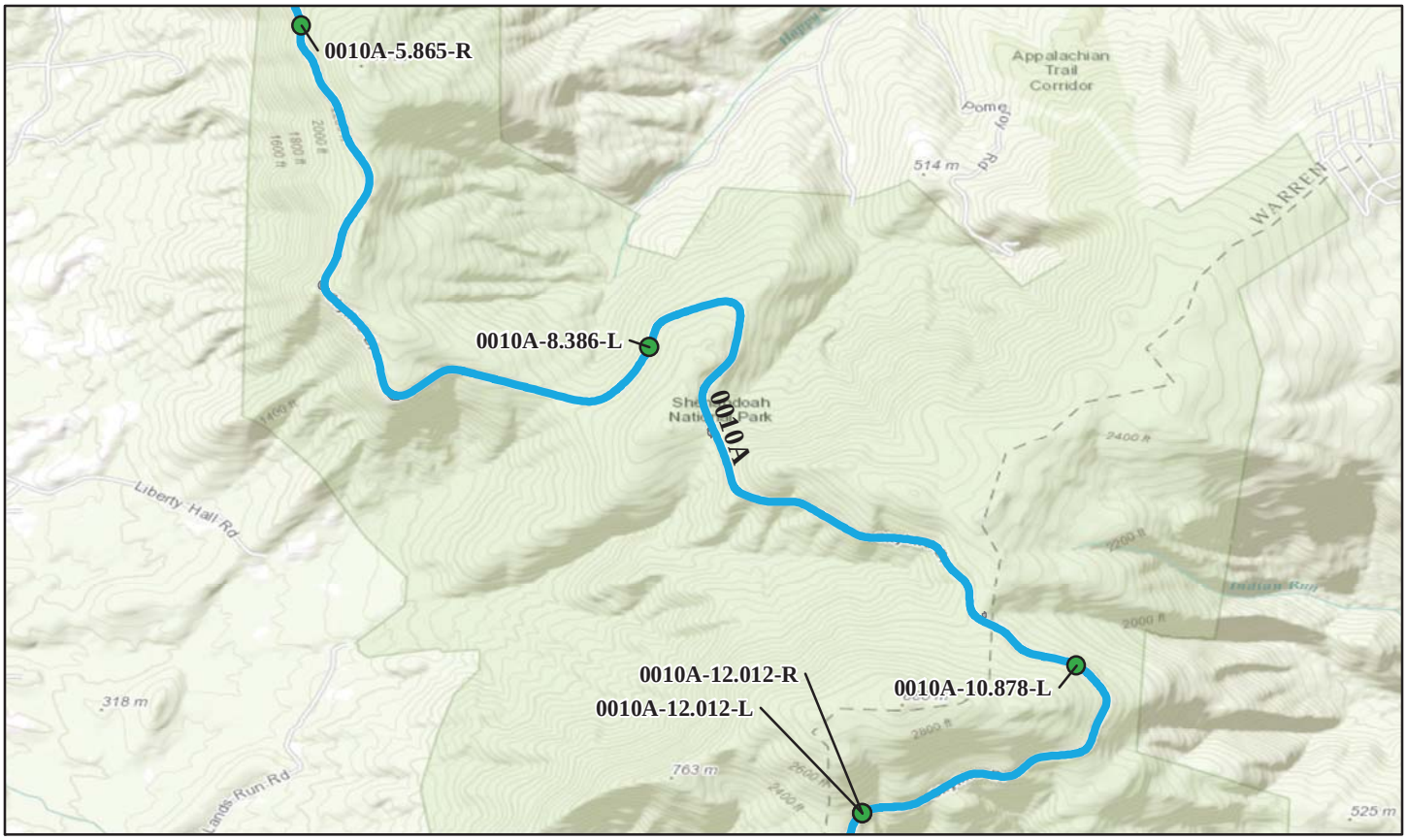
Critical / Poor (0 - 49)	Fair (50 - 69)	Good to Excellent (70 - 100)	No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
SHEN-0010A-0.188-L 5/15/2007	170	55	Cantilever - Concrete	Head Wall	84	$0.00
SHEN-0010A-0.188-R 5/15/2007	175	54	Cantilever - Concrete	Head Wall	82	$0.00
SHEN-0010A-1.536-L 5/15/2007	3,200	183	Gravity - Dry Stone	Fill Wall	71	$0.00
SHEN-0010A-1.854-L 5/15/2007	110	41	Gravity - Mortared Stone	Head Wall	78	$0.00
SHEN-0010A-1.857-R 5/15/2007	120	36	Gravity - Mortared Stone	Head Wall	77	$0.00

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

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)



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Retaining Wall Condition Legend – Wall Condition Rating

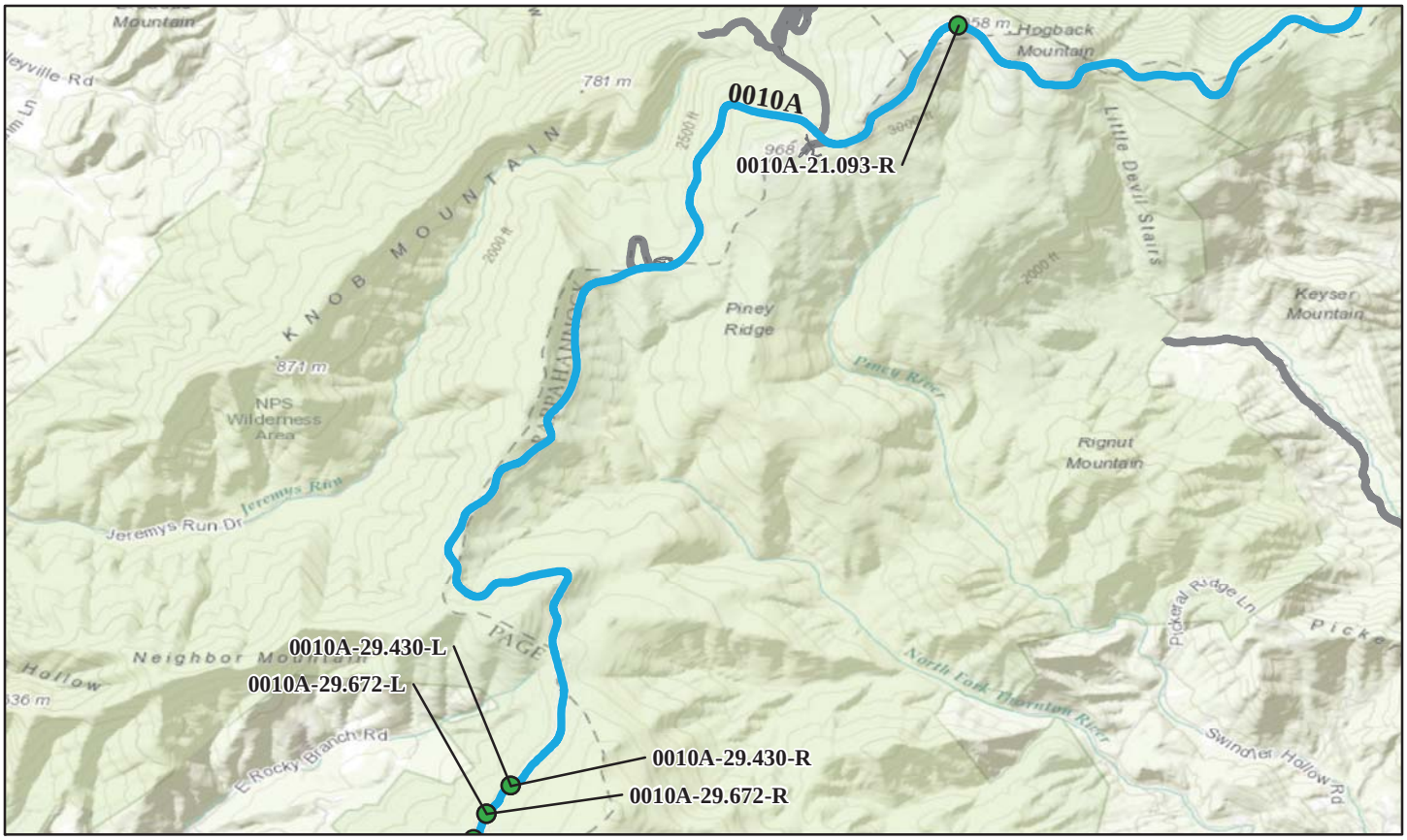
Critical / Poor (0 - 49)	Fair (50 - 69)	Good to Excellent (70 - 100)	No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
SHEN-0010A-5.865-R 5/15/2007	915	305	Gravity - Mortared Stone	Fill Wall	72	$2,000.00
SHEN-0010A-8.386-L 5/15/2007	936	234	Gravity - Mortared Stone	Fill Wall	72	$2,000.00
SHEN-0010A-10.878-L 5/15/2007	1,595	192	Gravity - Dry Stone	Fill Wall	83	$0.00
SHEN-0010A-12.012-L 5/17/2007	105	19	Gravity - Mortared Stone	Head Wall	78	$0.00
SHEN-0010A-12.012-R 5/17/2007	165	45	Gravity - Mortared Stone	Head Wall	69	$600.00

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

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)



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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
SHEN-0010A-21.093-R 5/16/2007	1,328	146	Gravity - Mortared Stone	Fill Wall	75	$1,500.00
SHEN-0010A-29.430-L 5/16/2007	130	27	Gravity - Mortared Stone	Head Wall	81	$0.00
SHEN-0010A-29.430-R 5/16/2007	110	22	Gravity - Mortared Stone	Head Wall	83	$0.00
SHEN-0010A-29.672-L 5/16/2007	75	22	Gravity - Mortared Stone	Head Wall	81	$0.00
SHEN-0010A-29.672-R 5/16/2007	100	29	Gravity - Mortared Stone	Head Wall	81	$0.00

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

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

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
SHEN-0010A-29.867-R 5/16/2007	40	9	Gravity - Mortared Stone	Head Wall	82	$0.00
SHEN-0010A-29.998-L 5/16/2007	50	15	Gravity - Mortared Stone	Head Wall	80	$0.00
SHEN-0010A-29.998-R 5/16/2007	85	21	Gravity - Mortared Stone	Head Wall	82	$0.00
SHEN-0010A-30.516-L 5/16/2007	135	26	Gravity - Mortared Stone	Head Wall	80	$0.00
SHEN-0010A-30.516-R 5/16/2007	110	31	Gravity - Mortared Stone	Head Wall	67	$1,030.00

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

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

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

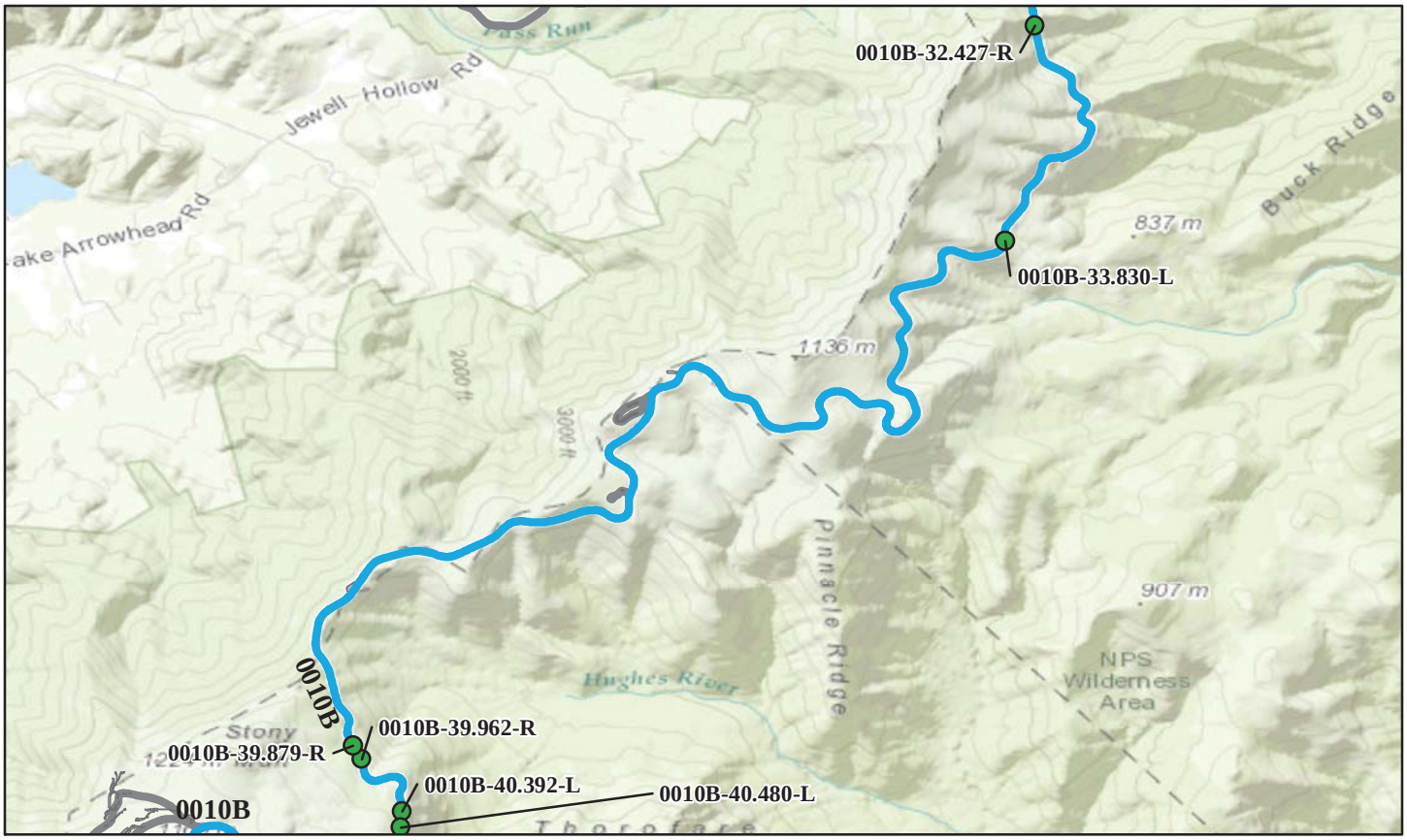
Critical / Poor (0 - 49)	Fair (50 - 69)	Good to Excellent (70 - 100)	No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
SHEN-0010A-31.344-L 5/15/2007	6,300	180	Gravity - Dry Stone	Fill Wall	90	$0.00

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

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)



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

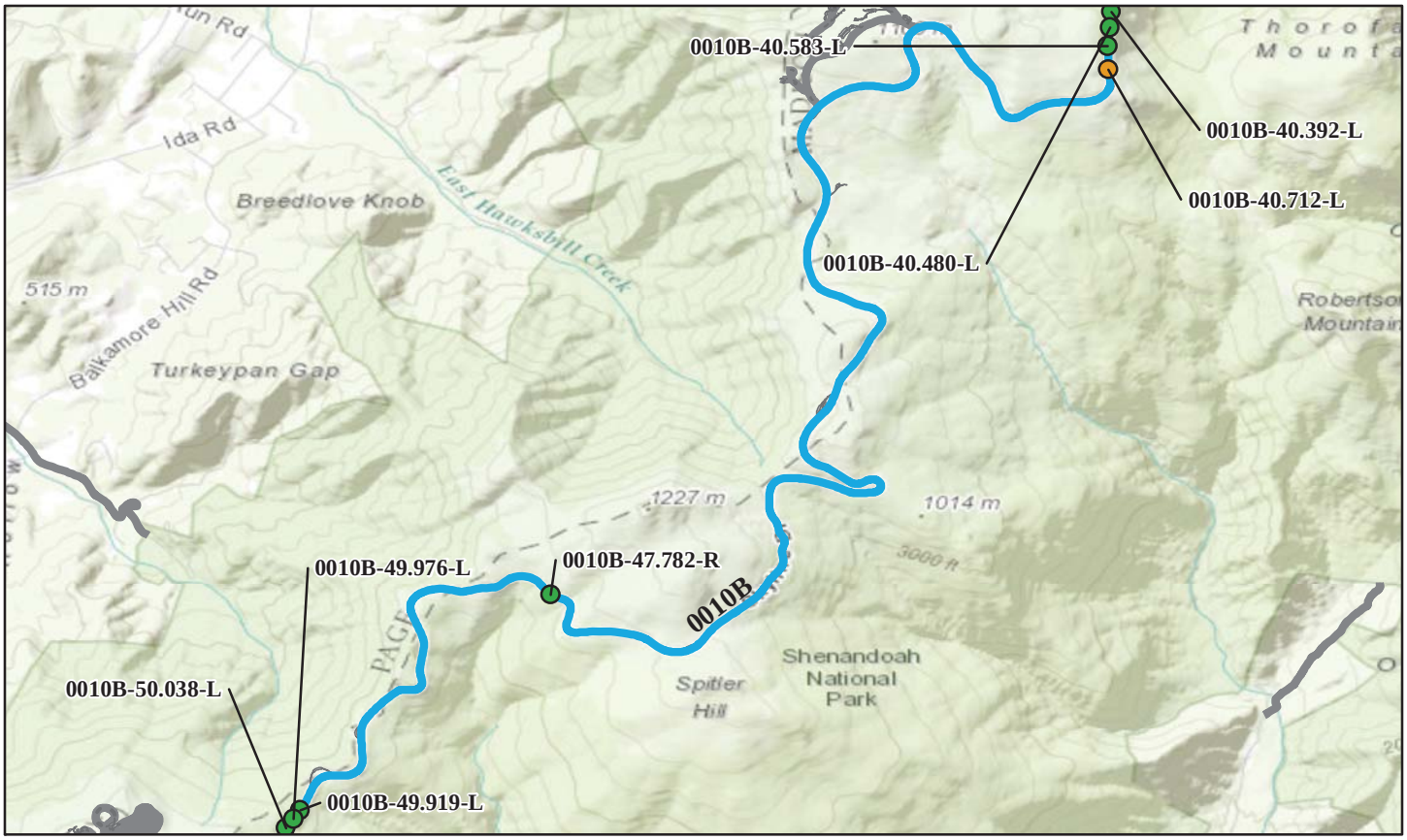
Critical / Poor (0 - 49)	Fair (50 - 69)	Good to Excellent (70 - 100)	No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
SHEN-0010B-32.427-R 5/15/2007	900	45	Gravity - Dry Stone	Slope Protection	83	$0.00
SHEN-0010B-33.830-L 5/17/2007	68	14	Gravity - Mortared Stone	Head Wall	75	$1,100.00
SHEN-0010B-39.879-R 5/17/2007	38	7	Gravity - Mortared Stone	Head Wall	80	$110.00
SHEN-0010B-39.962-R 5/17/2007	32	8	Gravity - Mortared Stone	Head Wall	80	$0.00
SHEN-0010B-40.392-L 5/16/2007	150	100	Crib - Concrete	Fill Wall	86	$0.00

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

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)



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Retaining Wall Condition Legend – Wall Condition Rating

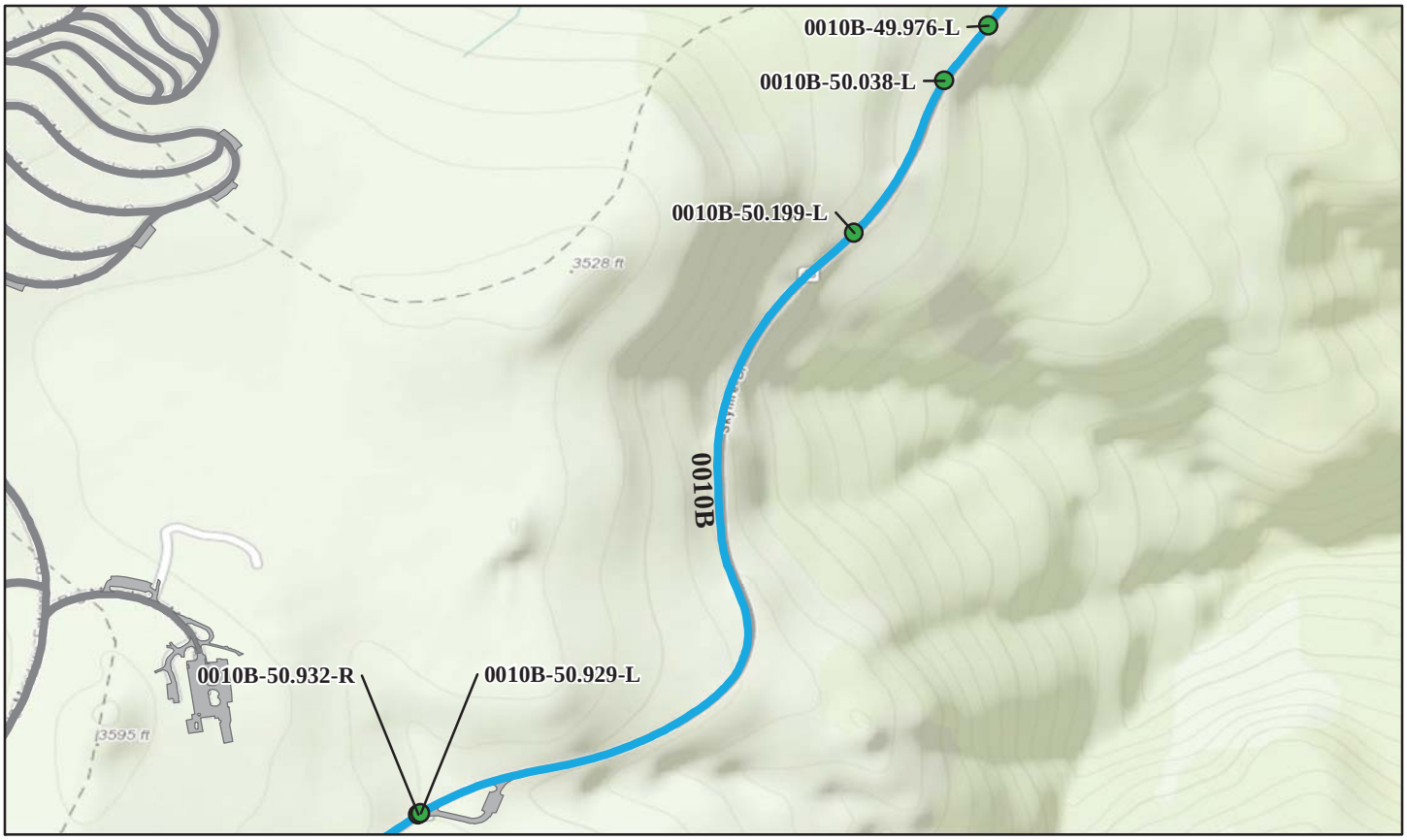
Critical / Poor (0 - 49)	Fair (50 - 69)	Good to Excellent (70 - 100)	No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
SHEN-0010B-40.480-L 5/16/2007	600	150	Crib - Concrete	Fill Wall	87	$0.00
SHEN-0010B-40.583-L 5/16/2007	800	200	Crib - Concrete	Fill Wall	87	$0.00
SHEN-0010B-40.712-L 5/16/2007	420	105	Crib - Concrete	Fill Wall	69	$0.00
SHEN-0010B-47.782-R 5/17/2007	55	11	Gravity - Mortared Stone	Head Wall	80	$0.00
SHEN-0010B-49.919-L 5/16/2007	300	150	Crib - Concrete	Fill Wall	81	$0.00

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

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)



Retaining Wall Condition Legend – Wall Condition Rating

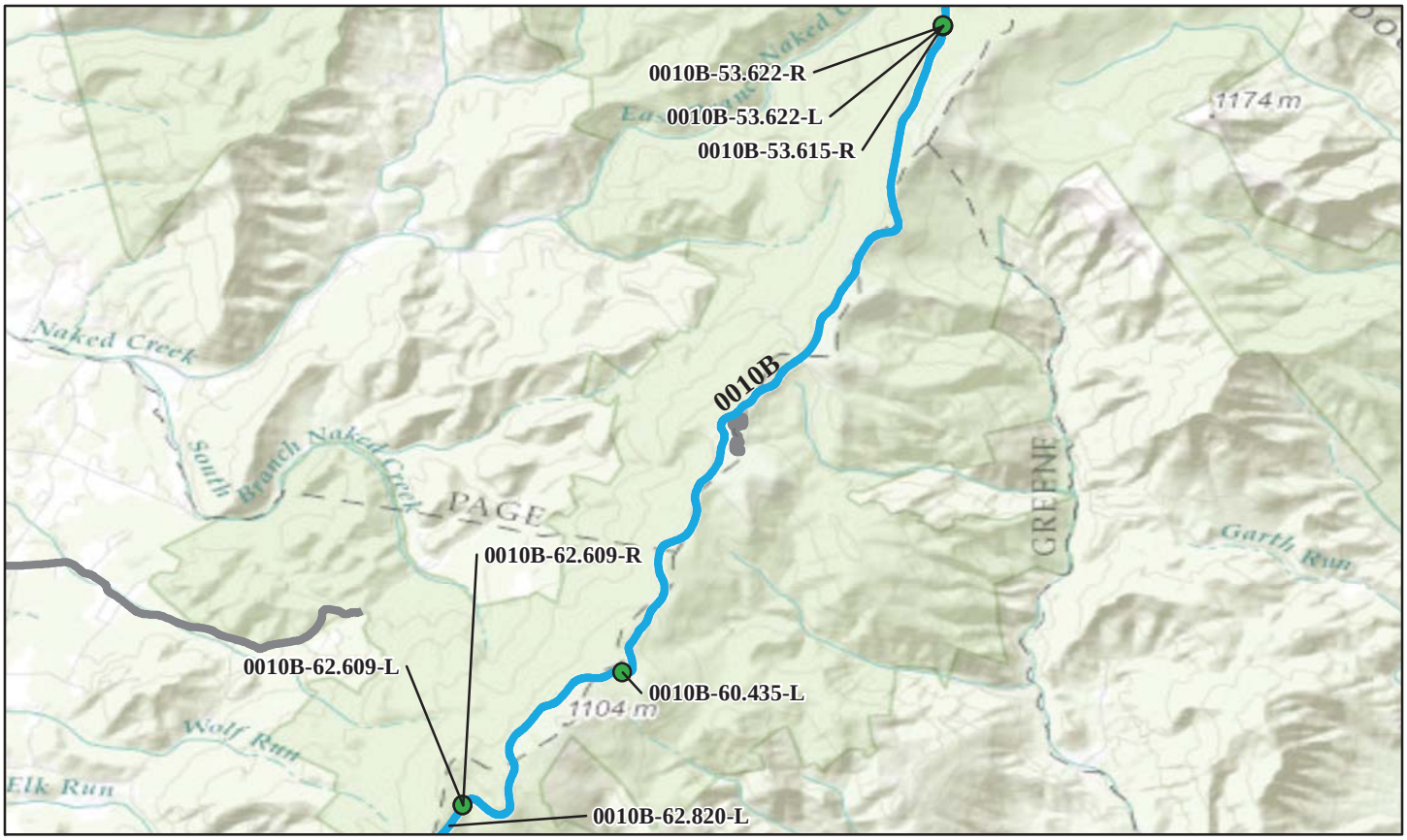
Critical / Poor (0 - 49)	Fair (50 - 69)	Good to Excellent (70 - 100)	No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
SHEN-0010B-49.976-L 5/16/2007	1,110	740	Crib - Concrete	Fill Wall	84	$0.00
SHEN-0010B-50.038-L 5/16/2007	860	430	Crib - Concrete	Fill Wall	84	$0.00
SHEN-0010B-50.199-L 5/16/2007	2,600	1,300	Crib - Concrete	Fill Wall	81	$0.00
SHEN-0010B-50.929-L 5/17/2007	154	28	Gravity - Mortared Stone	Head Wall	80	$0.00
SHEN-0010B-50.932-R 5/17/2007	282	47	Gravity - Mortared Stone	Head Wall	80	$0.00

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

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)



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

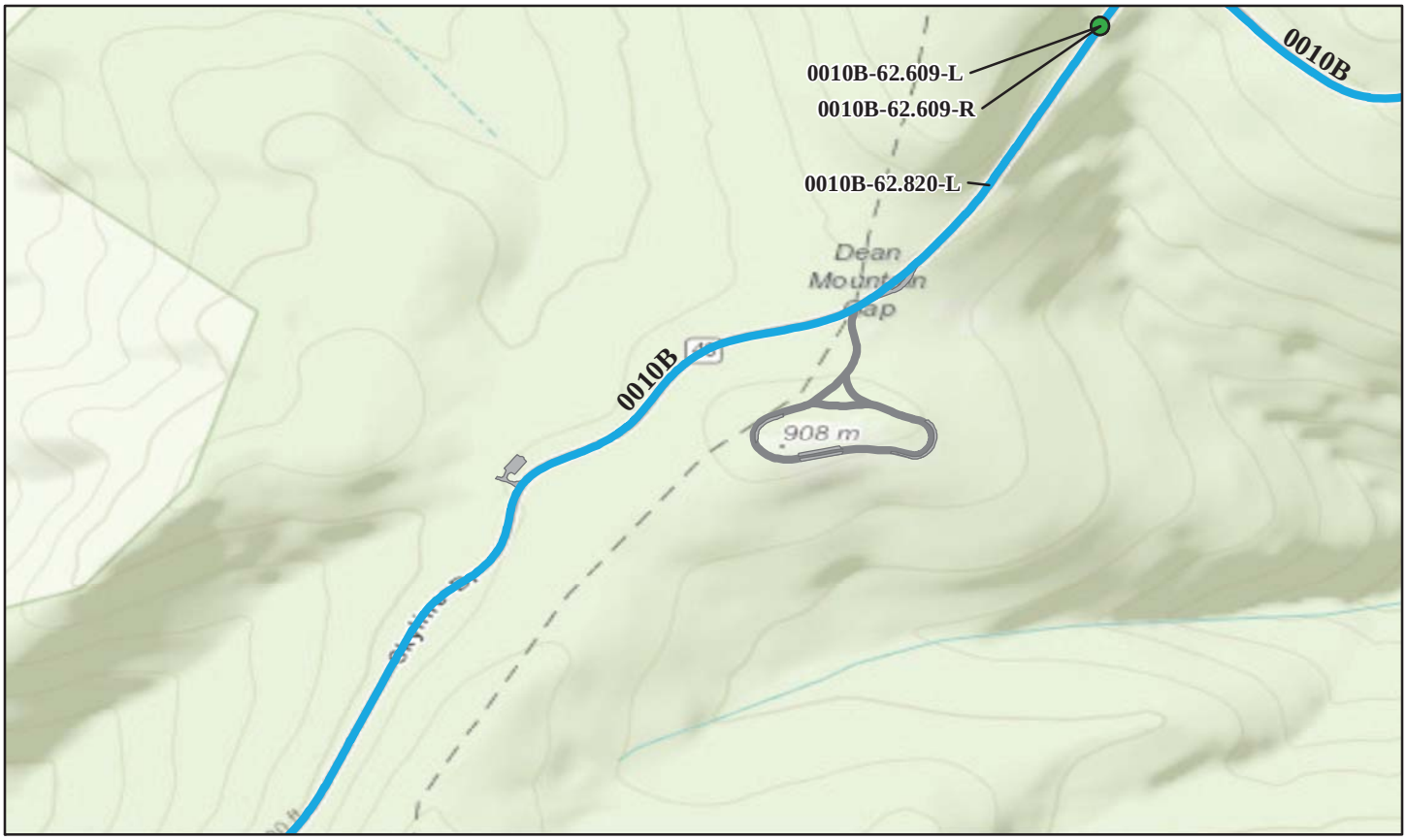
Critical / Poor (0 - 49)	Fair (50 - 69)	Good to Excellent (70 - 100)	No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
SHEN-0010B-53.615-R 5/15/2007	48	10	Gravity - Mortared Stone	Head Wall	71	$3,000.00
SHEN-0010B-53.622-L 5/17/2007	58	14	Gravity - Mortared Stone	Head Wall	65	$5,000.00
SHEN-0010B-53.622-R 5/17/2007	90	15	Gravity - Mortared Stone	Head Wall	64	$7,325.00
SHEN-0010B-60.435-L 5/15/2007	60	10	Gravity - Mortared Stone	Head Wall	79	$0.00
SHEN-0010B-62.609-L 5/18/2007	80	14	Gravity - Mortared Stone	Head Wall	69	$0.00

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

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)



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
SHEN-0010B-62.609-R 5/18/2007	66	12	Gravity - Mortared Stone	Head Wall	80	$0.00
SHEN-0010B-62.820-L 5/17/2007	60	10	Gravity - Mortared Stone	Head Wall	47	$47,000.00

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

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

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

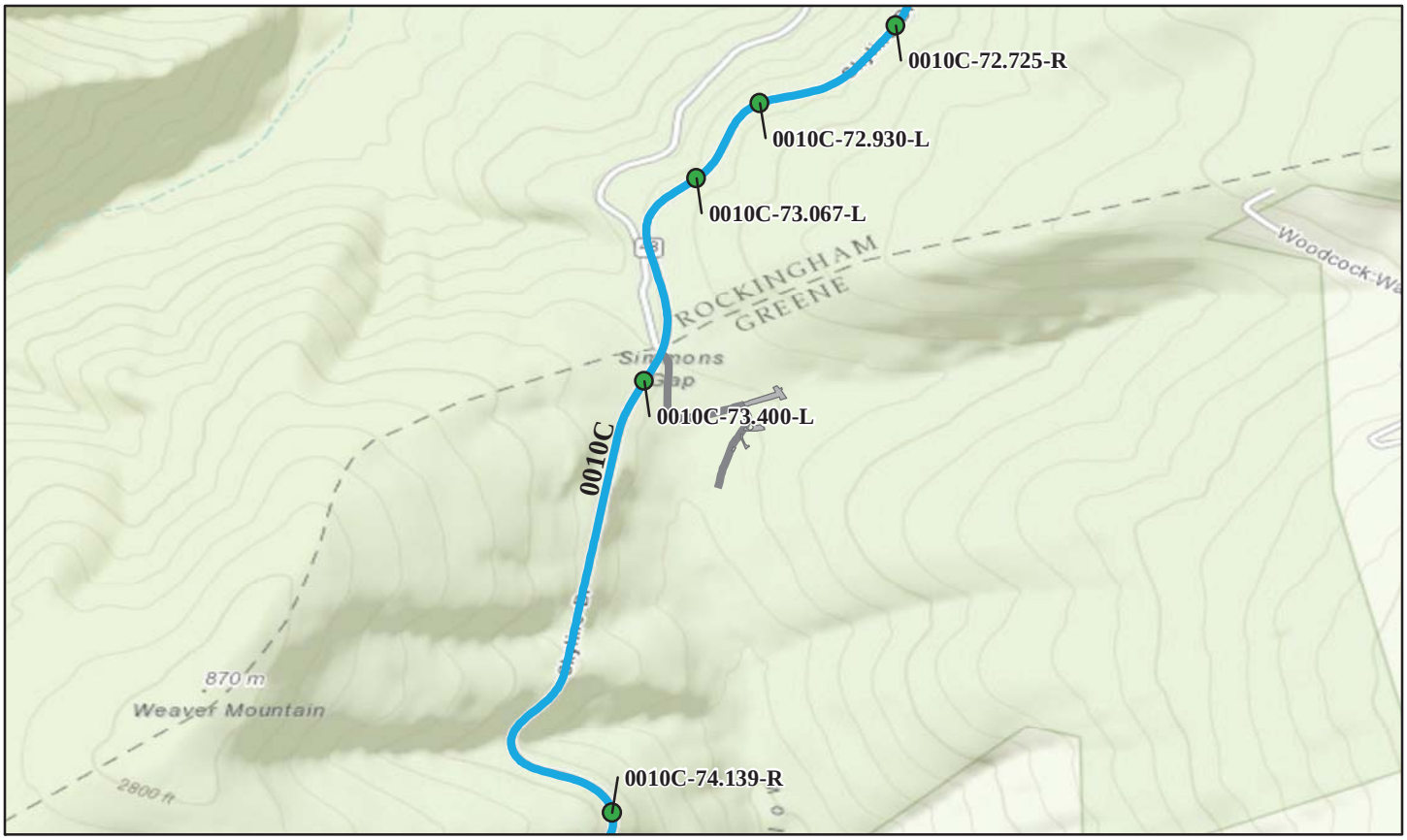
Critical / Poor (0 - 49)	Fair (50 - 69)	Good to Excellent (70 - 100)	No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
SHEN-0010C-67.347-L 5/17/2007	-1	600	Gravity - Dry Stone	Fill Wall	64	$0.00
SHEN-0010C-67.546-R 5/17/2007	960	80	Gravity - Dry Stone	Fill Wall	64	$0.00
SHEN-0010C-69.390-L 5/17/2007	2,360	118	Gravity - Dry Stone	Fill Wall	70	$0.00
SHEN-0010C-69.548-L 5/17/2007	3,625	145	Gravity - Dry Stone	Fill Wall	80	$0.00
SHEN-0010C-71.967-L 5/17/2007	70	25	Gravity - Mortared Stone	Head Wall	79	$0.00

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

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)



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

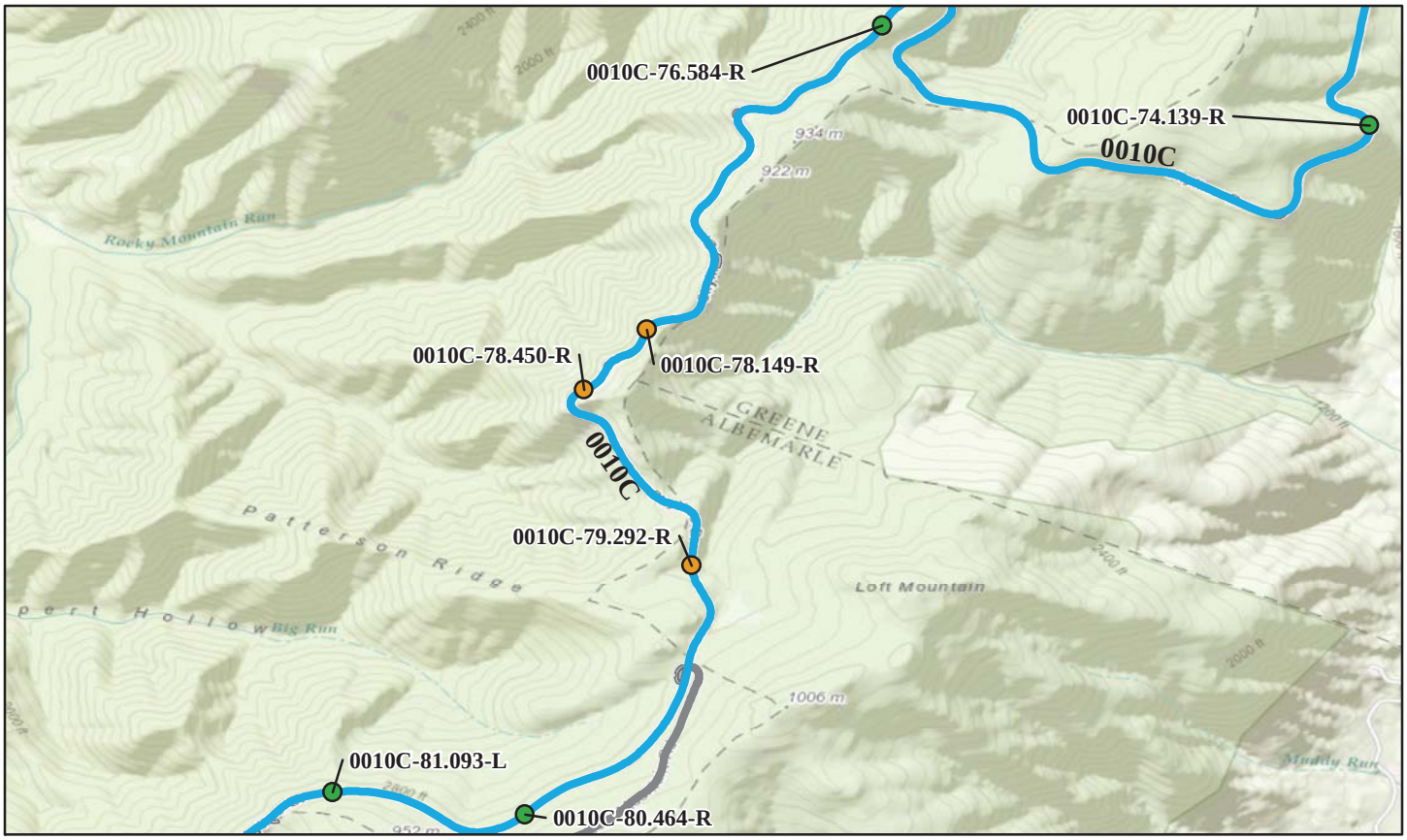
Critical / Poor (0 - 49)	Fair (50 - 69)	Good to Excellent (70 - 100)	No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
SHEN-0010C-72.725-R 5/17/2007	8,750	250	Gravity - Dry Stone	Fill Wall	75	$0.00
SHEN-0010C-72.930-L 5/17/2007	50	22	Gravity - Mortared Stone	Head Wall	80	$0.00
SHEN-0010C-73.067-L 5/17/2007	50	22	Gravity - Mortared Stone	Head Wall	80	$0.00
SHEN-0010C-73.400-L 5/17/2007	45	21	Gravity - Mortared Stone	Head Wall	80	$0.00
SHEN-0010C-74.139-R 5/17/2007	60	26	Gravity - Mortared Stone	Head Wall	80	$0.00

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

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)



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
SHEN-0010C-76.584-R 5/17/2007	3,650	152	Gravity - Dry Stone	Fill Wall	70	$10,800.00
SHEN-0010C-78.149-R 5/17/2007	14,750	295	Gravity - Dry Stone	Fill Wall	64	$0.00
SHEN-0010C-78.450-R 5/17/2007	-1	1,680	Gravity - Dry Stone	Fill Wall	64	$0.00
SHEN-0010C-79.292-R 5/17/2007	4,500	225	Gravity - Dry Stone	Slope Protection	67	$0.00
SHEN-0010C-80.464-R 5/17/2007	48	12	Gravity - Mortared Stone	Head Wall	78	$0.00

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

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Legend – Wall Condition Rating

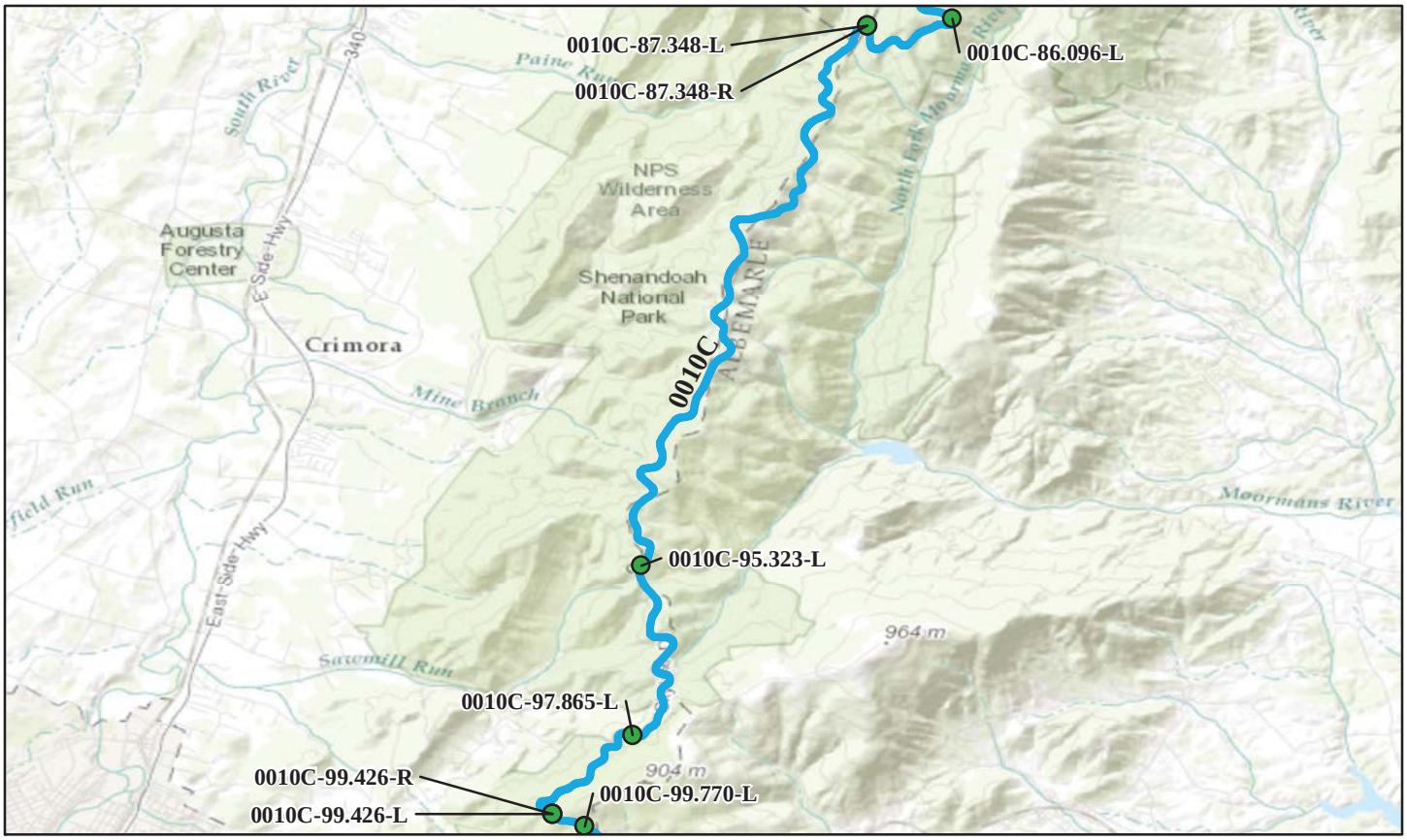
Critical / Poor (0 - 49)	Fair (50 - 69)	Good to Excellent (70 - 100)	No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
SHEN-0010C-81.093-L 5/17/2007	80	27	Gravity - Mortared Stone	Head Wall	75	$120.00
SHEN-0010C-82.478-L 5/17/2007	3,100	155	Gravity - Dry Stone	Fill Wall	64	$0.00
SHEN-0010C-83.355-R 5/17/2007	2,900	415	Gravity - Mortared Stone	Fill Wall	70	$0.00
SHEN-0010C-86.096-L 5/16/2007	1,080	180	Gravity - Mortared Stone	Fill Wall	80	$0.00
SHEN-0010C-87.348-L 5/16/2007	180	30	Gravity - Mortared Stone	Fill Wall	75	$0.00

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

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)



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

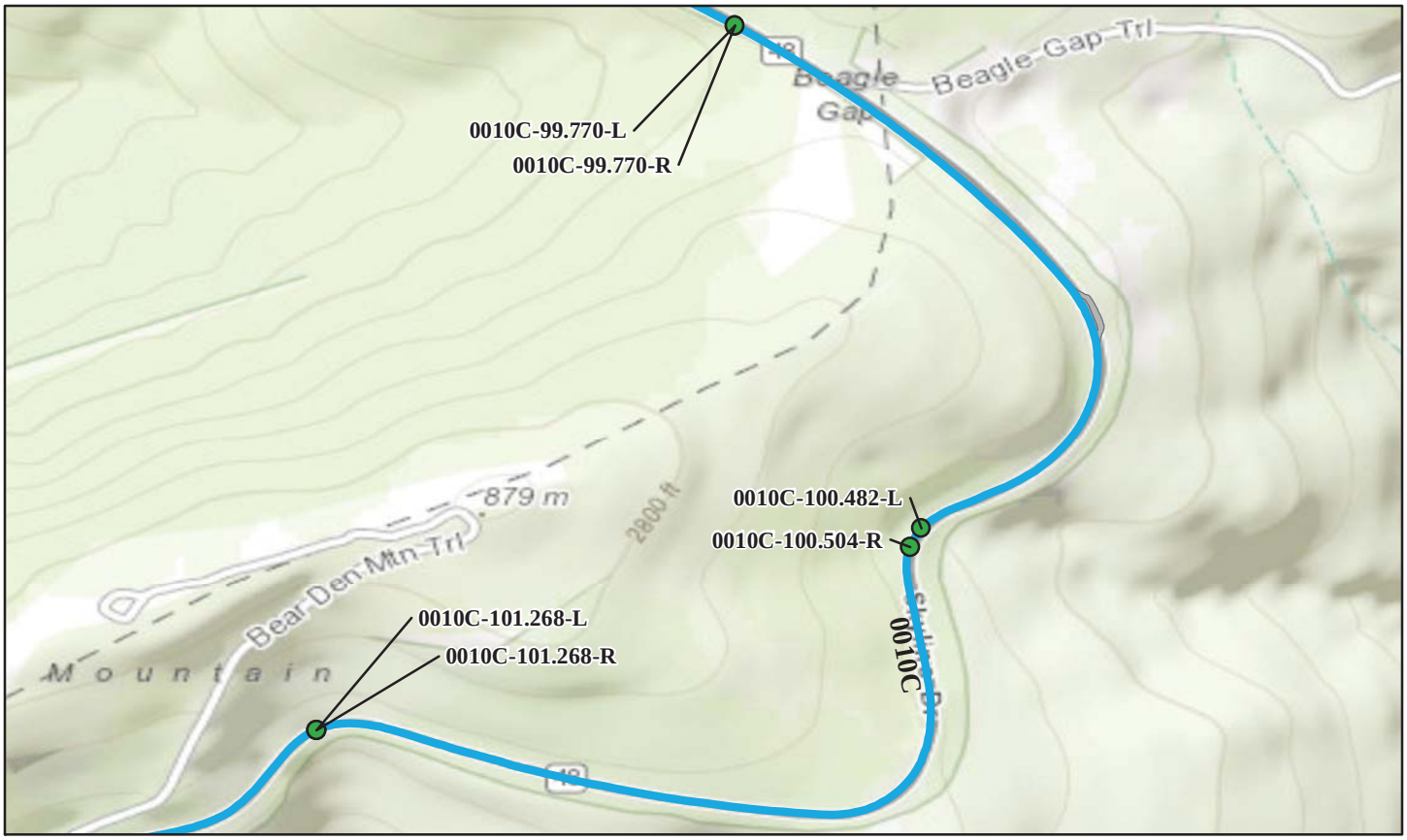
Critical / Poor (0 - 49)	Fair (50 - 69)	Good to Excellent (70 - 100)	No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
SHEN-0010C-87.348-R 5/16/2007	180	30	Gravity - Mortared Stone	Head Wall	80	$0.00
SHEN-0010C-95.323-L 5/17/2007	3,200	320	Gravity - Mortared Stone	Fill Wall	73	$0.00
SHEN-0010C-97.865-L 5/16/2007	54	18	Gravity - Mortared Stone	Head Wall	80	$0.00
SHEN-0010C-99.426-L 5/16/2007	364	52	Gravity - Mortared Stone	Head Wall	80	$0.00
SHEN-0010C-99.426-R 5/16/2007	364	52	Gravity - Mortared Stone	Head Wall	80	$0.00

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

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)



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

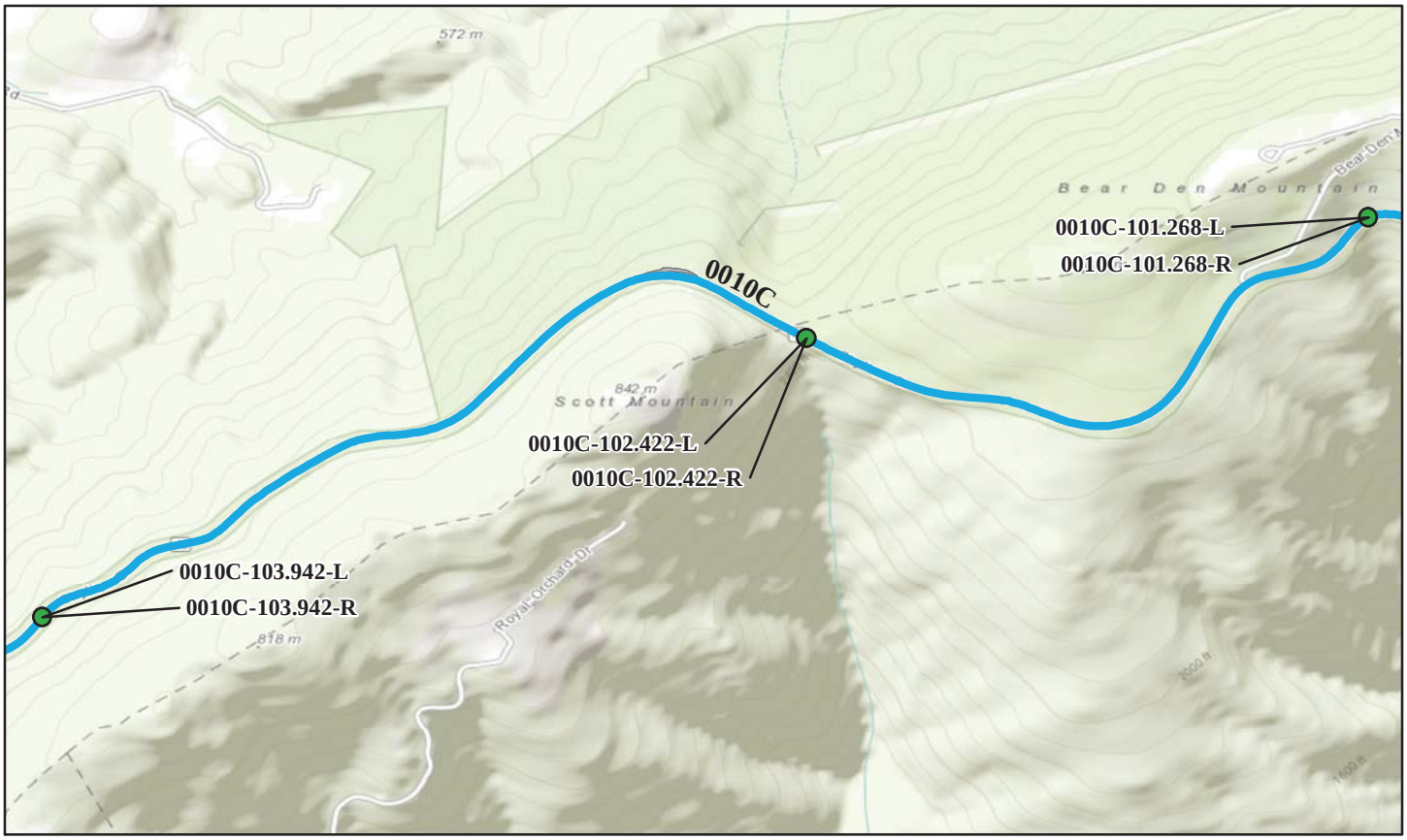
Critical / Poor (0 - 49)	Fair (50 - 69)	Good to Excellent (70 - 100)	No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
SHEN-0010C-99.770-L 5/16/2007	392	56	Gravity - Mortared Stone	Head Wall	78	$0.00
SHEN-0010C-99.770-R 5/16/2007	392	56	Gravity - Mortared Stone	Head Wall	78	$0.00
SHEN-0010C-100.482-L 5/17/2007	28	7	Gravity - Mortared Stone	Head Wall	71	$0.00
SHEN-0010C-100.504-R 5/17/2007	40	10	Gravity - Mortared Stone	Head Wall	78	$0.00
SHEN-0010C-101.268-L 5/16/2007	160	32	Gravity - Mortared Stone	Head Wall	80	$0.00

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

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)



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

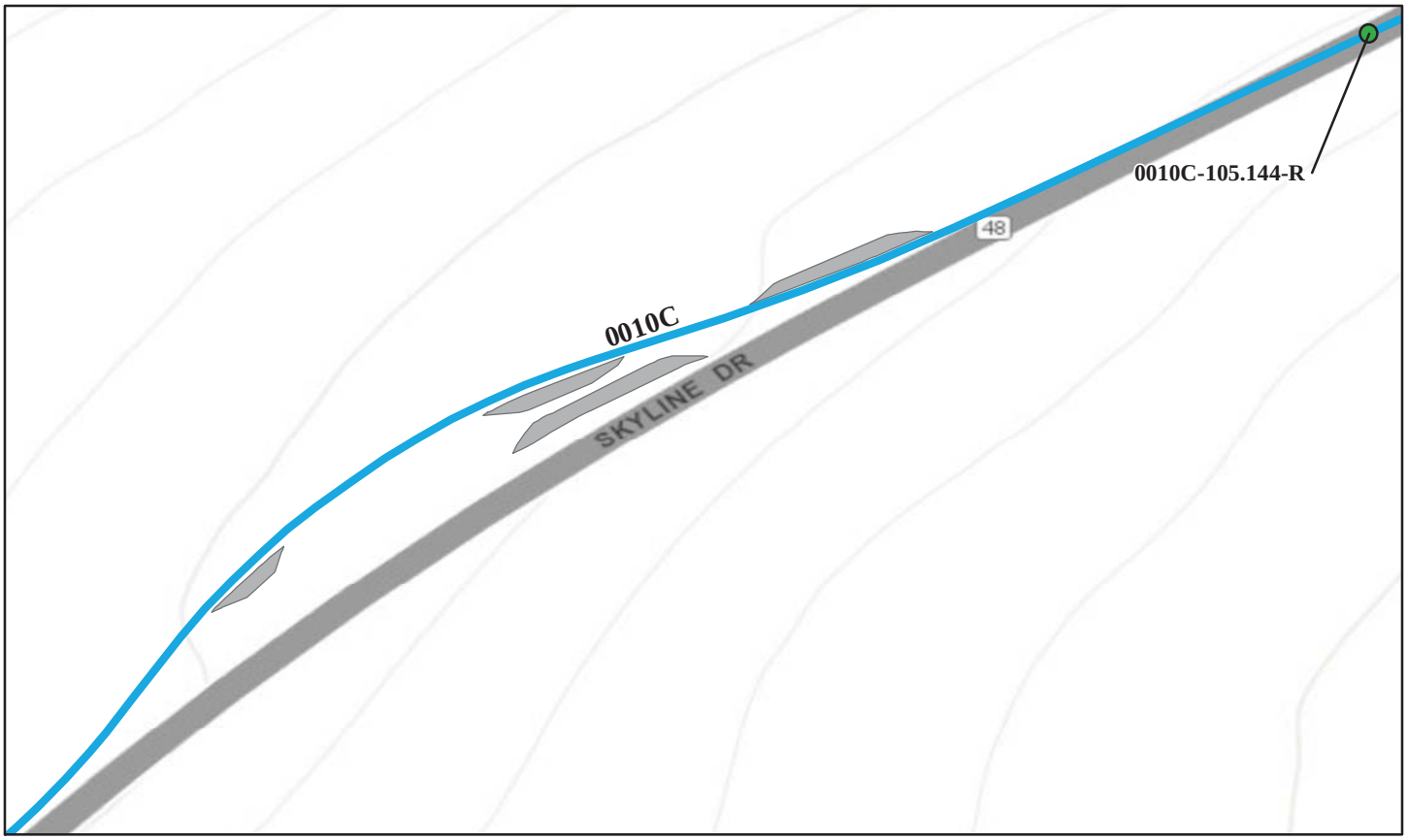
Critical / Poor (0 - 49)	Fair (50 - 69)	Good to Excellent (70 - 100)	No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
SHEN-0010C-101.268-R 5/16/2007	192	32	Gravity - Mortared Stone	Head Wall	80	$0.00
SHEN-0010C-102.422-L 5/16/2007	264	44	Gravity - Mortared Stone	Head Wall	80	$0.00
SHEN-0010C-102.422-R 5/16/2007	315	44	Gravity - Mortared Stone	Head Wall	80	$0.00
SHEN-0010C-103.942-L 5/16/2007	670	66	Gravity - Mortared Stone	Head Wall	80	$0.00
SHEN-0010C-103.942-R 5/16/2007	378	54	Gravity - Mortared Stone	Head Wall	81	$0.00

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

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)



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
SHEN-0010C-105.144-R 5/15/2007	14,300	1,000	MSE - Welded Wire Face	Fill Wall	90	$0.00

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

Shenandoah National Park

ROUTE 0012: MATHEWS ARM 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
SHEN-0012-0.309-R 5/16/2007	264	66	Gravity - Mortared Stone	Head Wall	82	$0.00
SHEN-0012-0.435-R 5/16/2007	170	57	Gravity - Mortared Stone	Head Wall	83	$0.00
SHEN-0012-0.499-R 5/16/2007	160	56	Gravity - Mortared Stone	Head Wall	83	$0.00
SHEN-0012-0.648-R 5/16/2007	208	52	Gravity - Mortared Stone	Head Wall	83	$0.00

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

Shenandoah National Park

ROUTE 0400: SNEAD FARM ROAD

GPS is not available because the route is unpaved.

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
SHEN-0400-0.300-L 5/16/2007	423	65	Other -Timber Pile/Timber-Lagged Wall	Cut Wall	70	$300.00

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

Shenandoah National Park

ROUTE 0417: KEYSER RUN ROAD

GPS is not available because the route is unpaved.

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
SHEN-0417-2.000-L 5/16/2007	380	85	Gravity - Dry Stone	Fill Wall	70	$0.00

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

Shenandoah National Park

ROUTE 0974: UPPER THORNTON GAP 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

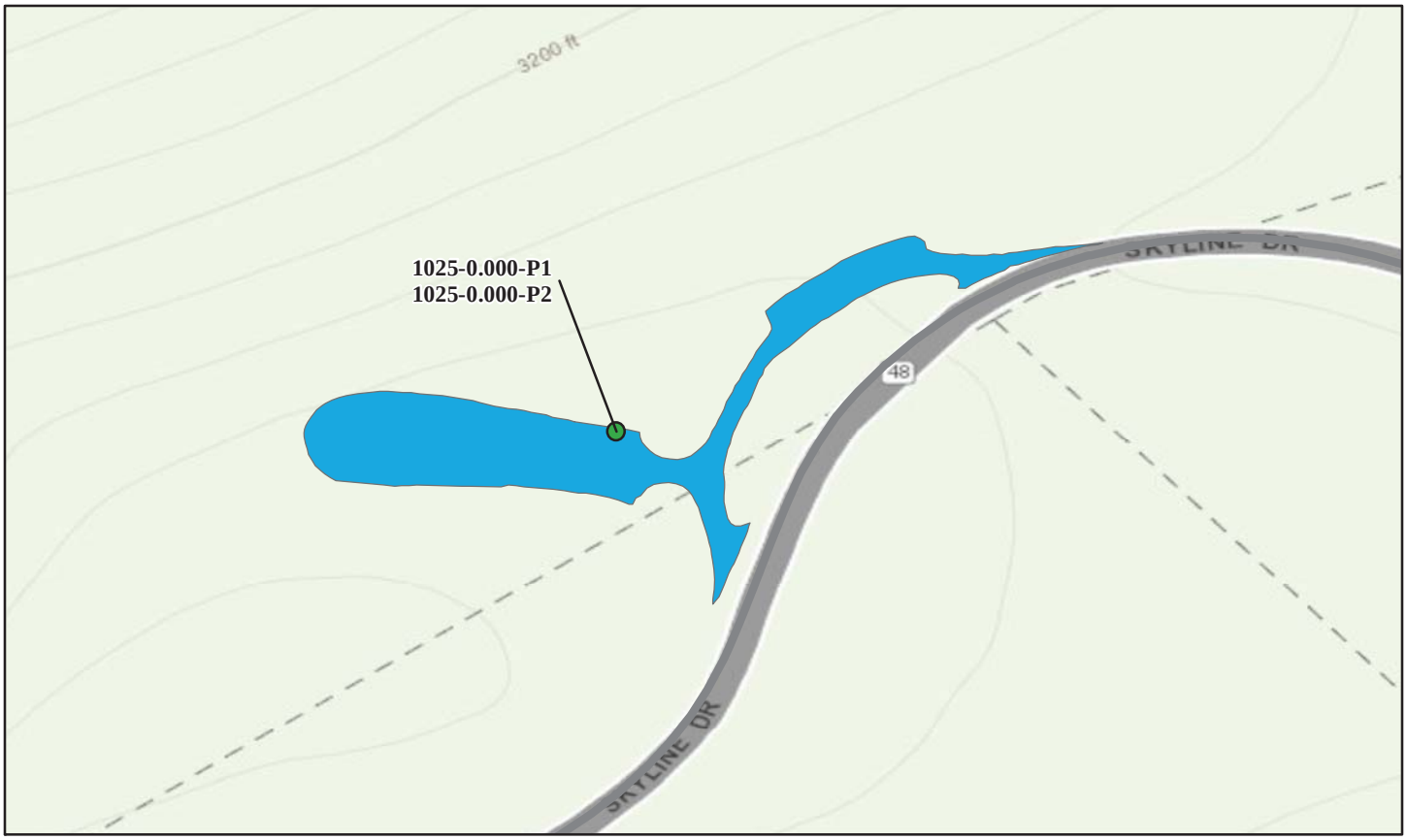
Critical / Poor (0 - 49)	Fair (50 - 69)	Good to Excellent (70 - 100)	No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
SHEN-0974-0.000-P1 5/15/2007	3094	442	Gravity - Mortared Stone	Cut Wall	82	$0.00
SHEN-0974-0.000-P2 5/15/2007	646	95	Gravity - Mortared Stone	Cut Wall	85	$0.00

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

Shenandoah National Park

ROUTE 1025: JEWELL HOLLOW OVERLOOK 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

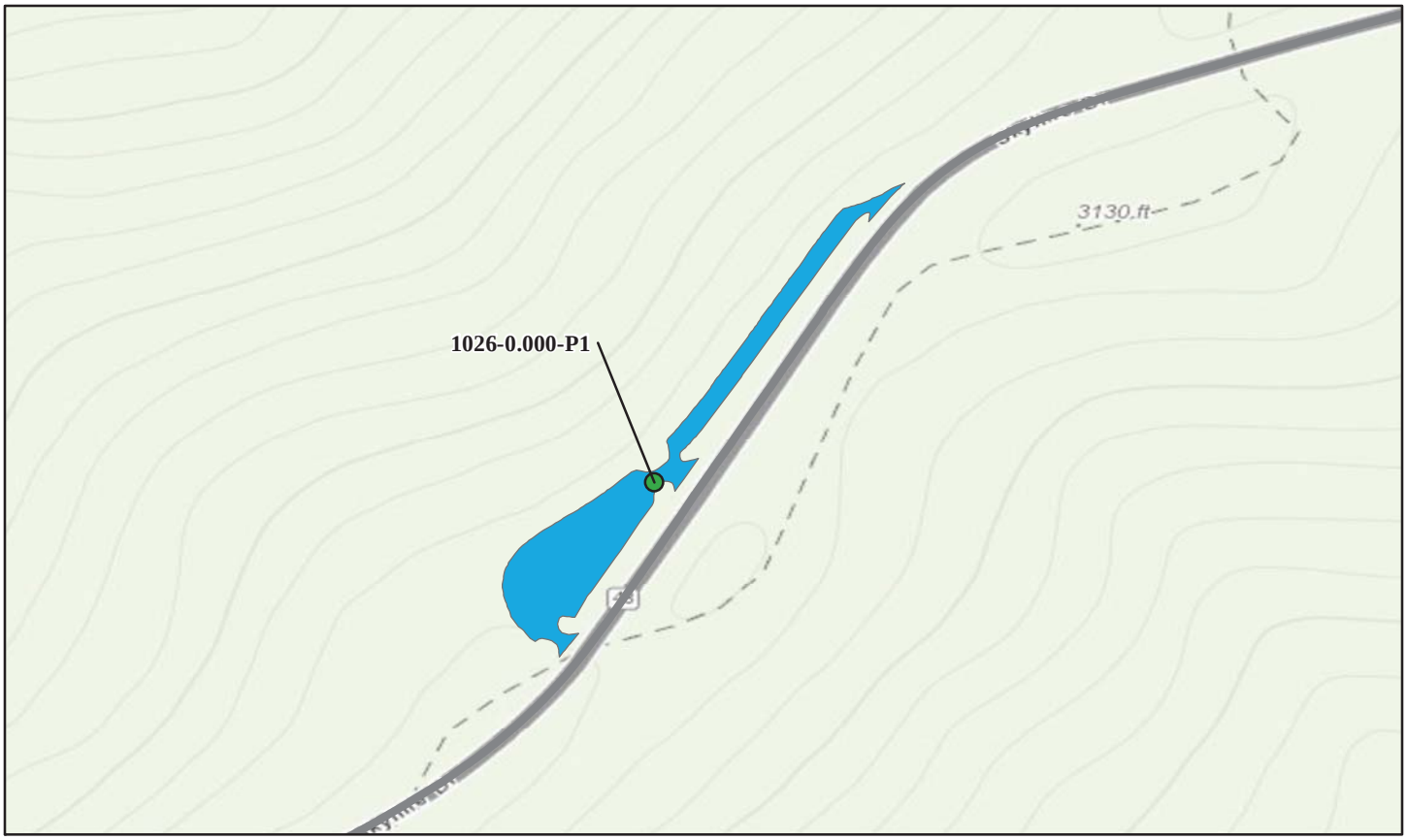
Critical / Poor (0 - 49)	Fair (50 - 69)	Good to Excellent (70 - 100)	No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
SHEN-1025-0.000-P1 5/16/2007	920	230	Gravity - Dry Stone	Cut Wall	76	$6,500.00
SHEN-1025-0.000-P2 5/16/2007	920	230	Gravity - Dry Stone	Cut Wall	70	$0.00

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

Shenandoah National Park

ROUTE 1026: STONY MAN HUGHES OVERLOOK 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

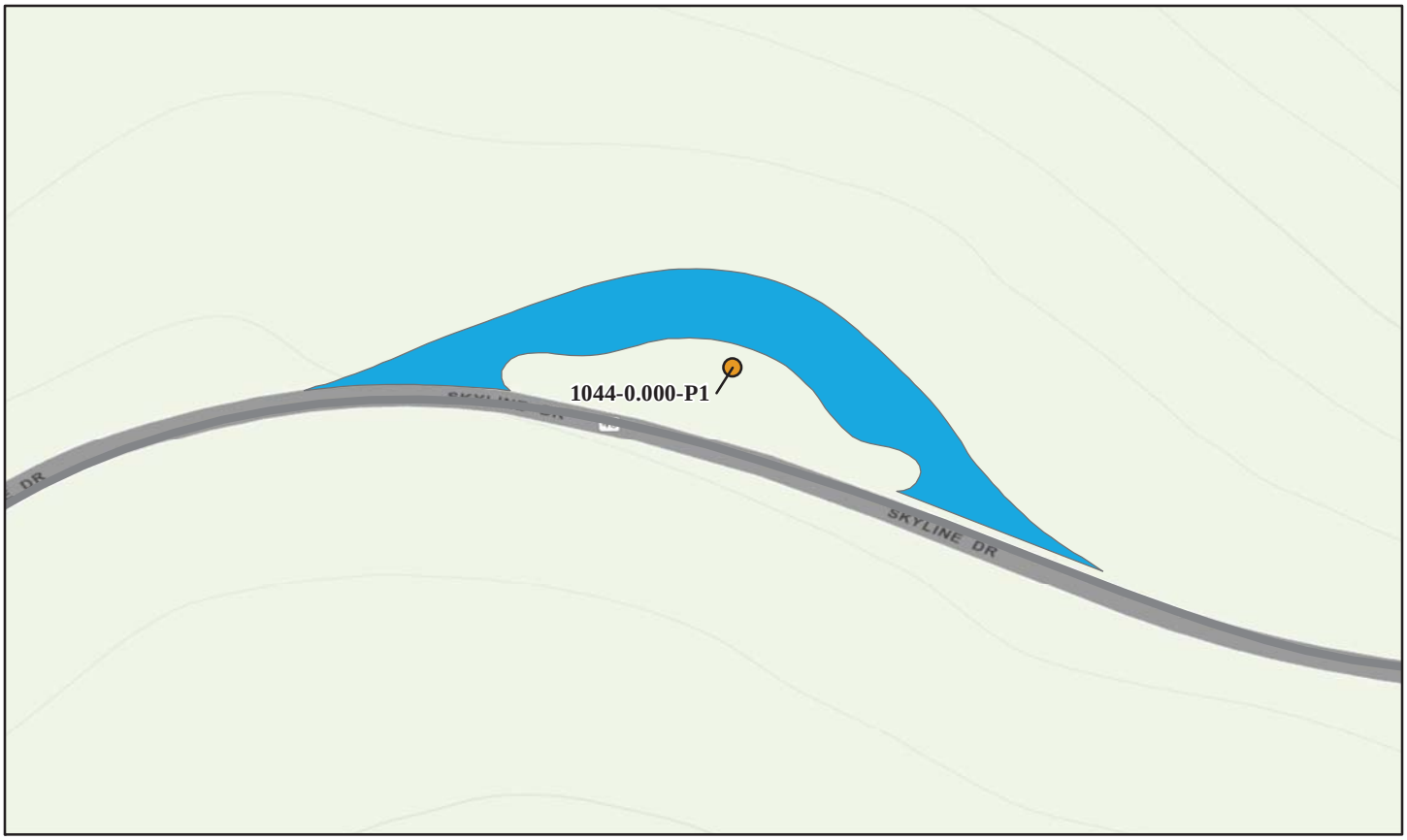
Critical / Poor (0 - 49)	Fair (50 - 69)	Good to Excellent (70 - 100)	No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
SHEN-1026-0.000-P1 5/16/2007	1620	180	Gravity - Dry Stone	Fill Wall	82	$0.00

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

Shenandoah National Park

ROUTE 1044: SWIFT RUN OVERLOOK 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

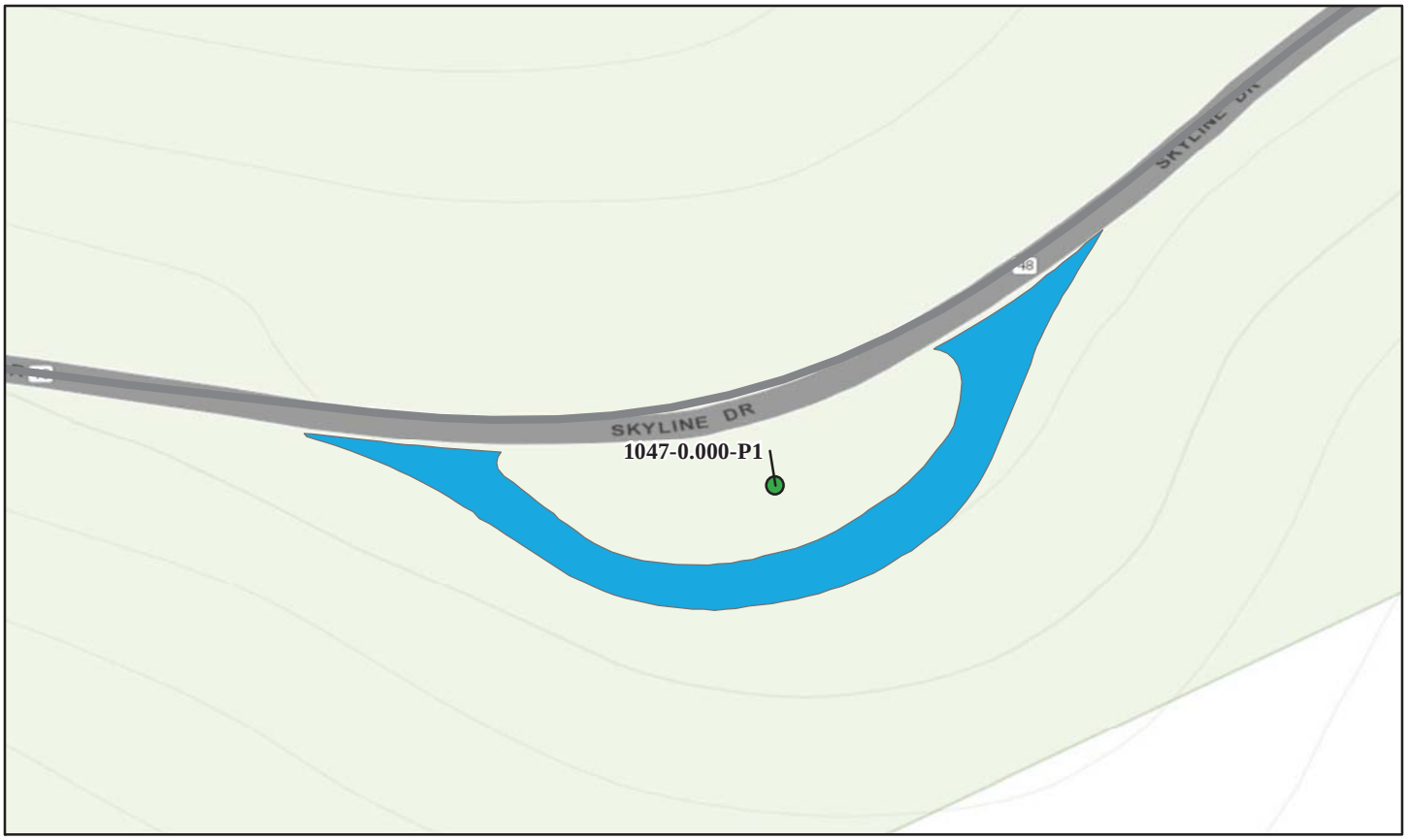
Critical / Poor (0 - 49)	Fair (50 - 69)	Good to Excellent (70 - 100)	No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
SHEN-1044-0.000-P1 5/17/2007	5000	250	Gravity - Dry Stone	Fill Wall	67	$0.00

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

Shenandoah National Park

ROUTE 1047: BACON HOLLOW OVERLOOK 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
SHEN-1047-0.000-P1 5/17/2007	26000	520	Gravity - Dry Stone	Fill Wall	71	$0.00

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

Tier 3
Retaining Wall Details

Shenandoah National Park

Federal Lands Highway
Road Inventory Program

Wall ID:	**SHEN-0010A-0.188-L**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 15, 2007	**Approximate Year Built:**	1980
***Wall Rating:**	84	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Cantilever - Concrete
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Triple-barrel concrete box culvert with cantilever wingwalls.		

Wall Measurements

Wall Length (ft.):	55	**Face Area (sq.):**	170
Average Wall Height (ft.):	3	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	7	**Vertical Offset (ft.):**	-3

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Culvert box and wingwalls are performing as designed and constructed, with no signs of global distress, settlement or displacement.	9
WALL FOUNDATION MATERIAL 8.00	Saturated granular soils and exposed cobbles. No signs of scour or foundation distress impacting the walls.	8
CONCRETE 8.00	Relatively fresh concrete with little or no signs of weathering, cracking or spalling. All joints are tight with no signs of breakage in the concrete.	8
DOWNSLOPE 0.50	Downslope is the bottom of the drainage, which shows no signs of scour, settlement or significant erosion along the channel.	8
TRAFFIC BARRIER/FENCE 0.50	Mortared stone masonry guardwall shows no signs of wall-related distress.	8
WALL DRAINS 0.50	Wingwalls have no visible drains, but show no signs of water-related damage.	8
CULVERT 0.50	Open, free-flowing, with no signs of seepage around the box or distress within the box.	9
CURB/BERM/DITCH 0.50	Concrete curb shows no signs of wall-related distress.	9
LATERAL SLOPE 0.50	Lateral slopes are well-vegetated, stable, and show no signs of bulging or significant erosion.	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.

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos

SHEN_0010A_0.188_L_1.jpg

SHEN_0010A_0.188_L_2.jpg

Wall ID:	**SHEN-0010A-0.188-R**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 15, 2007	**Approximate Year Built:**	1980
***Wall Rating:**	82	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Cantilever - Concrete
Surface Treatment:		**Secondary Wall Type:**	Gravity - Mortared Stone
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Triple-barrel concrete box culvert with one wingwall concrete cantilever wall and one wingwall mortared stone masonry wall. Park-designated Wall Id of SDRV001RW001.		

Wall Measurements

Wall Length (ft.):	54	**Face Area (sq.):**	175
Average Wall Height (ft.):	3	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	8	**Vertical Offset (ft.):**	-1

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Walls are performing as designed and constructed, showing no signs of global distress, settlement or displacement.	9
WALL FOUNDATION MATERIAL 8.00	Saturated soils and cobbles showing no signs of scour or other distress.	8
CONCRETE 8.00	Generally fresh, unweathered concrete showing no significant signs of cracking or other distress.	8
MORTAR 8.00	Unweathered, no signs of cracking, durable, and in-place.	8
STONE MASONRY 8.00	Minor weathering, no cracking or spalling, no missing blocks, well-cut blocks.	8
CULVERT 0.50	Functioning as designed, showing no signs of seepage or cracking within or about the box or wingwalls.	8
CURB/BERM/DITCH 0.50	Concrete curb shows no signs of wall-related distress.	8
DOWNSLOPE 0.50	Downslope is the drainage bottom, which shows no signs of significant channel erosion or other types of distress.	8
LATERAL SLOPE 0.50	Lateral slopes are well vegetated, showing no signs of bulging or significant erosion.	8

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.

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos

SHEN_0010A_0.188_R_1.jpg

Wall ID:	**SHEN-0010A-1.536-L**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 15, 2007	**Approximate Year Built:**	1980
***Wall Rating:**	71	**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-laid rough-masoned stone wall with box culvert exiting the toe. Bottom few courses are mortared, though mostly in support of the culvert construction. Park-designated Wall Id of SDRV001RW002.		

Wall Measurements

Wall Length (ft.):	183	**Face Area (sq.):**	3200
Average Wall Height (ft.):	17	**Face Angle (deg.):**	55
Maximum Wall Height (ft.):	35	**Vertical Offset (ft.):**	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Rough stone work and unknown retained soil conditions has resulted in minor bulging at isolated locations. Unknown if bulging is due to water/earth loads or due to slippage within placed rough-cut stone face. No signs of global failures, or of significa	7
WALL FOUNDATION MATERIAL 8.00	Some bedrock visible in the immediate drainage at the wall toe. No signs of foundation-related wall distress. Difficult to see foundation material due to ground cover.	8
MORTAR 8.00	Minor mortar in lower few courses near box inlet. Weathered, separated from rock in places, missing in some places.	6
STONE MASONRY 8.00	Very rough-cut dry-laid rock showing minor weathering. No chinking is evident, with some slippage of facing rock (possible bulging of the face). Rock is generally angular and well interlocked.	7
CULVERT 0.50	Concrete box integrated into wall face is functioning as designed and constructed, showing no signs of significant distress, seepage, or displacement.	8
LATERAL SLOPE 0.50	lateral slopes are well-vegetated, stable and serve as ditch drains feeding the culvert. Due to heavy ground cover it was difficult to see extent of erosion, but appear stable.	8
TRAFFIC BARRIER/FENCE 0.50	Mortared stone masonry guardwall; no signs of wall-related distress.	8
VEGETATION 0.50	Minor vegetation at top of wall, but no distress to wall.	8
WALL DRAINS 0.50	Wall appears free-draining, with no signs of wall seepage issues (th9ugh minor bulging may be water-related).	8

Repair Recommendations

Failure Consequence:	HIGH
Recommendation Narrative:	None
Repair Cost:	$0

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

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos

SHEN_0010A_1.536_L_1.jpg

SHEN_0010A_1.536_L_2.jpg

Wall ID:	**SHEN-0010A-1.854-L**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 15, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	78	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Double-barrel, mortared stone masonry box culvert headwall.		

Wall Measurements

Wall Length (ft.):	41	**Face Area (sq.):**	110
Average Wall Height (ft.):	2	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	7	**Vertical Offset (ft.):**	-20

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Minor weathering of elements, but no global distresses, settlement, or displacement of the wingwalls or headwall structure.	8
WALL FOUNDATION MATERIAL 8.00	Saturated coarse aggregates and cobbles/boulders. Very stable foundation with no signs of scour or settlement.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	7
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
CULVERT 0.50	Culvert shows no signs of seepage in or around the box. Stone work within the box is intact and shows no signs of significant distress.	8
LATERAL SLOPE 0.50	Well-vegetated side slopes. Very stable.	8
TRAFFIC BARRIER/FENCE 0.50	Mortared stone masonry guardwall with no signs of wall-related distress.	8
DOWNSLOPE 0.50	Drainage bottom shows no signs of significant erosion or scour.	9
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related 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.

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos

SHEN_0010A_1.854_L_1.jpg

Wall ID:	**SHEN-0010A-1.857-R**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 15, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	77	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Double-barrel, mortared stone masonry box culvert headwall.		

Wall Measurements

Wall Length (ft.):	36	**Face Area (sq.):**	120
Average Wall Height (ft.):	3	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	8	**Vertical Offset (ft.):**	-20

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Headwall/wingwalls are functioning as intended, showing signs of weathering and minor seepage distress to some elements. No signs of global distress, displacement or significant settlement of the structure.	8
WALL FOUNDATION MATERIAL 8.00	Saturated coarse aggregates and cobbles/boulders. Very stable foundation with no signs of scour or settlement.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	7
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
LATERAL SLOPE 0.50	Well-vegetated side slopes. Very stable.	8
TRAFFIC BARRIER/FENCE 0.50	Mortared stone masonry guardwall with no signs of wall-related distress.	8
UPSLOPE 0.50	Well-vegetated fill slope, very stable with no signs of bulging or sloughing.	8
DOWNSLOPE 0.50	Drainage bottom shows no signs of significant erosion or scour.	9
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related 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.

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos

SHEN_0010A_1.857_R_1.jpg

SHEN_0010A_1.857_R_2.jpg

Wall ID:	**SHEN-0010A-5.865-R**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 15, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	72	**Maintenance Action:**	Maintenance

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 masonry wall with rock fill above (possible one-time dry-laid structure common to the Park?). Park-designated as SDRV005RW001.		

Wall Measurements

Wall Length (ft.):	305	**Face Area (sq.):**	915
Average Wall Height (ft.):	3	**Face Angle (deg.):**	80
Maximum Wall Height (ft.):	5	**Vertical Offset (ft.):**	-22

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Top of wall may be in disrepair, though difficult to discern wall top-line. Once brush is cleared, missing and/or loose blocks may become evident. No immediate signs of global distress, displacement or significant settlement anywhere along the wall - tho	7
WALL FOUNDATION MATERIAL 8.00	Difficult to see foundation material due to vegetation, but appears to be rock fill. Generally stable (where visible), with no signs of significant erosion.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	7
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or significant missing blocks (difficult to discern top-line of wall).	7
DOWNSLOPE 0.50	Well-vegetated fill slope, with signs of rock fill present. Very stable with no signs of bulging or sloughing.	8
LATERAL SLOPE 0.50	Well-vegetated fill slope, with signs of rock fill present. Very stable with no signs of bulging or sloughing.	8
TRAFFIC BARRIER/FENCE 0.50	Mortared stone masonry guardwall with no signs of wall-related distress.	8
UPSLOPE 0.50	Well-vegetated fill slope, with signs of rock fill present. Very stable with no signs of bulging or sloughing.	8
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related distress.	9

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	Clear small tress and substantial brush from the top and toe of the wall along the entire length of the retaining wall. Inspect for further wall damage - particularly loose or missing masoned stone elements along the top of the wall. 40 hrs labor @ $50
Repair Cost:	$2,000

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

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos

SHEN_0010A_5.865_R_1.jpg

Wall ID:	**SHEN-0010A-8.386-L**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 15, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	72	**Maintenance Action:**	Maintenance

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 masonry wall located at the toe of a rock fill slope. The wall is obscured in locations by vegetation and slide debris from top slope. Park-designated wall id of SDRV008RW001.		

Wall Measurements

Wall Length (ft.):	234	**Face Area (sq.):**	936
Average Wall Height (ft.):	4	**Face Angle (deg.):**	85
Maximum Wall Height (ft.):	4	**Vertical Offset (ft.):**	-15

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Minor weathering of elements, but no global distresses, settlement, or displacement of the wall evident. Trees, shrubs and possibly buried wall sections should be cleared to better inspect and preserve wall performance.	7
WALL FOUNDATION MATERIAL 8.00	Rock fill with no signs of erosion, bulging or other distress.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	7
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks, though some sections of the wall are obscured by slide debris from top slope.	7
DOWNSLOPE 0.50	Well-vegetated fill slope, with signs of rock fill present. Very stable with no signs of bulging or sloughing.	8
LATERAL SLOPE 0.50	Well-vegetated fill slope, with signs of rock fill present. Very stable with no signs of bulging or sloughing.	8
TRAFFIC BARRIER/FENCE 0.50	Mortared stone masonry guardwall with no signs of wall-related distress.	8
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related distress.	9
VEGETATION 1.00	Small trees and brush above and below the wall, with some minor impacting the wall. Brush and tress should be removed to prevent further impacts.	5

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	Clear small trees and brush from around top and toe of wall. Clear buried wall sections only if damage is observed once brush is removed. 40 hrs @ $50/hr = $2,000
Repair Cost:	$2,000

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

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos

SHEN_0010A_8.386_L_1.jpg

SHEN_0010A_8.386_L_2.jpg

Wall ID:	**SHEN-0010A-10.878-L**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 15, 2007	**Approximate Year Built:**	1937
***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:	Dry-laid, rough-cut stone masonry wall. Very well built. Park-designated Wall Id of SDRV010RW001.		

Wall Measurements

Wall Length (ft.):	192	**Face Area (sq.):**	1595
Average Wall Height (ft.):	8	**Face Angle (deg.):**	55
Maximum Wall Height (ft.):	17	**Vertical Offset (ft.):**	-1

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	No signs of global distress or significant slippage of rocks in the wall face. Performing as intended.	8
WALL FOUNDATION MATERIAL 8.00	Very stable rock fill foundation with no signs of bulging or settlement.	9
STONE MASONRY 8.00	Well-placed, chinked dry-laid rough-masoned stone. Relatively fresh, angular stone with minor weathering. No missing blocks evident.	8
DOWNSLOPE 0.50	Well-vegetated fill slope, with signs of rock fill present. Very stable with no signs of bulging or sloughing.	8
LATERAL SLOPE 0.50	Well-vegetated fill slope, with signs of rock fill present. Very stable with no signs of bulging or sloughing.	8
WALL DRAINS 0.50	No drains visible. Wall is free-draining, with no signs of water-related distress.	8
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related distress.	9
TRAFFIC BARRIER/FENCE 0.50	Mortared stone masonry guardwall with no signs of wall-related distress.	9
VEGETATION 1.00	Minor vegetation along top and toe of wall. No impacts to 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.

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos

SHEN_0010A_10.878_L_1.jpg

Wall ID:	**SHEN-0010A-12.012-L**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	78	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall and wingwalls.		

Wall Measurements

Wall Length (ft.):	19	**Face Area (sq.):**	105
Average Wall Height (ft.):	5	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	6	**Vertical Offset (ft.):**	-9

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Minor weathering of elements, but no global distresses, settlement, or displacement of the wingwalls or headwall structure.	8
WALL FOUNDATION MATERIAL 8.00	Coarse aggregates and cobbles/boulders. Very stable foundation with no signs of scour or settlement.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	7
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
CULVERT 0.50	Culvert shows no signs of seepage in or around the box. Stone work within the box is intact and shows no signs of significant distress.	8
DOWNSLOPE 0.50	Drainage bottom shows no signs of significant erosion or scour.	8
LATERAL SLOPE 0.50	Well-vegetated side slopes. Very stable.	8
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related distress.	8
TRAFFIC BARRIER/FENCE 0.50	Mortared stone masonry guardwall with no signs of wall-related distress.	8

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.

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos

SHEN_0010A_12.012_L_1.jpg

SHEN_0010A_12.012_L_2.jpg

Wall ID:	**SHEN-0010A-12.012-R**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	69	**Maintenance Action:**	Maintenance

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	Gravity - Dry Stone
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall overlain with 5 ft-high dry-laid rock wall.		

Wall Measurements

Wall Length (ft.):	45	**Face Area (sq.):**	165
Average Wall Height (ft.):	3	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	8	**Vertical Offset (ft.):**	-29

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Wall is showing no global signs of distress, but preventive maintenance is required to mitigate scour and vegetation problems.	6
WALL FOUNDATION MATERIAL 8.00	Coarse aggregates and cobbles/boulders. Very stable foundation with no signs of scour or settlement. Needs drainage fill to prevent scour of foundation in future.	7
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	7
PLACED STONE 8.00	Loosely placed, hard, angular rock. No chinking, but no missing blocks evident.	7
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
CULVERT 0.50	Culvert shows no signs of seepage in or around the box. Stone work within the box is intact and shows no signs of significant distress.	8
DOWNSLOPE 1.00	Down-cutting in drainage below walls is scouring in front of the culvert. Rock fill needs to be added to the culvert to mitigate future scour problems.	4
LATERAL SLOPE 0.50	Well-vegetated side slopes. Very stable.	8
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related distress.	8

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	Remove small trees from top of wall and place riprap for scour protection. Remove small trees: 4 hrs @ $50/hr = $200. Fill culvert drainage apron with riprap: 8 hrs @ $50/hr = $400. Total = $600
Repair Cost:	$600

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

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos

SHEN_0010A_12.012_R_1.jpg

Wall ID:	**SHEN-0010A-21.093-R**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	75	**Maintenance Action:**	Maintenance

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 masonry wall located mid-slope just before the Hogback Overlook (when traveling up station). This wall was not listed in the Park retaining wall database.		

Wall Measurements

Wall Length (ft.):	146	**Face Area (sq.):**	1328
Average Wall Height (ft.):	9	**Face Angle (deg.):**	85
Maximum Wall Height (ft.):	13	**Vertical Offset (ft.):**	-16

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	No global distress observed, including significant settlement or wall displacement. Brush needs to be cleared and the end of the walls further inspected for ravel.	7
WALL FOUNDATION MATERIAL 8.00	Large boulder fill from the overlying road cut. Very stable with no signs of distress.	9
MORTAR 8.00	Moderately weathered, subject to isolated seepage in areas where mortar has separated from stone (moss evident at these locations). Mortar is generally present and intact, and hard.	7
STONE MASONRY 8.00	Hard, durable, unbroken or cracked blocks subject to surface weathering.	7
DOWNSLOPE 0.50	Large boulder fill - very stable.	8
LATERAL SLOPE 0.50	Lightly-vegetated fill slope, with substantial rock fill present. Very stable with no signs of bulging or sloughing.	8
TRAFFIC BARRIER/FENCE 0.50	Mortared stone masonry guardwall with no signs of wall-related distress.	8
UPSLOPE 0.50	Lightly-vegetated fill slope, with substantial rock fill present. Very stable with no signs of bulging or sloughing.	8
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related distress.	9

Repair Recommendations

Failure Consequence:	HIGH
Recommendation Narrative:	Remove brush and small trees from top of wall and inspect for additional wall damage. 30 hrs @ $50/hr = $1,500
Repair Cost:	$1,500

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

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos

SHEN_0010A_21.093_R_1.jpg

SHEN_0010A_21.093_R_2.jpg

Wall ID:	**SHEN-0010A-29.430-L**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	81	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall and wingwalls.		

Wall Measurements

Wall Length (ft.):	27	**Face Area (sq.):**	130
Average Wall Height (ft.):	4	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	6	**Vertical Offset (ft.):**	-2

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Minor weathering of elements, but no global distresses, settlement, or displacement of the wingwalls or headwall structure.	9
WALL FOUNDATION MATERIAL 8.00	Coarse aggregates and cobbles/boulders. Very stable foundation with no signs of scour or settlement.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	8
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
CULVERT 0.50	Culvert shows no signs of seepage in or around the box. Stone work within the box is intact and shows no signs of significant distress.	8
DOWNSLOPE 0.50	Drainage bottom shows no signs of significant erosion or scour.	8
LATERAL SLOPE 0.50	Well-vegetated side slopes. Very stable.	8
VEGETATION 0.50	Minor vegetation along the top and sides of the culvert and wingwalls, but not impacting the walls.	8
WALL DRAINS 0.50	None visible. No signs of water-related distress to wall elements.	8

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.

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos

SHEN_0010A_29.430_L_1.jpg

Wall ID:	**SHEN-0010A-29.430-R**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	83	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall and wingwalls.		

Wall Measurements

Wall Length (ft.):	22	**Face Area (sq.):**	110
Average Wall Height (ft.):	5	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	6	**Vertical Offset (ft.):**	-1

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Minor weathering of elements, but no global distresses, settlement, or displacement of the wingwalls or headwall structure.	9
WALL FOUNDATION MATERIAL 8.00	Coarse aggregates and cobbles/boulders. Very stable foundation with no signs of scour or settlement.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	8
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
DOWNSLOPE 0.50	Drainage bottom shows no signs of significant erosion or scour.	8
LATERAL SLOPE 0.50	Well-vegetated side slopes. Very stable.	8
VEGETATION 0.50	Minor vegetation along the top and sides of the culvert and wingwalls, but not impacting the walls.	8
WALL DRAINS 0.50	No visible wall drains, yet no signs of water-related distress or wall face seepage.	8
CULVERT 0.50	Culvert shows no signs of seepage in or around the box. Stone work within the box is intact and shows no signs of significant 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.

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos

SHEN_0010A_29.430_R_1.jpg

Wall ID:	**SHEN-0010A-29.672-L**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	81	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall.		

Wall Measurements

Wall Length (ft.):	22	**Face Area (sq.):**	75
Average Wall Height (ft.):	3	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	5	**Vertical Offset (ft.):**	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Performing as designed and constructed showing no signs of global distress.	9
WALL FOUNDATION MATERIAL 8.00	Assumed stable soil and/or rock fill (obscured by leaves). No signs of settlement distress or apparent loss of foundation material.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	8
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
CULVERT 0.50	Culvert shows no signs of seepage in or around the box. Stone work within the box is intact and shows no signs of significant distress.	8
DOWNSLOPE 0.50	Drainage bottom appears intact with no signs of significant erosion.	8
LATERAL SLOPE 0.50	Stable, well-vegetated side slopes.	8
VEGETATION 0.50	Minor vegetation along the top and sides of the culvert and wingwalls, but not impacting the walls.	8
WALL DRAINS 0.50	None visible, but no signs of water-related wall distress.	8

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.

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos

SHEN_0010A_29.672_L_1.jpg

Wall ID:	**SHEN-0010A-29.672-R**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	81	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall and wingwalls.		

Wall Measurements

Wall Length (ft.):	29	**Face Area (sq.):**	100
Average Wall Height (ft.):	3	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	5	**Vertical Offset (ft.):**	-1

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	No signs of global distress. Functioning as intended,	9
WALL FOUNDATION MATERIAL 8.00	Saturated coarse aggregates and cobbles/boulders. Very stable foundation with no signs of scour or settlement.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	8
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
DOWNSLOPE 0.50	Drainage bottom shows no signs of significant erosion or scour.	8
LATERAL SLOPE 0.50	Stable lateral slope showing no signs of distress.	8
VEGETATION 0.50	Minor vegetation along the top and sides of the culvert and wingwalls, but not impacting the walls.	8
WALL DRAINS 0.50	None visible. No water-related distress to the wall apparent. Some seepage from above the wall.	8
CULVERT 0.50	Culvert shows no signs of seepage in or around the box. Stone work within the box is intact and shows no signs of significant 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.

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos

SHEN_0010A_29.672_R_1.jpg

Wall ID:	**SHEN-0010A-29.867-R**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	82	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall.		

Wall Measurements

Wall Length (ft.):	9	**Face Area (sq.):**	40
Average Wall Height (ft.):	4	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	6	**Vertical Offset (ft.):**	-9

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Minor weathering of elements, but no global distresses, settlement, or displacement of the headwall structure.	9
WALL FOUNDATION MATERIAL 8.00	Coarse aggregates and cobbles/boulders. Very stable foundation with no signs of scour or settlement.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	8
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
CULVERT 0.50	Culvert shows no signs of seepage in or around the box. Stone work within the box is intact and shows no signs of significant distress.	8
DOWNSLOPE 0.50	Drainage bottom shows no signs of significant erosion or scour.	8
LATERAL SLOPE 0.50	Well-vegetated side slopes. Very stable.	8
VEGETATION 0.50	Minor vegetation along top and toe of wall. No impacts to wall.	8
WALL DRAINS 0.50	No visible wall drains, yet no signs of water-related distress or wall face seepage.	8

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.

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos

SHEN_0010A_29.867_R_1.jpg

Wall ID:	**SHEN-0010A-29.998-L**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	80	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall.		

Wall Measurements

Wall Length (ft.):	15	**Face Area (sq.):**	50
Average Wall Height (ft.):	3	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	4	**Vertical Offset (ft.):**	-7

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Minor weathering of elements, but no global distresses, settlement, or displacement of the wingwalls or headwall structure.	8
WALL FOUNDATION MATERIAL 8.00	Coarse aggregates and cobbles/boulders. Very stable foundation with no signs of scour or settlement.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	8
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
DOWNSLOPE 0.50	Drainage bottom shows no signs of significant erosion or scour.	8
LATERAL SLOPE 0.50	Well-vegetated side slopes. Very stable.	8
UPSLOPE 0.50	Very stable with no signs of bulging or sloughing.	8
VEGETATION 0.50	Minor vegetation along top and toe of wall. No impacts to wall.	8
CULVERT 0.50	Culvert shows no signs of seepage in or around the box. Stone work within the box is intact and shows no signs of significant 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.

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos

SHEN_0010A_29.998_L_1.jpg

Wall ID:	**SHEN-0010A-29.998-R**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	82	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall.		

Wall Measurements

Wall Length (ft.):	21	**Face Area (sq.):**	85
Average Wall Height (ft.):	4	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	5	**Vertical Offset (ft.):**	-1

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Minor weathering of elements, but no global distresses, settlement, or displacement of the headwall structure.	9
WALL FOUNDATION MATERIAL 8.00	Coarse aggregates and cobbles/boulders. Very stable foundation with no signs of scour or settlement.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	8
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
DOWNSLOPE 0.50	Drainage bottom shows no signs of significant erosion or scour.	8
LATERAL SLOPE 0.50	Well-vegetated side slopes. Very stable.	8
VEGETATION 0.50	Minor vegetation along top and toe of wall. No impacts to wall.	8
WALL DRAINS 0.50	None visible. No signs of water-related distress to wall elements.	8
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related 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.

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos

SHEN_0010A_29.998_R_1.jpg

Wall ID:	**SHEN-0010A-30.516-L**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	80	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall and wingwalls.		

Wall Measurements

Wall Length (ft.):	26	**Face Area (sq.):**	135
Average Wall Height (ft.):	5	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	6	**Vertical Offset (ft.):**	-5

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Minor weathering of elements, but no global distresses, settlement, or displacement of the wingwalls or headwall structure.	8
WALL FOUNDATION MATERIAL 8.00	Coarse aggregates and cobbles/boulders. Very stable foundation with no signs of scour or settlement.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	8
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
CULVERT 0.50	Culvert shows no signs of seepage in or around the box. Stone work within the box is intact and shows no signs of significant distress.	8
DOWNSLOPE 0.50	Drainage bottom shows no signs of significant erosion or scour.	8
LATERAL SLOPE 0.50	Well-vegetated fill slope, with signs of rock fill present. Very stable with no signs of bulging or sloughing.	8
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related distress.	8
UPSLOPE 0.50	Well-vegetated fill slope, with signs of rock fill present. Very stable with no signs of bulging or sloughing.	8

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.

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos

SHEN_0010A_30.516_L_1.jpg

SHEN_0010A_30.516_L_2.jpg

Wall ID:	**SHEN-0010A-30.516-R**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	67	**Maintenance Action:**	Repair Elements

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	Gravity - Dry Stone
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall overlain by short-height dry-laid rock wall.		

Wall Measurements

Wall Length (ft.):	31	**Face Area (sq.):**	110
Average Wall Height (ft.):	3	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	7	**Vertical Offset (ft.):**	-6

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Wall is distressed from tree damage/possible water damage, but functioning okay globally. Needs roots mitigated and headwall blocks replaced/remortared.	6
WALL FOUNDATION MATERIAL 8.00	Coarse aggregates and cobbles/boulders. Very stable foundation with no signs of scour or settlement.	8
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked blocks. Several blocks have fallen from the headwall crown.	5
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking, except in crown of headwall.	7
PLACED STONE 8.00	Dry-laid stone work is loosely stacked, with some blocks having fallen out. No chinking for wall support.	7
CULVERT 0.50	Culvert shows no signs of seepage in or around the box.	8
DOWNSLOPE 0.50	Drainage bottom shows no signs of significant erosion or scour.	8
LATERAL SLOPE 0.50	Well-vegetated fill slope, with signs of rock fill present. Very stable with no signs of bulging or sloughing.	8
UPSLOPE 0.50	Well-vegetated fill slope, with signs of rock fill present. Very stable with no signs of bulging or sloughing.	8

Repair Recommendations

Failure Consequence:	LOW
Recommendation Narrative:	Remove small trees, mitigate larger tree roots, repair displaced mortared stone masonry blocks. Remove trees: 4 hrs @ $50/hr = $200. Clean and replace existing masoned stones: 16 hrs @ $50/hr = $800. Mortar: 3 bags @ $10/bag = $30. Total = $1,030
Repair Cost:	$1,030

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

Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos

SHEN_0010A_30.516_R_1.jpg

SHEN_0010A_30.516_R_2.jpg

Wall ID:	**SHEN-0010A-31.344-L**		
Route Name:	SKYLINE DRIVE (NORTH)		
Inspection Date:	May 15, 2007	**Approximate Year Built:**	1932
***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:	Dry laid rock wall at base of 1(h):1(v) slope (steeper in sections) wall supports slope supporting Skyline Drive immediately north of tunnel entrance high consequence of failure		

Wall Measurements

Wall Length (ft.):	180	**Face Area (sq.):**	6300
Average Wall Height (ft.):	35	**Face Angle (deg.):**	70
Maximum Wall Height (ft.):	35	**Vertical Offset (ft.):**	-75

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent performance; no sign of wall or slope movement	9
WALL FOUNDATION MATERIAL 8.00	Wall is founded on intact bedrock; no evidence of settlement or rotation	9
PLACED STONE 8.00	Dry laid stones; in good to excellent condition	9
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement in good condition with minor cracking along outward wheel line (typical along the Drive); vegetated shoulder with no evidence of distress	8
UPSLOPE 0.50	Loose riprap along face of steep slope face; no evidence of slope movement	8
DOWNSLOPE 0.50	Comprised of bedrock outcrops	9
LATERAL SLOPE 0.50	Wall is keyed into the adjacent bedrock	9
TRAFFIC BARRIER/FENCE 0.50	GM guard wall at top of slope above wall; no observed distress	9
VEGETATION 0.50	No large diameter trees immediate to the wall	9

Repair Recommendations

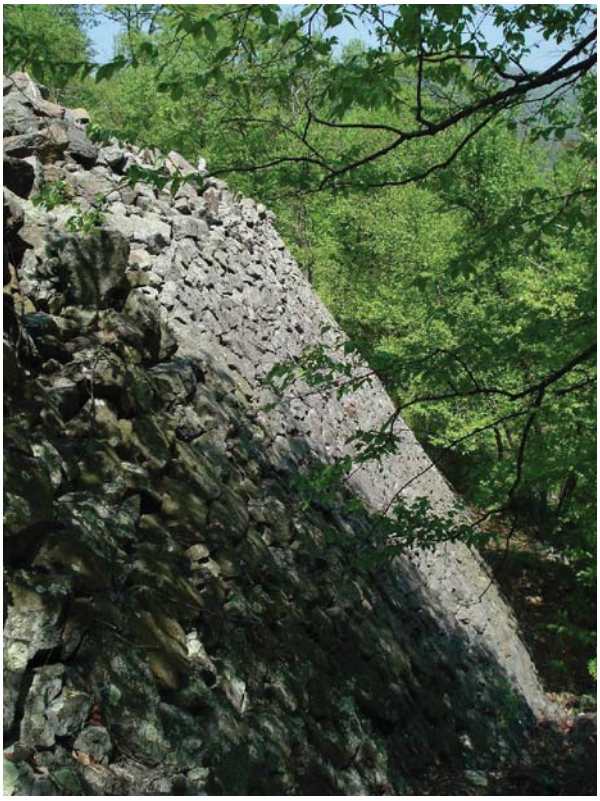
Failure Consequence:	HIGH
Recommendation Narrative:	None
Repair Cost:	$0

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

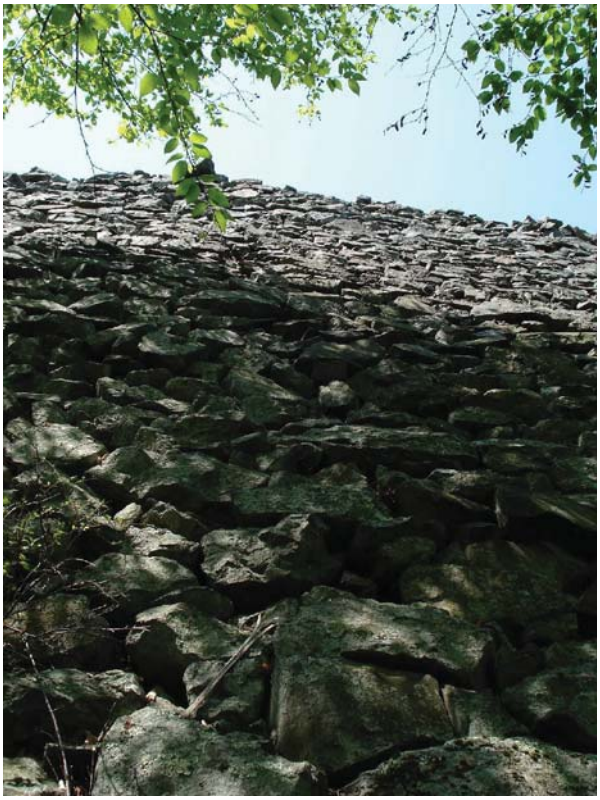
Shenandoah National Park

ROUTE 0010A: SKYLINE DRIVE (NORTH)

Retaining Wall Condition Photos



SHEN_0010A_31.344_L_1.jpg



SHEN_0010A_31.344_L_2.jpg

Wall ID:	**SHEN-0010B-32.427-R**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 15, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	83	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Slope Protection	**Primary Wall Type:**	Gravity - Dry Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Dry laid stone wall above the southbound tunnel entrance the wall is a tiered wall with the lower wall being approximately 6 ft high upper wall is approximately 17 ft high high consequence of failure		

Wall Measurements

Wall Length (ft.):	45	**Face Area (sq.):**	900
Average Wall Height (ft.):	20	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	20	**Vertical Offset (ft.):**	40

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent performance of wall; No evidence of movement or distress	8
WALL FOUNDATION MATERIAL 8.00	Wall founded on rock; no evidence of settlement or rotation	9
PLACED STONE 8.00	Dry laid stones; in good condition	8
DOWNSLOPE 0.50	Vegetated slope of soil and rock; no evidence of slope movement	8
UPSLOPE 0.50	Vegetated slope comprised of rock and soil; no evidence of slope movement or distress	8
VEGETATION 0.50	Small to medium diameter trees above the upper wall; do not appear to impact the wall	8
LATERAL SLOPE 0.50	Walls keyed into bedrock above tunnel	9
WALL DRAINS 0.50	Wall is self-draining; no observed drainage-related issues	9

Repair Recommendations

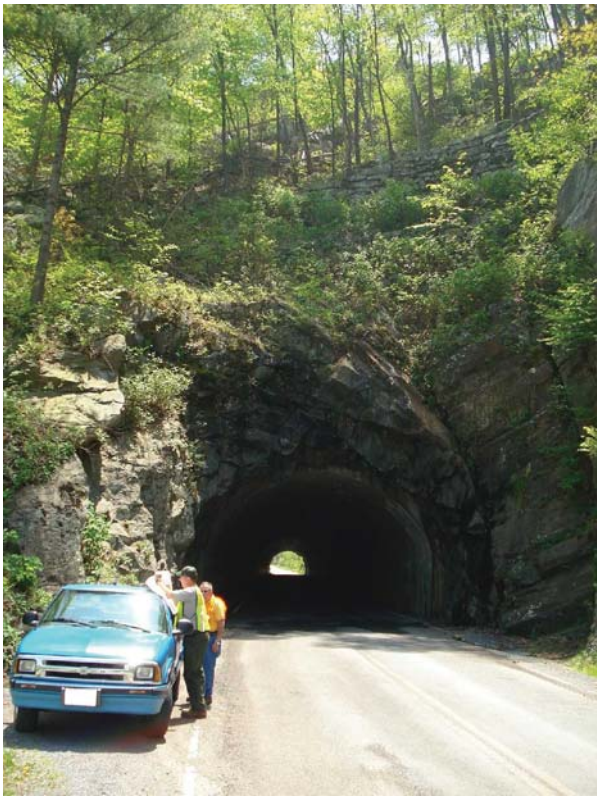
Failure Consequence:	HIGH
Recommendation Narrative:	None
Repair Cost:	$0

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

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos



SHEN_0010B_32.427_R_1.jpg

SHEN_0010B_32.427_R_2.jpg

Wall ID:	**SHEN-0010B-33.830-L**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	75	**Maintenance Action:**	Repair Elements

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	GM inlet HW for two(2) 36 in diameter corrugated metal pipe culverts along curve in seasonally high ADT roadway moderate consequence of failure		

Wall Measurements

Wall Length (ft.):	14	**Face Area (sq.):**	68
Average Wall Height (ft.):	4	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	5	**Vertical Offset (ft.):**	-1

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent performance of the HW; minor distress; no evidence of movement	8
WALL FOUNDATION MATERIAL 8.00	Wall founded on soil; no evidence of settlement or rotation	8
MORTAR 8.00	Generally in good condition; shows sign of normal seasonal weathering; some deteriorated and missing mortar along bottom of the northern outlet pipe	7
STONE MASONRY 8.00	Stone blocks are in good condition; some loose stones below northern outlet pipe	7
CULVERT 0.50	Culverts appear to be in good condition; minor rusting of the inverts; leaves in the inlet end impede the flow of water	8
LATERAL SLOPE 0.50	Minor erosion along northern end of headwall	8
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement in good condition with minor cracking along outward wheel line (typical along the Drive); vegetated shoulder with no evidence of distress	8
TRAFFIC BARRIER/FENCE 0.50	GM guard wall at top of slope above wall; no observed distress	8
UPSLOPE 0.50	Vegetated slope; level to steep; no evidence of slope movement	8

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	(1) Remove/replace masonry stone = $620/sqft (1 sqft), (2) General Labor = $55/hr (2 workers) (4 hrs) = $440. Total = $1,100
Repair Cost:	$1,100

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

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos

SHEN_0010B_33.830_L_1.jpg

SHEN_0010B_33.830_L_2.jpg

Wall ID:	**SHEN-0010B-39.879-R**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	Unknown
***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:	GM inlet HW for 24 in diameter corrugated plastic pipe culvert close proximity to roadway carrying seasonally high ADT Moderate to high consequence of failure		

Wall Measurements

Wall Length (ft.):	7	**Face Area (sq.):**	38
Average Wall Height (ft.):	5	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	6	**Vertical Offset (ft.):**	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent performance of the HW; no evidence of movement or distress	8
WALL FOUNDATION MATERIAL 8.00	Wall founded on soil; no evidence of settlement or rotation	8
MORTAR 8.00	Generally in good condition; shows sign of normal seasonal weathering	8
STONE MASONRY 8.00	Stone blocks are in good condition; no sign of distress	8
DOWNSLOPE 0.50	Riprap erosion protection along the slope leading to HW; no evidence of erosion	8
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement in good condition with minor cracking along outward wheel line (typical along the Drive); vegetated shoulder with no evidence of distress	8
WALL DRAINS 0.50	Generally good drainage around wall; evidence of ongoing erosion of lateral slope at edges of HW	8
VEGETATION 0.50	No large vegetation immediate to the wall	9
CULVERT 1.00	24-in. diameter culvert; culvert in good condition; inlet is clogged with leaves; routine maintenance required to removed leaves	7

Repair Recommendations

Failure Consequence:	HIGH
Recommendation Narrative:	General Labor = $55/hr (2 hrs) = $110
Repair Cost:	$110

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

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos

Condition photos are not available for SHEN-0010B-39.879-R.

Wall ID:	**SHEN-0010B-39.962-R**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	80	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	GM inlet HW for a 30 in diameter corrugated plastic pipe culvert close proximity to roadway carrying seasonally high ADT Moderate consequence of failure		

Wall Measurements

Wall Length (ft.):	8	**Face Area (sq.):**	32
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	Good to excellent performance of the HW; no evidence of movement or distress	8
WALL FOUNDATION MATERIAL 8.00	Wall founded on soil; no evidence of settlement or rotation	8
MORTAR 8.00	Generally in good condition; shows sign of normal seasonal weathering	8
STONE MASONRY 8.00	Stone blocks are in good condition; no sign of distress	8
CURB/BERM/DITCH 0.50	Paved ditches on either side of the HW drains to culvert; in good condition; no sign of distress	8
LATERAL SLOPE 0.50	No evidence of erosion or distress	8
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement in good condition with minor cracking along outward wheel line (typical along the Drive); vegetated shoulder with no evidence of distress	8
VEGETATION 0.50	No large vegetation immediate to the wall	8
UPSLOPE 0.50	Riprap outlet protection; no evidence of ongoing erosion	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.

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos

SHEN_0010B_39.962_R_1.jpg

Wall ID:	**SHEN-0010B-40.392-L**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	86	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Fill Wall	**Primary Wall Type:**	Crib - Concrete
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	SDRV040RW001 Embedded CC wall with 3 in minus gravel backfill along top of slope supporting seasonally high ADT roadway high consequence of failure		

Wall Measurements

Wall Length (ft.):	100	**Face Area (sq.):**	150
Average Wall Height (ft.):	1	**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	Good to excellent performance of wall/headwall; no evidence of movement or distress	9
WALL FOUNDATION MATERIAL 8.00	Wall founded on soil and bedrock; no evidence of settlement or rotation	8
BIN OR CRIB 8.00	Concrete cribs appear to be in good condition; no evidence of distress	9
DOWNSLOPE 0.50	Steep slope (1(h):1(v); steeper in sections; no evidence of slope movement or distress	8
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement in good condition with minor cracking along outward wheel line (typical along the Drive); vegetated shoulder with no evidence of distress	8
VEGETATION 0.50	No large vegetation immediate to the wall	8
WALL DRAINS 0.50	Wall is self-draining; no observed drainage-related issues	8
LATERAL SLOPE 0.50	Ends of the wall are embedded into the slope; slope is in good condition with no sign of distress	9
TRAFFIC BARRIER/FENCE 0.50	GM guard wall at top of slope above wall; no observed distress	9

Repair Recommendations

Failure Consequence:	HIGH
Recommendation Narrative:	None
Repair Cost:	$0

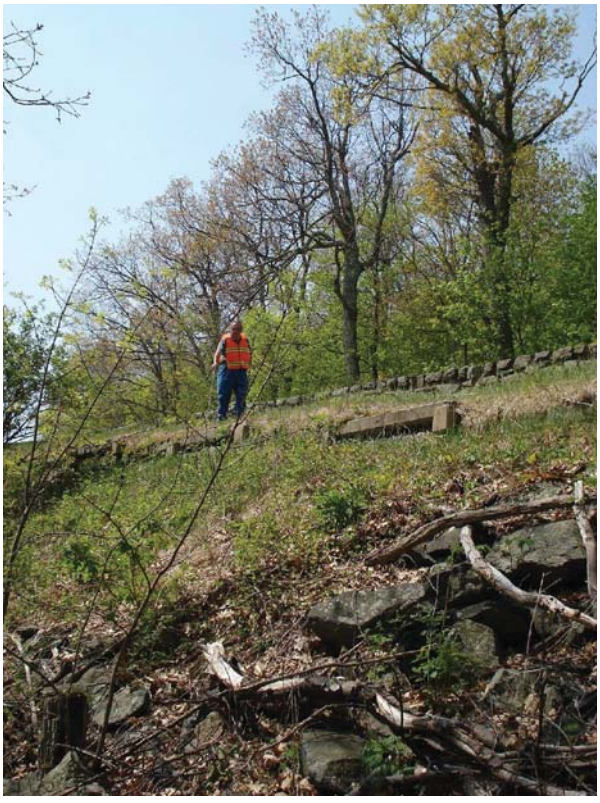
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos

SHEN_0010B_40.392_L_1.jpg



SHEN_0010B_40.392_L_2.jpg

Wall ID:	**SHEN-0010B-40.480-L**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	87	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Fill Wall	**Primary Wall Type:**	Crib - Concrete
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Embedded CC wall with 3 in minus gravel backfill along top of slope supporting seasonally high ADT roadway high consequence of failure		

Wall Measurements

Wall Length (ft.):	150	**Face Area (sq.):**	600
Average Wall Height (ft.):	4	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	4	**Vertical Offset (ft.):**	-1

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent performance of wall/headwall; no evidence of movement or distress	9
WALL FOUNDATION MATERIAL 8.00	Wall founded on firm soil; no evidence of settlement or rotation	8
BIN OR CRIB 8.00	Concrete cribs appear to be in good condition; no evidence of distress	9
DOWNSLOPE 0.50	Steep slope (1(h):1(v); steeper in sections; no evidence of slope movement or distress	8
LATERAL SLOPE 0.50	Ends of the wall are embedded into the slope; slope is in good condition with no sign of distress	8
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement in good condition with minor cracking along outward wheel line (typical along the Drive); vegetated shoulder with no evidence of distress	8
TRAFFIC BARRIER/FENCE 0.50	Concrete guard wall with GM veneer; at top of slope above wall; no observed distress	9
UPSLOPE 0.50	Vegetated slope; level to steep; no evidence of slope movement	9
VEGETATION 0.50	No large vegetation immediate to the wall	9

Repair Recommendations

Failure Consequence:	HIGH
Recommendation Narrative:	None
Repair Cost:	$0

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

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos

SHEN_0010B_40.480_L_1.jpg

SHEN_0010B_40.480_L_2.jpg

Wall ID:	**SHEN-0010B-40.583-L**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	87	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Fill Wall	**Primary Wall Type:**	Crib - Concrete
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Embedded CC wall with 3 in minus gravel backfill along top of slope supporting seasonally high ADT roadway high consequence of failure		

Wall Measurements

Wall Length (ft.):	200	**Face Area (sq.):**	800
Average Wall Height (ft.):	4	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	4	**Vertical Offset (ft.):**	-2

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent performance of wall; no evidence of movement or distress	9
WALL FOUNDATION MATERIAL 8.00	Wall founded on bedrock and blast rock fill	9
BIN OR CRIB 8.00	Concrete cribs appear to be in good condition; no evidence of distress	8
LATERAL SLOPE 0.50	Ends of the wall are embedded into the slope; slope is in good condition with no sign of distress	8
DOWNSLOPE 0.50	Steep slope (1(h):1(v); steeper in sections; no evidence of slope movement or distress	9
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement in good condition with minor cracking along outward wheel line (typical along the Drive); vegetated shoulder with no evidence of distress	9
TRAFFIC BARRIER/FENCE 0.50	GM guard wall at top of slope above wall; no observed distress	9
UPSLOPE 0.50	Vegetated slope; level to steep; no evidence of slope movement	9
VEGETATION 0.50	No large vegetation immediate to the wall	9

Repair Recommendations

Failure Consequence:	HIGH
Recommendation Narrative:	None
Repair Cost:	$0

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

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos

SHEN_0010B_40.583_L_1.jpg

SHEN_0010B_40.583_L_2.jpg

Wall ID:	**SHEN-0010B-40.712-L**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	69	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Fill Wall	**Primary Wall Type:**	Crib - Concrete
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Embedded CC wall with 3 in minus gravel backfill along top of steep slope supporting seasonally high ADT roadway high consequence of failure		

Wall Measurements

Wall Length (ft.):	105	**Face Area (sq.):**	420
Average Wall Height (ft.):	4	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	4	**Vertical Offset (ft.):**	-3

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Fair to good condition; some minor cracking of cribbing elements that should be monitored to see if it gets worse	6
WALL FOUNDATION MATERIAL 8.00	Wall founded on soil and blast rock fill; minor cracking of crib elements suggests minor settlement of foundation; no evidence of rotation	7
BIN OR CRIB 8.00	Concrete cribs are generally in good condition; some crib elements exhibit minor to moderate crib elements;	7
CULVERT 0.50	30-in. diameter corrugated metal culvert through wall; in good condition; no evidence of distress	8
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement in good condition with minor cracking along outward wheel line (typical along the Drive); vegetated shoulder with no evidence of distress	8
WALL DRAINS 0.50	Wall is self draining; no evidence of drainage issues	8
LATERAL SLOPE 0.50	Ends of the wall are embedded into the slope; slope is in good condition with no sign of distress	9
TRAFFIC BARRIER/FENCE 0.50	GM guard wall at top of slope above wall; no observed distress	9
UPSLOPE 0.50	Vegetated slope; moderate to steep; no evidence of slope movement	9

Repair Recommendations

Failure Consequence:	HIGH
Recommendation Narrative:	None
Repair Cost:	$0

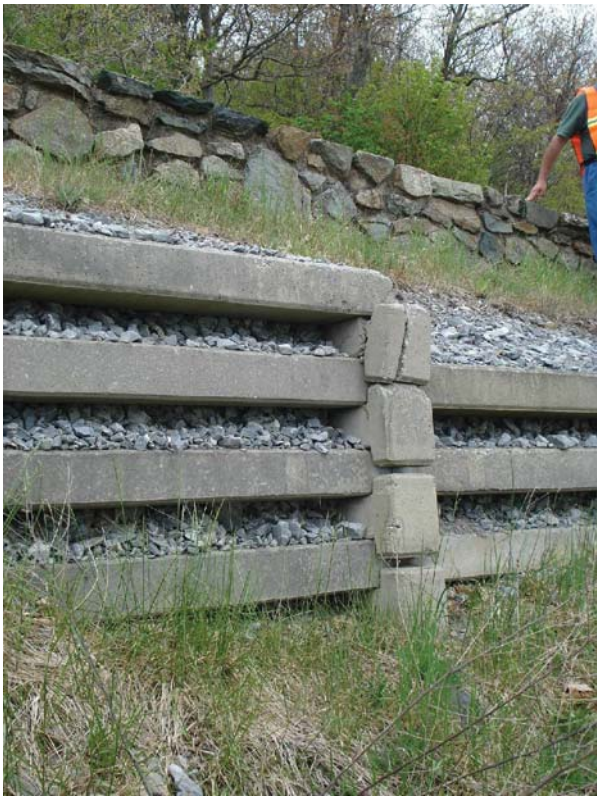
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos

SHEN_0010B_40.712_L_1.jpg



SHEN_0010B_40.712_L_2.jpg

Wall ID:	**SHEN-0010B-47.782-R**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	80	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	GM inlet HW for two(2) 30 in diameter corrugated plastic pipes located 8 ft from edge of roadway supporting shoulder of roadway of seasonally high ADT: low to moderate consequence of failure		

Wall Measurements

Wall Length (ft.):	11	**Face Area (sq.):**	55
Average Wall Height (ft.):	5	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	5	**Vertical Offset (ft.):**	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent performance of headwall; no evidence of movement or distress	8
WALL FOUNDATION MATERIAL 8.00	Wall founded on firm soil; no evidence of settlement or rotation	8
MORTAR 8.00	Generally good condition; shows sign of normal seasonal weathering; evidence of previous repointing along top of wall	8
STONE MASONRY 8.00	Stone blocks are in good condition; no sign of distress	8
CULVERT 0.50	Culvert appears to be in good conditions; leaves at/in the outlet impeding the flow of water should be removed	8
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement in good condition with minor cracking along outward wheel line (typical along the Drive); vegetated shoulder with no evidence of distress	8
UPSLOPE 0.50	Riprap erosion protection along the slope; no evidence of ongoing erosion	8
WALL DRAINS 0.50	Generally good drainage around wall; evidence of ongoing erosion of lateral slope at edges of HW	8
CURB/BERM/DITCH 0.50	Paved ditches graded to drain to the culverts are in good condition	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.

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos

SHEN_0010B_47.782_R_1.jpg

SHEN_0010B_47.782_R_2.jpg

Wall ID:	**SHEN-0010B-49.919-L**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	81	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Fill Wall	**Primary Wall Type:**	Crib - Concrete
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Embedded CC wall with 3 in minus gravel backfill along top of steep slope supporting seasonally high ADT roadway supports part of NPS trail (Fishers Gap Overlook to Dark Hollow Falls) high consequence of failure.		

Wall Measurements

Wall Length (ft.):	150	**Face Area (sq.):**	300
Average Wall Height (ft.):	2	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	4	**Vertical Offset (ft.):**	-2

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent performance of wall/headwall; no evidence of movement or distress	8
WALL FOUNDATION MATERIAL 8.00	Wall founded on soil and blast rock fill; no evidence of wall settlement or rotation	8
BIN OR CRIB 8.00	Concrete cribs appear to be in good condition; no evidence of distress	8
DOWNSLOPE 0.50	Moderate to steep slope (1(h):1(v); steeper in sections; no evidence of slope movement or distress	8
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement in good condition with minor cracking along outward wheel line (typical along the Drive); vegetated shoulder with no evidence of distress	8
WALL DRAINS 0.50	Wall is self-draining; no observed drainage-related issues	8
LATERAL SLOPE 0.50	Ends of the wall are embedded into the slope; slope is in good condition with no sign of distress	9
TRAFFIC BARRIER/FENCE 0.50	GM guard wall at top of slope above wall; no observed distress	9
UPSLOPE 0.50	Vegetated slope; level to steep; no evidence of slope movement	9

Repair Recommendations

Failure Consequence:	HIGH
Recommendation Narrative:	None
Repair Cost:	$0

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

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos

SHEN_0010B_49.919_L_1.jpg

SHEN_0010B_49.919_L_2.jpg

Wall ID:	**SHEN-0010B-49.976-L**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	84	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Fill Wall	**Primary Wall Type:**	Crib - Concrete
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Embedded CC wall with 3 in minus gravel backfill constructed along top of steep slope supporting seasonally high ADT roadway supports part of NPS trail (Fishers Gap Overlook to Dark Hollow Falls) moderate consequence of failure.		

Wall Measurements

Wall Length (ft.):	740	**Face Area (sq.):**	1110
Average Wall Height (ft.):	1	**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	Good to excellent performance of wall/headwall; no evidence of movement or distress	9
WALL FOUNDATION MATERIAL 8.00	Wall founded on firm soil; no evidence of settlement or rotation	8
BIN OR CRIB 8.00	Concrete cribs appear to be in good condition; no evidence of distress	8
WALL DRAINS 0.50	Wall is self-draining; no observed drainage-related issues	8
DOWNSLOPE 0.50	Moderate to steep slope (1(h):1(v); steeper in sections; no evidence of slope movement or distress	9
LATERAL SLOPE 0.50	Ends of the wall are embedded into the slope; slope is in good condition with no sign of distress	9
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement in good condition with minor cracking along outward wheel line (typical along the Drive); vegetated shoulder with no evidence of distress	9
TRAFFIC BARRIER/FENCE 0.50	GM guard wall at top of slope above wall; no observed distress	9
UPSLOPE 0.50	Vegetated slope; relatively level; no evidence of slope movement	9

Repair Recommendations

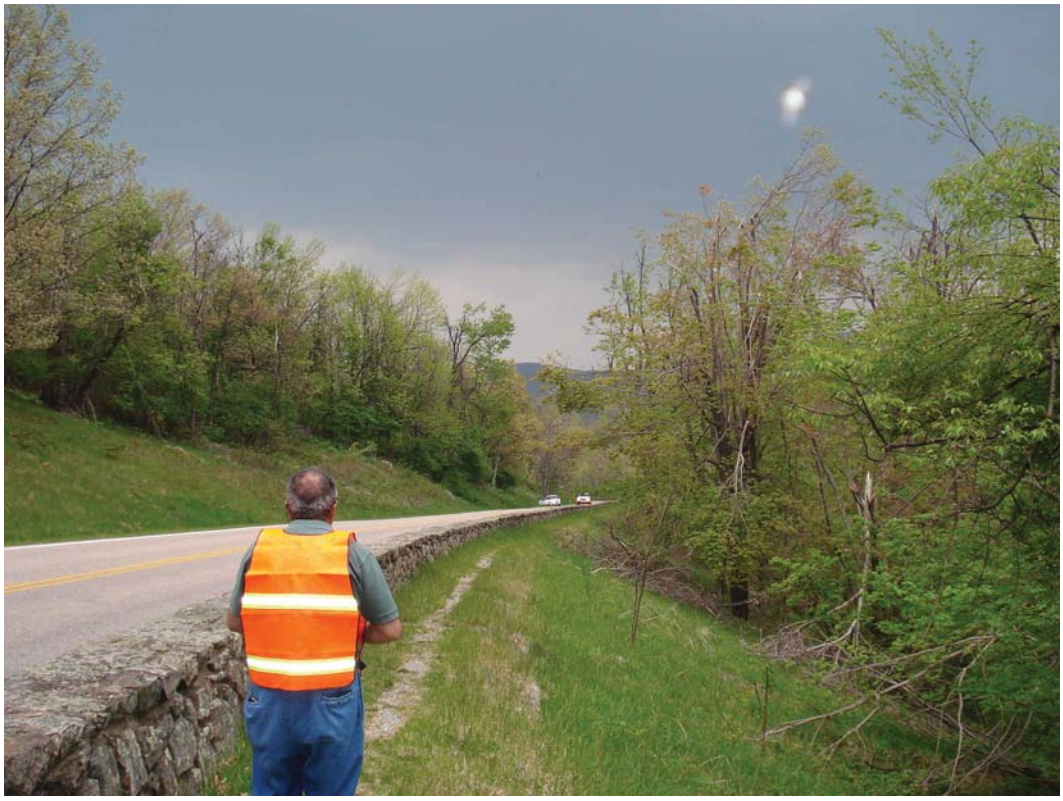
Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	$0

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

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos



SHEN_0010B_49.976_L_1.jpg

SHEN_0010B_49.976_L_2.jpg

Wall ID:	**SHEN-0010B-50.038-L**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	84	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Fill Wall	**Primary Wall Type:**	Crib - Concrete
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	CC wall with 3 in minus gravel backfill constructed along top of steep slope supporting seasonally high ADT roadway supports part of NPS trail (Fishers Gap Overlook to Dark Hollow Falls) high consequence of failure.		

Wall Measurements

Wall Length (ft.):	430	**Face Area (sq.):**	860
Average Wall Height (ft.):	2	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	4	**Vertical Offset (ft.):**	-2

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent performance of wall/headwall; no evidence of movement or distress	9
WALL FOUNDATION MATERIAL 8.00	Wall founded on firm soil; no evidence of settlement or rotation	8
BIN OR CRIB 8.00	Concrete cribs appear to be in good condition; no evidence of distress	8
DOWNSLOPE 0.50	Moderate to steep slope (1(h):1(v); no evidence of slope movement or distress	8
WALL DRAINS 0.50	Wall is self-draining; no observed drainage-related issues	8
LATERAL SLOPE 0.50	No evidence of erosion or distress	9
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement in good condition with minor cracking along outward wheel line (typical along the Drive); vegetated shoulder with no evidence of distress	9
TRAFFIC BARRIER/FENCE 0.50	GM guard wall at top of slope above wall; no observed distress	9
UPSLOPE 0.50	Vegetated slope; relatively level; no evidence of slope movement	9

Repair Recommendations

Failure Consequence:	HIGH
Recommendation Narrative:	None
Repair Cost:	$0

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

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos

SHEN_0010B_50.038_L_1.jpg

SHEN_0010B_50.038_L_2.jpg

Wall ID:	**SHEN-0010B-50.199-L**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	81	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Fill Wall	**Primary Wall Type:**	Crib - Concrete
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	CC wall with 3 in minus gravel backfill constructed along top of steep slope supporting seasonally high ADT roadway supports part of NPS trail (Fishers Gap Overlook to Dark Hollow Falls) high consequence of failure.		

Wall Measurements

Wall Length (ft.):	1300	**Face Area (sq.):**	2600
Average Wall Height (ft.):	2	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	4	**Vertical Offset (ft.):**	-3

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent wall performance; no observed movement or distress	8
WALL FOUNDATION MATERIAL 8.00	Wall founded on firm soil; no evidence of settlement or rotation	8
BIN OR CRIB 8.00	Concrete cribs appear to be in good condition; no evidence of distress	8
DOWNSLOPE 0.50	Steep slope (1(h):1(v); steeper in sections; no evidence of slope movement or distress	8
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement in good condition with minor cracking along outward wheel line (typical along the Drive); vegetated shoulder with no evidence of distress	8
UPSLOPE 0.50	Vegetated slope; level to steep; no evidence of slope movement	8
WALL DRAINS 0.50	Wall is self-draining; no observed drainage-related issues	8
CULVERT 0.50	24-in. diameter corrugated metal culvert through wall (approx. MP49.88) shows no evidence of distress; 18-in. diameter corrugated metal culvert through wall (approx. MP50.01) - no evidence of distress	9
LATERAL SLOPE 0.50	No evidence of erosion or distress	9

Repair Recommendations

Failure Consequence:	HIGH
Recommendation Narrative:	None
Repair Cost:	$0

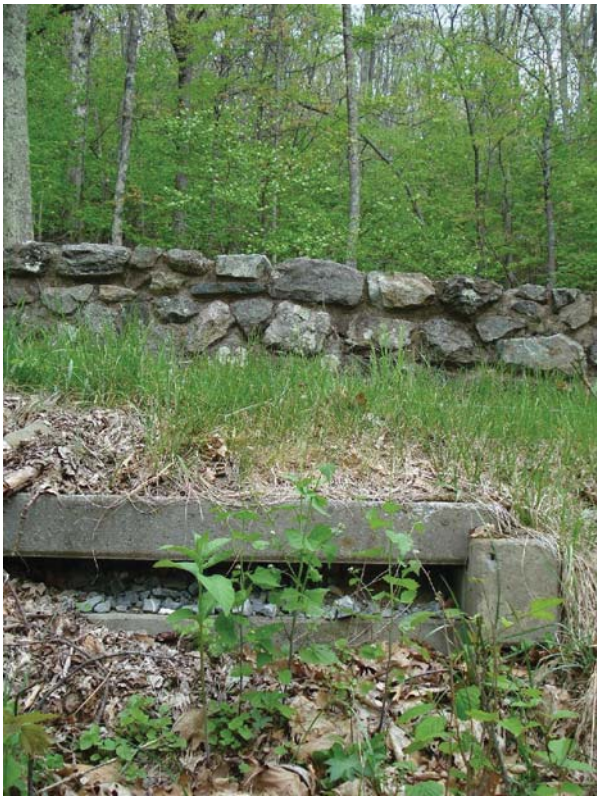
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos

SHEN_0010B_50.199_L_1.jpg



SHEN_0010B_50.199_L_2.jpg

Wall ID:	**SHEN-0010B-50.929-L**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	80	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	GM outlet HW for a 30 in diameter corrugated metal culvert and a 4 ft x 6 ft box culvert opening supports trail to Dark Hollow Falls and parking lot low to moderate consequence of failure		

Wall Measurements

Wall Length (ft.):	28	**Face Area (sq.):**	154
Average Wall Height (ft.):	5	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	6	**Vertical Offset (ft.):**	-4

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent performance; No observed movement or distress	8
WALL FOUNDATION MATERIAL 8.00	Wall founded on concrete footing on firm soil; no evidence of settlement or rotation	8
MORTAR 8.00	Generally good condition; shows sign of normal seasonal weathering	8
STONE MASONRY 8.00	Stone blocks are in good condition; no sign of distress	8
CULVERT 0.50	Culvert appears to be in good conditions; minor rusting of metal culvert invert; evidence of buckling within the metal culvert	8
DOWNSLOPE 0.50	Adequate riprap outlet protection; no evidence of ongoing erosion	8
LATERAL SLOPE 0.50	Good condition; no evidence of erosion	8
ROAD/SIDEWALK/SHOULDER 0.50	Skyline Dr. within influence of HW; asphalt pavement with minor cracking along outward wheel line (typical along the Drive); vegetated shoulder with no evidence of distress; asphalt trail on top of wall in good condition	8
UPSLOPE 0.50	Vegetated slope; no evidence of slope movement or distress	8

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.

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos

SHEN_0010B_50.929_L_1.jpg

SHEN_0010B_50.929_L_2.jpg

Wall ID:	**SHEN-0010B-50.932-R**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	80	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	GM inlet HW for a 30 in diameter corrugated metal culvert and a 4 ft x 6 ft box culvert opening along right shoulder or roadway and across from Dark Hollow Falls parking lot low to moderate consequence of failure. Park Wall ID as SDRV050RW001.		

Wall Measurements

Wall Length (ft.):	47	**Face Area (sq.):**	282
Average Wall Height (ft.):	6	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	6	**Vertical Offset (ft.):**	-2

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent performance of the headwall; no evidence of wall movement or distress	8
WALL FOUNDATION MATERIAL 8.00	Wall founded on firm soil; no evidence of settlement or rotation	8
MORTAR 8.00	Generally good condition; shows sign of normal seasonal weathering	8
STONE MASONRY 8.00	Stone blocks are in good condition; no sign of distress	8
CULVERT 0.50	Culvert appears to be in good conditions; minor rusting along invert of metal culvert; leaves at opening of metal culvert impeding flow of water	8
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement with minor cracking along outward wheel line (typical along the Drive); vegetated shoulder with no evidence of distress	8
UPSLOPE 0.50	Riprap outlet protection along slope leading to culverts; no evidence of ongoing erosion	8
VEGETATION 0.50	No large vegetation immediate to wall	9
LATERAL SLOPE 1.00	Evidence of ongoing erosion along the southern end of the HW	7

Repair Recommendations

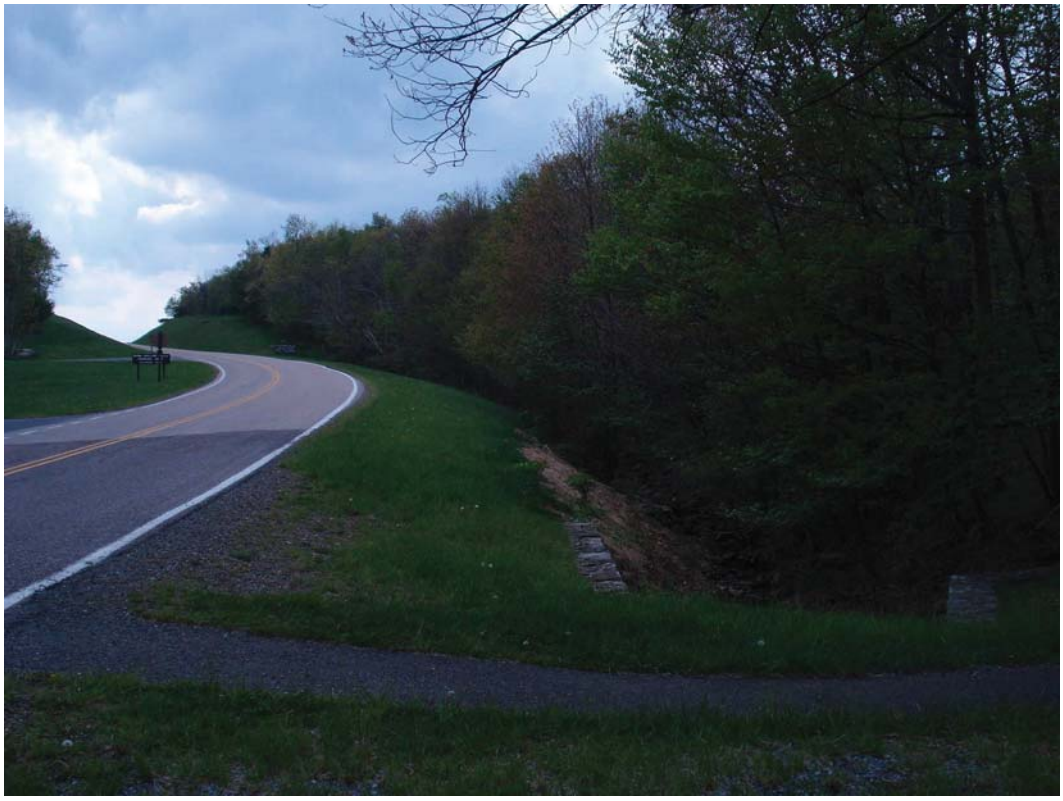
Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	$0

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

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos



SHEN_0010B_50.932_R_1.jpg

SHEN_0010B_50.932_R_2.jpg

Wall ID:	**SHEN-0010B-53.615-R**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 15, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	71	**Maintenance Action:**	Repair Elements

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	GM outlet HW for 24 in diameter corrugated plastic pipe along southbound travel lane of roadway that supports seasonally high ADT within gentle to moderate slope low consequence of failure		

Wall Measurements

Wall Length (ft.):	10	**Face Area (sq.):**	48
Average Wall Height (ft.):	4	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	5	**Vertical Offset (ft.):**	-2

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition; some minor repair required to reset loose blocks below the culvert	7
WALL FOUNDATION MATERIAL 8.00	Wall founded on firm soil; no evidence of settlement or rotation	8
STONE MASONRY 8.00	Blocks are generally in good condition; no sign of distress; loose blocks below the culvert opening need to be replaced	6
MORTAR 8.00	Generally good condition; shows sign of normal seasonal weathering; evidence or recent repointing along southern end; badly deteriorated and missing mortar below culvert opening has resulted in loose blocks	7
CULVERT 0.50	Culvert appears to be in good conditions; leaves at/in the outlet impeding the flow of water should be removed	8
DOWNSLOPE 0.50	Adequate riprap outlet protection; no evidence of ongoing erosion	8
LATERAL SLOPE 0.50	Evidence of minor ongoing erosion along the edges of the HW	8
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement with minor cracking along outward wheel line (typical along the Drive); vegetated shoulder with no evidence of distress	8
UPSLOPE 0.50	Vegetated slope; no evidence of slope movement	8

Repair Recommendations

Failure Consequence:	LOW
Recommendation Narrative:	(1) Remove/reset stone masonry = $620/sqft (3.0 sf) = $1860, (2) General Labor = $55/hr (20 cuyd) = $1100. Total = $3,000
Repair Cost:	$3,000

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

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos

SHEN_0010B_53.615_R_1.jpg

SHEN_0010B_53.615_R_2.jpg

Wall ID:	**SHEN-0010B-53.622-L**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	65	**Maintenance Action:**	Repair Elements

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	GM inlet HW for two(2) 30 in diameter corrugated metal pipe culverts close proximity to roadway carrying seasonally high ADT Moderate to high consequence of failure		

Wall Measurements

Wall Length (ft.):	14	**Face Area (sq.):**	58
Average Wall Height (ft.):	4	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	4	**Vertical Offset (ft.):**	-1

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Fair to good condition; some routine maintenance required; repair required to reset loose and missing stone below the culvert opening.	7
WALL FOUNDATION MATERIAL 8.00	Wall founded on firm soil and rock; no evidence of settlement or rotation	8
BIN OR CRIB 8.00	Cribbing foundation elements have partially collapsed resulting in loss of ground below headwall.	2
STONE MASONRY 8.00	Stone blocks are in good condition; some loose and missing stone below the culvert opening; requires routing maintenance to replace	7
MORTAR 8.00	Generally good condition; show sign of normal seasonal weathering	8
CULVERT 0.50	Two(2) 30-in. diameter corrugated metal culverts; minor rusting along the invert	8
CURB/BERM/DITCH 0.50	Gravel lined ditches graded to drain to culvert; maintenance required to remove leaves	8
LATERAL SLOPE 0.50	No evidence of erosion	8
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement in good condition; vegetated should with no evidence of slope movement	8

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	(1) Remove/reset stone masonry = $620/sqft (7.5 sf) = $4650. (2) Lean concrete backfill to fill void below HW = $175/cuyd (2 cuyd) = $350
Repair Cost:	$5,000

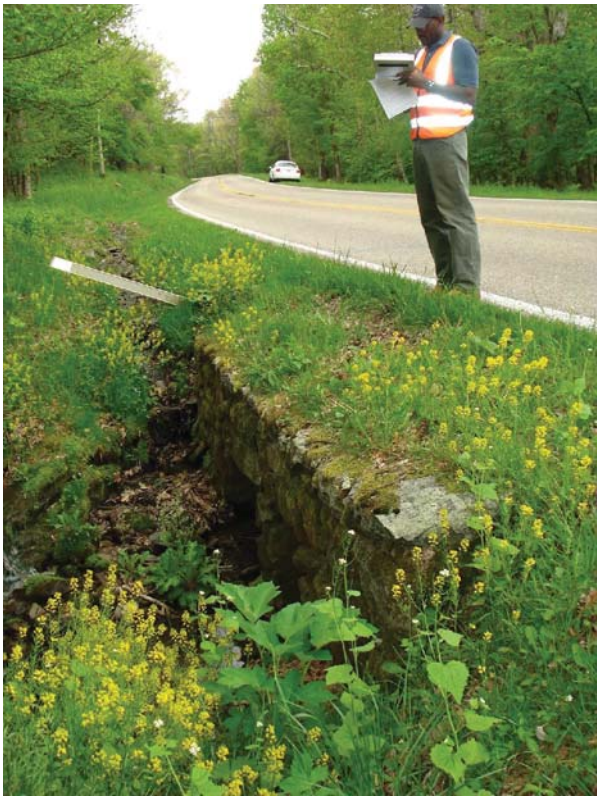
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos

SHEN_0010B_53.622_L_1.jpg



SHEN_0010B_53.622_L_2.jpg

Wall ID:	**SHEN-0010B-53.622-R**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	64	**Maintenance Action:**	Repair Elements

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	GM outlet headwall for two(2) 30 in diameter corrugated metal culverts constructed along southbound travel lane of roadway supporting seasonally high ADT within gentle slope low to consequence of failure		

Wall Measurements

Wall Length (ft.):	15	**Face Area (sq.):**	90
Average Wall Height (ft.):	6	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	6	**Vertical Offset (ft.):**	-2

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Fair to good condition; some minor repair required to reset loose blocks below the culverts); requires lean concrete backfill to fill void below HW	6
WALL FOUNDATION MATERIAL 8.00	Wall founded on rock and firm soil; no evidence of settlement or rotation; requires some lean concrete backfill below the wall	7
MORTAR 8.00	Generally in good condition; shows signs of normal seasonal weathering; badly deteriorated and missing mortar below culvert openings has resulted in loose blocks	5
STONE MASONRY 8.00	Blocks are generally in good condition; no sign of distress; loose blocks below the culvert openings need to be replaced	7
CULVERT 0.50	Culverts appears to be in good conditions; minor rusting along the inverts	8
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement in good condition with minor cracking along the outward wheel line (typical along the drive); vegetated shoulder with no evidence of distress	8
UPSLOPE 0.50	Vegetated shoulder with no evidence of distress	8
DOWNSLOPE 0.50	Comprised of bedrock and placed riprap erosion protection	9
VEGETATION 0.50	No large vegetation immediate to the wall	9

Repair Recommendations

Failure Consequence:	LOW
Recommendation Narrative:	(1) Remove/reset stone masonry = $620/sqft (15 sf) = $6975. (2) Lean concrete backfill to fill void below HW = $175/cuyd (2 cuyd) = $350. Total = $7,325
Repair Cost:	$7,325

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

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos

SHEN_0010B_53.622_R_1.jpg

SHEN_0010B_53.622_R_2.jpg

Wall ID:	**SHEN-0010B-60.435-L**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 15, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	79	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	GM outlet HW for 30 in diameter corrugated plastic culvert along northbound travel lane where it supports part of the embankment low consequence of failure		

Wall Measurements

Wall Length (ft.):	10	**Face Area (sq.):**	60
Average Wall Height (ft.):	6	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	6	**Vertical Offset (ft.):**	-2

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent performance of the HW	8
WALL FOUNDATION MATERIAL 8.00	Wall founded on firm soil; no evidence of settlement or rotation	8
MORTAR 8.00	Generally in good condition; shows sign of normal seasonal weathering	8
STONE MASONRY 8.00	Stone blocks are in good condition; no sign of distress	8
CULVERT 0.50	Culvert appears to be in good condition	8
DOWNSLOPE 0.50	Adequate riprap outlet protection; no evidence of ongoing erosion	8
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement with minor cracking along outer wheel travel line (typical along the Drive); vegetated shoulder with no evidence of distress	8
UPSLOPE 0.50	Vegetated slope; no evidence of slope movement	8
VEGETATION 0.50	One large diameter tree in close proximity to the HW; does not impact the wall	8

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.

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos

SHEN_0010B_60.435_L_1.jpg

SHEN_0010B_60.435_L_2.jpg

Wall ID:	**SHEN-0010B-62.609-L**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 18, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	69	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	GM inlet headwall for two(2) 30 in diameter corrugated plastic culverts constructed at curved in roadway on outside edge of curve on roadway supporting seasonally high ADT low to consequence of failure		

Wall Measurements

Wall Length (ft.):	14	**Face Area (sq.):**	80
Average Wall Height (ft.):	5	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	6	**Vertical Offset (ft.):**	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent performance of the headwall.	8
WALL FOUNDATION MATERIAL 8.00	Wall constructed on firm soil; no sign of wall settlement or rotation	8
BIN OR CRIB 8.00	Cribbing foundation elements have partially collapsed resulting in loss of ground below headwall.	2
MORTAR 8.00	In generally good condition; shows sign of normal seasonal weathering	8
STONE MASONRY 8.00	Generally in good condition; shows sign of normal seasonal weathering	8
CULVERT 0.50	Two(20 30-in. diameter corrugated plastic culverts observed to be in good condition; leaves collecting at inlet affecting flow of water; requires routine maintenance	8
LATERAL SLOPE 0.50	No evidence of erosion	8
ROAD/SIDEWALK/SHOULDER 0.50	Vegetated shoulder in good to excellent condition; asphalt pavement roadway in good condition with minor cracking (typical along Drive)	8
UPSLOPE 0.50	Riprap erosion protection along slope leading down to headwall; no evidence of erosion	8

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.

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos

SHEN_0010B_62.609_L_1.jpg

SHEN_0010B_62.609_L_2.jpg

Wall ID:	**SHEN-0010B-62.609-R**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 18, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	80	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	GM outlet headwall for two(2) 30 in diameter corrugated plastic culverts constructed at inside edge of slope supports moderate to steep slope that supports roadway of seasonally high ADT moderate consequence of failure		

Wall Measurements

Wall Length (ft.):	12	**Face Area (sq.):**	66
Average Wall Height (ft.):	5	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	6	**Vertical Offset (ft.):**	-17

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent wall performance	8
WALL FOUNDATION MATERIAL 8.00	Wall founded on firm soil; no evidence of settlement or rotation	8
MORTAR 8.00	Generally in good condition; shows sign of normal seasonal weathering	8
STONE MASONRY 8.00	In good condition	8
CULVERT 0.50	Two(2) 30-in. diameter corrugated plastic pipe culverts; in good condition	8
LATERAL SLOPE 0.50	No erosion; promotes drainage around HW	8
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement in good condition	8
UPSLOPE 0.50	Moderate to steep slope; no evidence of slope movement or erosion	8
VEGETATION 0.50	No large vegetation immediate to HW	8

Repair Recommendations

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

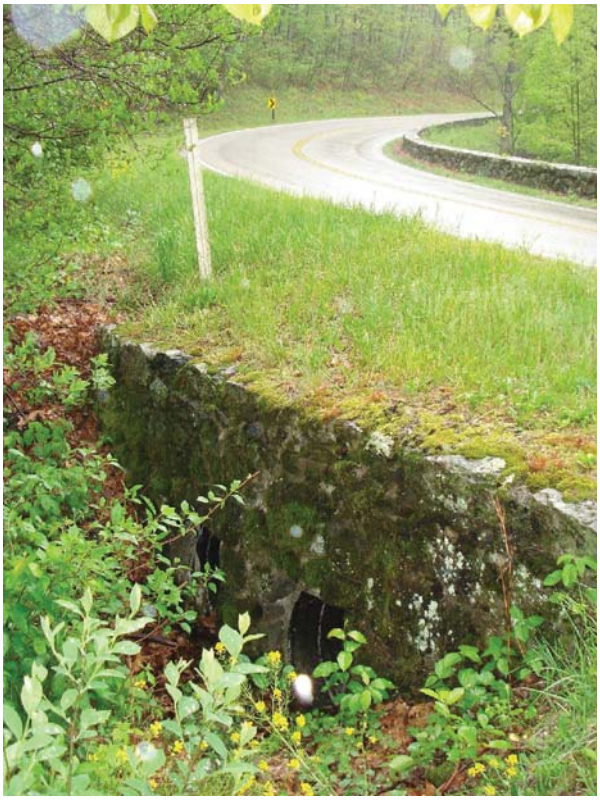
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos

SHEN_0010B_62.609_R_1.jpg



SHEN_0010B_62.609_R_2.jpg

Wall ID:	**SHEN-0010B-62.820-L**		
Route Name:	SKYLINE DRIVE (CENTRAL)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	47	**Maintenance Action:**	Repair Elements

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	Crib - Concrete
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	SDRV062RW001 Mortared stone headwall for 30 in diameter corrugated metal pipe constructed on concrete cribbing elements that have partially collapsed supporting part of slope that experiences seasonally high ADT.		

Wall Measurements

Wall Length (ft.):	10	**Face Area (sq.):**	60
Average Wall Height (ft.):	6	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	6	**Vertical Offset (ft.):**	-2

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Poor to critical condition; loss of HW bearing material; ongoing erosion of foundation soil; hole in upslope; minor buckling of the culvert	4
WALL FOUNDATION MATERIAL 8.00	Wall founded on concrete cribbing elements that have partially collapsed; ongoing erosion of foundation soil below HW	4
BIN OR CRIB 8.00	Cribbing foundation elements have partially collapsed resulting in loss of ground below headwall.	2
MORTAR 8.00	HW mortar is generally in fair to good condition; requires some minor repointing especially below the culvert opening	6
STONE MASONRY 8.00	Generally in good condition; loose stones below culvert opening; stone above culvert opening is cracked through in two locations	6
ROAD/SIDEWALK/SHOULDER 0.50	8 ft wide vegetated shoulder; asphalt PAV in good condition with minor cracking along the outward wheel line	8
VEGETATION 0.50	No large vegetation immediate to the wall	8
UPSLOPE 1.00	12-in. diameter hole in the slope suggests loss of soil around the culvert	6
WALL DRAINS 1.00	Wall appears to be well drained; however, ongoing erosion of lateral slope, foundation soil and possibly the upslope	6

Repair Recommendations

Failure Consequence:	MODERATE
Recommendation Narrative:	(1) Remove and reset stone headwall = $4,430 (2) Remove concrete crib elements = $55/sqyd (40 sqyd) = $2,200 (3) Foundation fill = $45/cuyd (180 cuyd) = $8,100 (4) Structural Backfill = $60/cuyd (160 cuyd) = $9,600 (5) Compactor = $210/hr (80 hrs)
Repair Cost:	$47,000

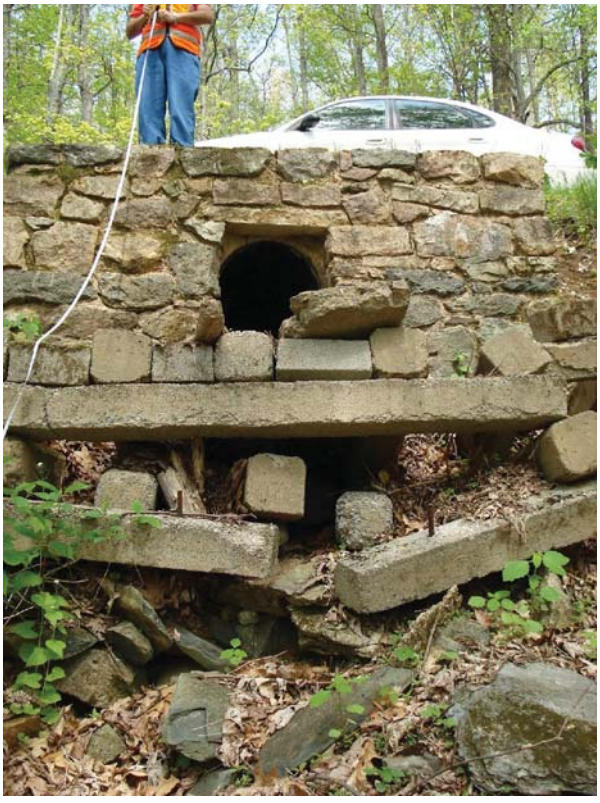
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Shenandoah National Park

ROUTE 0010B: SKYLINE DRIVE (CENTRAL)

Retaining Wall Condition Photos

SHEN_0010B_62.820_L_1.jpg



SHEN_0010B_62.820_L_2.jpg

Wall ID:	**SHEN-0010C-67.347-L**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1931
***Wall Rating:**	64	**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:	Rubble Rock, not wall		

Wall Measurements

Wall Length (ft.):	600	**Face Area (sq.):**	(1)
Average Wall Height (ft.):	60	**Face Angle (deg.):**	53
Maximum Wall Height (ft.):	80	**Vertical Offset (ft.):**	-3

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Somewhat deteriorated	6
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	7
PLACED STONE 8.00	Rubble, deteriorated, overgrown, mixed or covered with soil	6
LATERAL SLOPE 0.50	Slight	9
VEGETATION 1.00	Overgrown, trees and shrubs throughout	6
WALL DRAINS 1.00	None	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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_67.347_L_1.jpg

SHEN_0010C_67.347_L_2.jpg

Wall ID:	**SHEN-0010C-67.546-R**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1931
***Wall Rating:**	64	**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:	Rock Fill. Park designated Wall Id of SDRV067RW001		

Wall Measurements

Wall Length (ft.):	80	**Face Area (sq.):**	960
Average Wall Height (ft.):	12	**Face Angle (deg.):**	53
Maximum Wall Height (ft.):	15	**Vertical Offset (ft.):**	-6

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Somewhat deteriorated	6
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	7
PLACED STONE 8.00	Rubble, deteriorated, overgrown, mixed or covered with soil	6
LATERAL SLOPE 0.50	Slight	8
WALL DRAINS 1.00	None	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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_67.546_R_1.jpg

Wall ID:	**SHEN-0010C-69.390-L**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1931
***Wall Rating:**	70	**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 Laid Stone. Park designated Wall Id of SDRV069RW001		

Wall Measurements

Wall Length (ft.):	118	**Face Area (sq.):**	2360
Average Wall Height (ft.):	20	**Face Angle (deg.):**	53
Maximum Wall Height (ft.):	36	**Vertical Offset (ft.):**	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Performing well	7
WALL FOUNDATION MATERIAL 8.00	Soil, boulders	7
MORTAR 8.00	Only around drain pipe at top	7
PLACED STONE 8.00	15 ft. section near top of wall is bulging out	7
WALL DRAINS 0.50	Shown in literature, also drain pipe near top	8
LATERAL SLOPE 0.50	Flat	9
ROAD/SIDEWALK/SHOULDER 0.50	Grassed shoulder	9
DOWNSLOPE 1.00	Steep, 2H:1V Slope	6
CULVERT 1.00	18" culvert at North end	7

Repair Recommendations

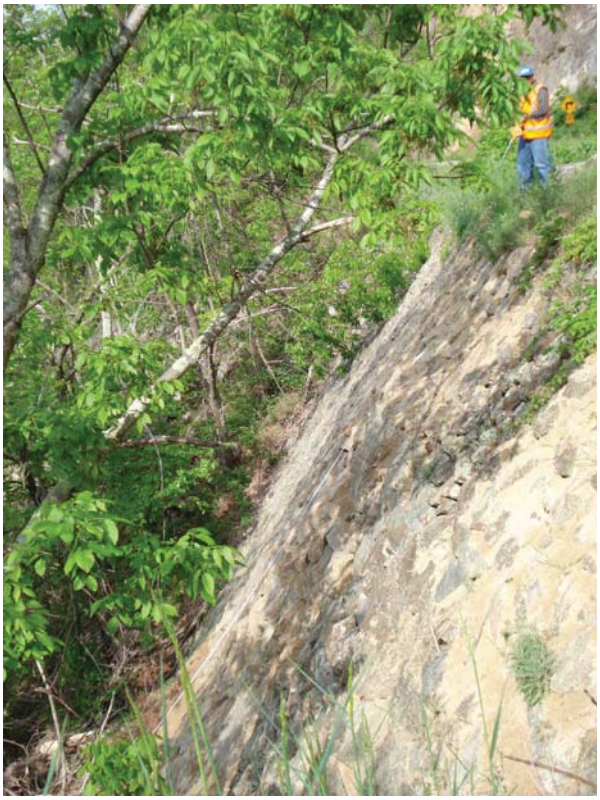
Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	$0

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

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos



SHEN_0010C_69.390_L_1.jpg

Wall ID:	**SHEN-0010C-69.548-L**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1931
***Wall Rating:**	80	**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 Laid Stone. Park designated Wall Id of SDRV069RW003		

Wall Measurements

Wall Length (ft.):	145	**Face Area (sq.):**	3625
Average Wall Height (ft.):	25	**Face Angle (deg.):**	53
Maximum Wall Height (ft.):	35	**Vertical Offset (ft.):**	-3

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Performing well	8
WALL FOUNDATION MATERIAL 8.00	Soil or Rock	8
PLACED STONE 8.00	Stone in good condition	8
ROAD/SIDEWALK/SHOULDER 0.50	Grassed	8
WALL DRAINS 0.50	Present based on literature	8
LATERAL SLOPE 0.50	Flat	9
DOWNSLOPE 1.00	Very Steep	7

Repair Recommendations

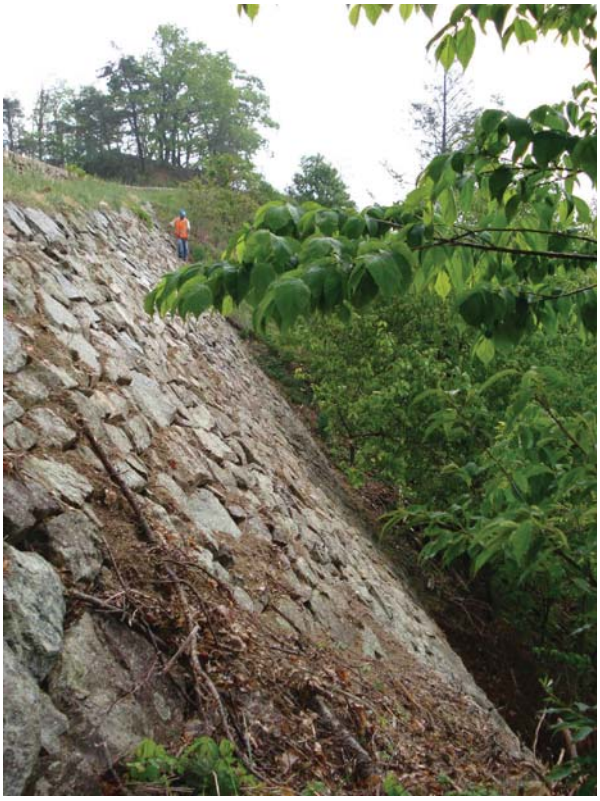
Failure Consequence:	MODERATE
Recommendation Narrative:	None
Repair Cost:	$0

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

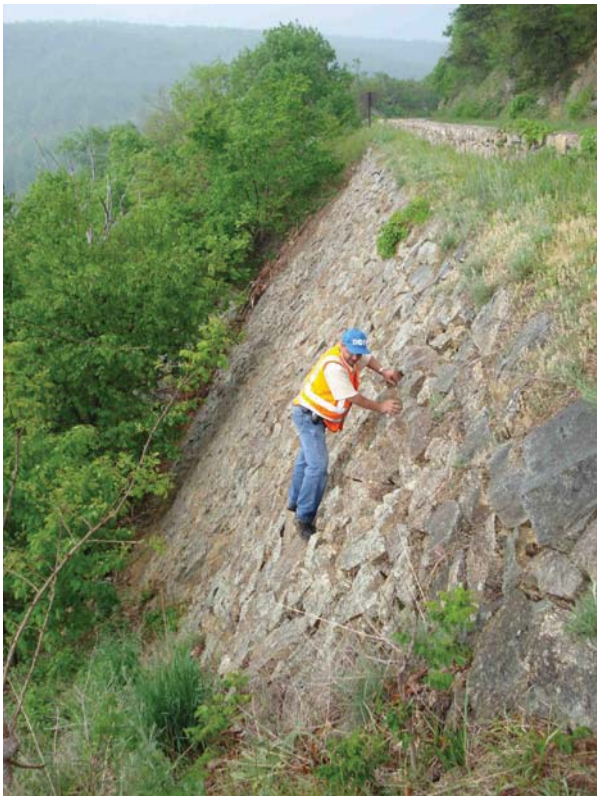
Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos



SHEN_0010C_69.548_L_1.jpg



SHEN_0010C_69.548_L_2.jpg

Wall ID:	**SHEN-0010C-71.967-L**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	79	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall and wingwalls on double-barrel box culvert.		

Wall Measurements

Wall Length (ft.):	25	**Face Area (sq.):**	70
Average Wall Height (ft.):	2	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	6	**Vertical Offset (ft.):**	-6

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Minor weathering of elements, but no global distresses, settlement, or displacement of the wingwalls or headwall structure.	8
WALL FOUNDATION MATERIAL 8.00	Mortared rock drainage path. No signs of foundation settlement.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	8
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
CULVERT 0.50	Culvert shows no signs of seepage in or around the box. Stone work within the box is intact and shows no signs of significant distress.	8
DOWNSLOPE 0.50	Drainage bottom shows no signs of significant erosion or scour.	8
LATERAL SLOPE 0.50	Well-vegetated side slopes. Very stable.	8
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related distress.	8
UPSLOPE 0.50	Well-vegetated fill slope, with signs of rock fill present. Very stable with no signs of bulging or sloughing.	8

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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_71.967_L_1.jpg

Wall ID:	**SHEN-0010C-72.725-R**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1931
***Wall Rating:**	75	**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 Laid Wall, Stone Culvert Opening at about midheight, 2 buttresses from repair of previous slides.		

Wall Measurements

Wall Length (ft.):	250	**Face Area (sq.):**	8750
Average Wall Height (ft.):	35	**Face Angle (deg.):**	53
Maximum Wall Height (ft.):	52	**Vertical Offset (ft.):**	-5

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Performing well	7
WALL FOUNDATION MATERIAL 8.00	Rock or Soil	8
MORTAR 8.00	Mortared only around culvert	7
PLACED STONE 8.00	2 Repairs with buttresses on North End	8
CULVERT 0.50	Stone Culvert, water is entering the side of the culvert, leaving underneath wall	8
ROAD/SIDEWALK/SHOULDER 0.50	Grassed shoulder	8
LATERAL SLOPE 0.50	Gradual	9
DOWNSLOPE 1.00	Moderate	7
WALL DRAINS 1.00	Culvert	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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_72.725_R_1.jpg

SHEN_0010C_72.725_R_2.jpg

Wall ID:	**SHEN-0010C-72.930-L**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	80	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall and wingwalls.		

Wall Measurements

Wall Length (ft.):	22	**Face Area (sq.):**	50
Average Wall Height (ft.):	2	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	5	**Vertical Offset (ft.):**	-5

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Minor weathering of elements, but no global distresses, settlement, or displacement of the wingwalls or headwall structure.	8
WALL FOUNDATION MATERIAL 8.00	Mortared rock drainage path. No signs of foundation settlement.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	8
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
CULVERT 0.50	Culvert shows no signs of seepage in or around the box. Stone work within the box is intact and shows no signs of significant distress.	8
DOWNSLOPE 0.50	Drainage bottom shows no signs of significant erosion or scour.	8
LATERAL SLOPE 0.50	Well-vegetated side slopes. Very stable.	8
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related distress.	8
UPSLOPE 0.50	Well-vegetated fill slope, with signs of rock fill present. Very stable with no signs of bulging or sloughing.	8

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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_72.930_L_1.jpg

Wall ID:	**SHEN-0010C-73.067-L**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	80	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall and wingwalls.		

Wall Measurements

Wall Length (ft.):	22	**Face Area (sq.):**	50
Average Wall Height (ft.):	2	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	5	**Vertical Offset (ft.):**	-3

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Minor weathering of elements, but no global distresses, settlement, or displacement of the wingwalls or headwall structure.	8
WALL FOUNDATION MATERIAL 8.00	Mortared rock drainage path. No signs of foundation settlement.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	8
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
CULVERT 0.50	Culvert shows no signs of seepage in or around the box. Stone work within the box is intact and shows no signs of significant distress.	8
DOWNSLOPE 0.50	Drainage bottom shows no signs of significant erosion or scour.	8
LATERAL SLOPE 0.50	Well-vegetated side slopes. Very stable.	8
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related distress.	8
VEGETATION 0.50	Minor vegetation along the top and sides of the culvert and wingwalls, but not impacting the walls.	8

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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_73.067_L_1.jpg

Wall ID:	**SHEN-0010C-73.400-L**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	80	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall and wingwalls.		

Wall Measurements

Wall Length (ft.):	21	**Face Area (sq.):**	45
Average Wall Height (ft.):	2	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	5	**Vertical Offset (ft.):**	-2

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Minor weathering of elements, but no global distresses, settlement, or displacement of the wingwalls or headwall structure.	8
WALL FOUNDATION MATERIAL 8.00	Mortared rock drainage path. No signs of foundation settlement.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	8
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
CULVERT 0.50	Culvert shows no signs of seepage in or around the box. Stone work within the box is intact and shows no signs of significant distress.	8
DOWNSLOPE 0.50	Drainage bottom shows no signs of significant erosion or scour.	8
LATERAL SLOPE 0.50	Well-vegetated side slopes. Very stable.	8
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related distress.	8
VEGETATION 0.50	Minor vegetation along the top and sides of the culvert and wingwalls, but not impacting the walls.	8

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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_73.400_L_1.jpg

Wall ID:	**SHEN-0010C-74.139-R**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	80	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall and wingwalls.		

Wall Measurements

Wall Length (ft.):	26	**Face Area (sq.):**	60
Average Wall Height (ft.):	2	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	6	**Vertical Offset (ft.):**	-20

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Minor weathering of elements, but no global distresses, settlement, or displacement of the wingwalls or headwall structure.	8
WALL FOUNDATION MATERIAL 8.00	Mortared rock drainage path. No signs of foundation settlement.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	8
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
CULVERT 0.50	Culvert shows no signs of seepage in or around the box. Stone work within the box is intact and shows no signs of significant distress.	8
DOWNSLOPE 0.50	Drainage bottom shows no signs of significant erosion or scour.	8
LATERAL SLOPE 0.50	Well-vegetated side slopes. Very stable.	8
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related distress.	8
UPSLOPE 0.50	Well-vegetated fill slope, with signs of rock fill present. Very stable with no signs of bulging or sloughing.	8

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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_74.139_R_1.jpg

Wall ID:	**SHEN-0010C-76.584-R**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	70	**Maintenance Action:**	Repair Elements

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-laid stone masonry wall. Park-designated wall id of SDRV076RW001.		

Wall Measurements

Wall Length (ft.):	152	**Face Area (sq.):**	3650
Average Wall Height (ft.):	24	**Face Angle (deg.):**	50
Maximum Wall Height (ft.):	40	**Vertical Offset (ft.):**	-2

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Minor bulging in wall face may be due to slippage between facing rocks, or due to the apparent slump at the top of the wall - not severe. Small sinkhole at one end of slump suggests fines are migrating through the face (could not find evidence at wall to	5
WALL FOUNDATION MATERIAL 8.00	Coarse aggregates and cobbles/boulders (Rock fill?) as well as some bedrock outcrop. Very stable foundation with no signs of scour or settlement.	8
STONE MASONRY 8.00	Well-placed, chinked dry-laid stone. Relatively fresh, angular stone with minor weathering. No missing blocks evident.	8
DOWNSLOPE 0.50	Downslope is stable, showing no signs of slumping or significant erosion.	8
LATERAL SLOPE 0.50	Well-vegetated side slopes. Very stable.	8
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related distress.	8
TRAFFIC BARRIER/FENCE 0.50	Mortared stone masonry guardwall with no signs of wall-related distress.	8
WALL DRAINS 0.50	Free-draining, with no signs of water-related distress.	8
UPSLOPE 1.00	Slope above wall to toe of guardwall appears to have either slumped or settled, without impacting the wall face. This slump is now catching water, and should be filled and regraded.	5

Repair Recommendations

Failure Consequence:	HIGH
Recommendation Narrative:	Regrade top slope and re-establish drainage away from top of wall. Labor: 100 hrs @ $50/hr = $5000. Equipment Time: 20 hrs excavator/backhoe @ $150/hr = $3000. Fill (unclassified borrow): 80 yds @ $35/yd = $2800. Total: $10,800
Repair Cost:	$10,800

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

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_76.584_R_1.jpg

SHEN_0010C_76.584_R_2.jpg

Wall ID:	**SHEN-0010C-78.149-R**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1931
***Wall Rating:**	64	**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:	Rock Fill. Park designated Wall Id of SDRV077RW001		

Wall Measurements

Wall Length (ft.):	295	**Face Area (sq.):**	14750
Average Wall Height (ft.):	50	**Face Angle (deg.):**	53
Maximum Wall Height (ft.):	80	**Vertical Offset (ft.):**	-1

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Somewhat deteriorated	6
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	7
PLACED STONE 8.00	Rubble, deteriorated, overgrown, mixed or covered with soil	6
LATERAL SLOPE 0.50	Mild	8
WALL DRAINS 1.00	None	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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_78.149_R_1.jpg

SHEN_0010C_78.149_R_2.jpg

Wall ID:	**SHEN-0010C-78.450-R**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1931
***Wall Rating:**	64	**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:	Rock Fill. Park designated Wall Id of SDRV077RW002.		

Wall Measurements

Wall Length (ft.):	1680	**Face Area (sq.):**	(1)
Average Wall Height (ft.):	71	**Face Angle (deg.):**	45
Maximum Wall Height (ft.):	150	**Vertical Offset (ft.):**	-8

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Somewhat deteriorated	6
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	7
PLACED STONE 8.00	Rubble, deteriorated, overgrown, mixed or covered with soil	6
LATERAL SLOPE 0.50	Mild	8
WALL DRAINS 1.00	none	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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_78.450_R_1.jpg

SHEN_0010C_78.450_R_2.jpg

Wall ID:	**SHEN-0010C-79.292-R**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1931
***Wall Rating:**	67	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Slope Protection	**Primary Wall Type:**	Gravity - Dry Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Slope Protection		

Wall Measurements

Wall Length (ft.):	225	**Face Area (sq.):**	4500
Average Wall Height (ft.):	20	**Face Angle (deg.):**	45
Maximum Wall Height (ft.):	25	**Vertical Offset (ft.):**	-8

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Somewhat deteriorated	6
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	7
PLACED STONE 8.00	Rubble, deteriorated, overgrown, mixed or covered with soil	6
LATERAL SLOPE 0.50	Mild	8
WALL DRAINS 1.00	None	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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_79.292_R_1.jpg

Wall ID:	**SHEN-0010C-80.464-R**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	78	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall and wingwalls.		

Wall Measurements

Wall Length (ft.):	12	**Face Area (sq.):**	48
Average Wall Height (ft.):	4	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	5	**Vertical Offset (ft.):**	-7

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Minor weathering of elements, but no global distresses, settlement, or displacement of the wingwalls or headwall structure.	7
WALL FOUNDATION MATERIAL 8.00	Coarse aggregates and cobbles/boulders. Very stable foundation with no signs of scour or settlement. (Difficult to see.)	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	8
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
CULVERT 0.50	Culvert shows no signs of seepage in or around the box. Stone work within the box is intact and shows no signs of significant distress.	8
DOWNSLOPE 0.50	Drainage bottom shows no signs of significant erosion or scour.	8
LATERAL SLOPE 0.50	Well-vegetated fill slope, with signs of rock fill present. Very stable with no signs of bulging or sloughing.	8
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related distress.	8
UPSLOPE 0.50	Well-vegetated fill slope, with signs of rock fill present. Very stable with no signs of bulging or sloughing.	8

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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_80.464_R_1.jpg

Wall ID:	**SHEN-0010C-81.093-L**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	75	**Maintenance Action:**	Repair Elements

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall and wingwalls.		

Wall Measurements

Wall Length (ft.):	27	**Face Area (sq.):**	80
Average Wall Height (ft.):	2	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	6	**Vertical Offset (ft.):**	-16

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Minor weathering of elements, but no global distresses, settlement, or displacement of the wingwalls or headwall structure.	7
WALL FOUNDATION MATERIAL 8.00	Mortared rock drainage path. No signs of foundation settlement.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. Minor signs of significant cracking, with some missing mortar at the top of the headwall (top course).	7
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
DOWNSLOPE 0.50	Drainage bottom shows no signs of significant erosion or scour.	8
LATERAL SLOPE 0.50	Well-vegetated fill slope, with signs of rock fill present. Very stable with no signs of bulging or sloughing.	8
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related distress.	8
UPSLOPE 0.50	Well-vegetated fill slope, with signs of rock fill present. Very stable with no signs of bulging or sloughing.	8
VEGETATION 0.50	Minor vegetation, with the exception of one large tree grown into the top of the culvert headwall. This tree does not appear to be impacting the wall and does not need to be removed.	8

Repair Recommendations

Failure Consequence:	LOW
Recommendation Narrative:	Remortar loose headwall blocks. Labor: 2 hrs @ $50/hr = $100. Concrete Quik-Patch: Lump Sum = $20. Total = $120
Repair Cost:	$120

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

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_81.093_L_1.jpg

SHEN_0010C_81.093_L_2.jpg

Wall ID:	**SHEN-0010C-82.478-L**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1931
***Wall Rating:**	64	**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:	Rock Fill		

Wall Measurements

Wall Length (ft.):	155	**Face Area (sq.):**	3100
Average Wall Height (ft.):	20	**Face Angle (deg.):**	53
Maximum Wall Height (ft.):	30	**Vertical Offset (ft.):**	-8

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Somewhat deteriorated	6
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	7
PLACED STONE 8.00	Rubble, deteriorated, overgrown, mixed or covered with soil	6
LATERAL SLOPE 0.50	Mild	8
WALL DRAINS 1.00	None	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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_82.478_L_1.jpg

Wall ID:	**SHEN-0010C-83.355-R**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1950
***Wall Rating:**	70	**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:	Mid-slope wall		

Wall Measurements

Wall Length (ft.):	415	**Face Area (sq.):**	2900
Average Wall Height (ft.):	6	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	8	**Vertical Offset (ft.):**	20

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Performing well	7
WALL FOUNDATION MATERIAL 8.00	Soil	8
MORTAR 8.00	Missing mortar in a few locations	6
STONE MASONRY 8.00	Good condition, stones are 3' +/- rectangular blocks	7
ROAD/SIDEWALK/SHOULDER 0.50	Road in good condition, vegetated shoulder	8
WALL DRAINS 0.50	Self-draining	8
VEGETATION 1.00	Heavily vegetated at wall	6
DOWNSLOPE 1.00	Moderate downslope	7
LATERAL SLOPE 1.00	Gently sloping	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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_83.355_R_1.jpg

SHEN_0010C_83.355_R_2.jpg

Wall ID:	**SHEN-0010C-86.096-L**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1950
***Wall Rating:**	80	**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:	Mid-slope fill wall, rock fill above wall covered with topsoil and vegetation		

Wall Measurements

Wall Length (ft.):	180	**Face Area (sq.):**	1080
Average Wall Height (ft.):	6	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	8	**Vertical Offset (ft.):**	-23

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition	8
WALL FOUNDATION MATERIAL 8.00	Good - no settlement/erosion	8
MORTAR 8.00	Fair to good, few losses	8
STONE MASONRY 8.00	Good - no loss of stone	8
LATERAL SLOPE 0.50	Moderate	8
ROAD/SIDEWALK/SHOULDER 0.50	Vegetated shoulder	8
UPSLOPE 0.50	Steep, vegetated, rock fill (good condition)	8
VEGETATION 0.50	Vegetated slopes for stability	8
WALL DRAINS 0.50	No drainage problems	8

Repair Recommendations

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

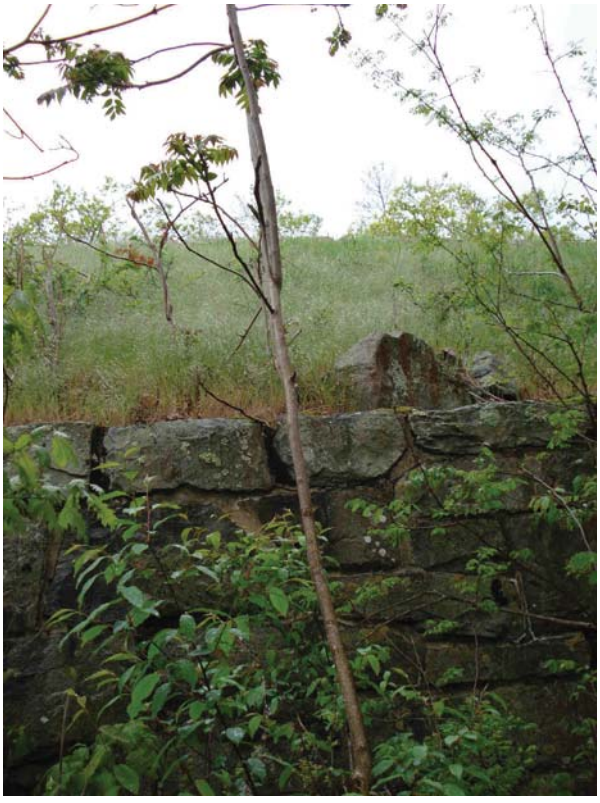
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_86.096_L_1.jpg



SHEN_0010C_86.096_L_2.jpg

Wall ID:	**SHEN-0010C-87.348-L**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1931
***Wall Rating:**	75	**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:	Culvert outlet, Headwall (6 ft x 6 ft)		

Wall Measurements

Wall Length (ft.):	30	**Face Area (sq.):**	180
Average Wall Height (ft.):	6	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	9	**Vertical Offset (ft.):**	-25

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition	8
WALL FOUNDATION MATERIAL 8.00	Fair to good, minor scour	7
MORTAR 8.00	Fair to good, mortar loss around culvert opening	7
STONE MASONRY 8.00	Good - no loss	8
DOWNSLOPE 0.50	Gentle slope	8
LATERAL SLOPE 0.50	Moderate	8
ROAD/SIDEWALK/SHOULDER 0.50	Grassed shoulder	8
WALL DRAINS 0.50	None - no drainage problems	8
CULVERT 1.00	Culvert functioning well	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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_87.348_L_1.jpg

Wall ID:	**SHEN-0010C-87.348-R**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1950
***Wall Rating:**	80	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Culvert outlet, headwall (6 ft x 6 ft)		

Wall Measurements

Wall Length (ft.):	30	**Face Area (sq.):**	180
Average Wall Height (ft.):	6	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	8	**Vertical Offset (ft.):**	-15

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition	8
WALL FOUNDATION MATERIAL 8.00	Good - no settlement or erosion	8
MORTAR 8.00	Good - no loss	8
STONE MASONRY 8.00	Good - no loss or cracks	8
DOWNSLOPE 0.50	Very gentle slope	8
LATERAL SLOPE 0.50	Steep	8
ROAD/SIDEWALK/SHOULDER 0.50	Grassed shoulder	8
UPSLOPE 0.50	Steep	8
WALL DRAINS 0.50	None observed, no drainage problems	8

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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_87.348_R_1.jpg

Wall ID:	**SHEN-0010C-95.323-L**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1950
***Wall Rating:**	73	**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:	Midslope wall. Park designated Wall Id of SDRV095RW001.		

Wall Measurements

Wall Length (ft.):	320	**Face Area (sq.):**	3200
Average Wall Height (ft.):	10	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	12	**Vertical Offset (ft.):**	-20

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition	7
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	7
MORTAR 8.00	Good condition	7
STONE MASONRY 8.00	No loss of stone	8
DOWNSLOPE 0.50	Moderate slope	8
LATERAL SLOPE 0.50	Gentle slope	8
ROAD/SIDEWALK/SHOULDER 0.50	Grassed shoulder	8
VEGETATION 0.50	Not much vegetation on the wall	8
WALL DRAINS 0.50	Self-draining	8

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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_95.323_L_1.jpg

SHEN_0010C_95.323_L_2.jpg

Wall ID:	**SHEN-0010C-97.865-L**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1950
***Wall Rating:**	80	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Culvert W x 2.8 ft H. Possibly repaired in 2002 Outlet on other side is less than 4 ft high, 100 ft hor. from road and 35 ft vert. below road. Potential failure of the outlet side not affect road		

Wall Measurements

Wall Length (ft.):	18	**Face Area (sq.):**	54
Average Wall Height (ft.):	3	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	5	**Vertical Offset (ft.):**	-15

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition	8
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	8
MORTAR 8.00	Good condition, no losses	8
STONE MASONRY 8.00	Good condition	8
CULVERT 0.50	Good condition	8
DOWNSLOPE 0.50	Short downslope	8
LATERAL SLOPE 0.50	Mild slope	8
ROAD/SIDEWALK/SHOULDER 0.50	Grassed shoulder	8
WALL DRAINS 0.50	None visible, no problems	8

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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_97.865_L_1.jpg

Wall ID:	**SHEN-0010C-99.426-L**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1950
***Wall Rating:**	80	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	A.T. Crossing (Cattle Crossing). 10 ft W x 6 ft H. Park designated Wall Id of SDRV099RW002		

Wall Measurements

Wall Length (ft.):	52	**Face Area (sq.):**	364
Average Wall Height (ft.):	7	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	9	**Vertical Offset (ft.):**	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition	8
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	8
MORTAR 8.00	Good Condition	8
STONE MASONRY 8.00	Good condition	8
CULVERT 0.50	Good condition	8
DOWNSLOPE 0.50	Brief downslope, then upslope	8
LATERAL SLOPE 0.50	Flat	8
UPSLOPE 0.50	Flat, vegetated	8
WALL DRAINS 0.50	None visible, no drainage problem	8

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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_99.426_L_1.jpg

SHEN_0010C_99.426_L_2.jpg

Wall ID:	**SHEN-0010C-99.426-R**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1950
***Wall Rating:**	80	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	A.T. Crossing (Cattle Crossing). 10 ft W x 6.7 ft H. Park designated Wall Id of SDRV099RW001.		

Wall Measurements

Wall Length (ft.):	52	**Face Area (sq.):**	364
Average Wall Height (ft.):	7	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	10	**Vertical Offset (ft.):**	-1

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition	8
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	8
MORTAR 8.00	Good condition	8
STONE MASONRY 8.00	Good condition	8
CULVERT 0.50	Good condition	8
DOWNSLOPE 0.50	Flat for 15', then sloped at 3H:1V	8
LATERAL SLOPE 0.50	Flat	8
ROAD/SIDEWALK/SHOULDER 0.50	vegetated	8
UPSLOPE 0.50	Flat	8

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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

Condition photos are not available for SHEN-0010C-99.426-R.

Wall ID:	**SHEN-0010C-99.770-L**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1950
***Wall Rating:**	78	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	A.T. Crossing (Cattle Crossing)		

Wall Measurements

Wall Length (ft.):	56	**Face Area (sq.):**	392
Average Wall Height (ft.):	7	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	9	**Vertical Offset (ft.):**	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition	8
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	8
MORTAR 8.00	Fair to good, few cracks	7
STONE MASONRY 8.00	Good condition	8
CULVERT 0.50	Good condition	8
DOWNSLOPE 0.50	Flat	8
LATERAL SLOPE 0.50	Flat	8
ROAD/SIDEWALK/SHOULDER 0.50	Vegetated	8
UPSLOPE 0.50	Flat	8

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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_99.770_L_1.jpg

Wall ID:	**SHEN-0010C-99.770-R**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1950
***Wall Rating:**	78	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	A.T. Crossing (Cattle Crossing). Culvert 7.8 ft W x 6.6 ft H		

Wall Measurements

Wall Length (ft.):	56	**Face Area (sq.):**	392
Average Wall Height (ft.):	7	**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 condition	8
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	8
MORTAR 8.00	Fair to good, few cracks	7
STONE MASONRY 8.00	Good condition	8
CULVERT 0.50	Good condition	8
DOWNSLOPE 0.50	Flat	8
LATERAL SLOPE 0.50	Flat	8
ROAD/SIDEWALK/SHOULDER 0.50	Vegetated	8
UPSLOPE 0.50	Flat	8

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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_99.770_R_1.jpg

SHEN_0010C_99.770_R_2.jpg

Wall ID:	**SHEN-0010C-100.482-L**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1950
***Wall Rating:**	71	**Maintenance Action:**	No Action

Wall Description

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

Wall Measurements

Wall Length (ft.):	7	**Face Area (sq.):**	28
Average Wall Height (ft.):	4	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	5	**Vertical Offset (ft.):**	-3

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition	7
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	7
MORTAR 8.00	Good condition	7
STONE MASONRY 8.00	Good condition	7
CULVERT 0.50	3' pipe in good condition	8
DOWNSLOPE 0.50	Gradual	8
ROAD/SIDEWALK/SHOULDER 0.50	Grassed shoulder	8
LATERAL SLOPE 0.50	Flat	9
WALL DRAINS 0.50	Well drained	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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_100.482_L_1.jpg

Wall ID:	**SHEN-0010C-100.504-R**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1950
***Wall Rating:**	78	**Maintenance Action:**	No Action

Wall Description

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

Wall Measurements

Wall Length (ft.):	10	**Face Area (sq.):**	40
Average Wall Height (ft.):	4	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	5	**Vertical Offset (ft.):**	-2

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition	8
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	7
MORTAR 8.00	No loss of mortar	8
STONE MASONRY 8.00	Good condition	8
CULVERT 0.50	3'H x 2'W	8
ROAD/SIDEWALK/SHOULDER 0.50	Grassed shoulder	8
DOWNSLOPE 0.50	Flat	9
LATERAL SLOPE 0.50	Flat	9
WALL DRAINS 0.50	Well drained	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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_100.504_R_1.jpg

Wall ID:	**SHEN-0010C-101.268-L**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1950
***Wall Rating:**	80	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Cattle crossing. 5 ft W x 6 ft H Culvert		

Wall Measurements

Wall Length (ft.):	32	**Face Area (sq.):**	160
Average Wall Height (ft.):	5	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	7	**Vertical Offset (ft.):**	-12

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition	8
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	8
MORTAR 8.00	Good condition, very few cracks	8
STONE MASONRY 8.00	Good condition	8
CULVERT 0.50	Good condition	8
UPSLOPE 0.50	Mild slope (3:1)	8
WALL DRAINS 0.50	None visible, no problems	8
DOWNSLOPE 0.50	Flat	9
LATERAL SLOPE 0.50	Flat	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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_101.268_L_1.jpg

Wall ID:	**SHEN-0010C-101.268-R**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1950
***Wall Rating:**	80	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Cattle Crossing. 5 ft W x 6 ft H Culvert		

Wall Measurements

Wall Length (ft.):	32	**Face Area (sq.):**	192
Average Wall Height (ft.):	6	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	9	**Vertical Offset (ft.):**	-3

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition	8
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	8
MORTAR 8.00	Good condition, very few cracks	8
STONE MASONRY 8.00	Good condition	8
CULVERT 0.50	Good condition	8
ROAD/SIDEWALK/SHOULDER 0.50	Grassed shoulder	8
UPSLOPE 0.50	1.5:1 slope	8
WALL DRAINS 0.50	No visible drains, no drainage problems	8
DOWNSLOPE 0.50	Flat	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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_101.268_R_1.jpg

Wall ID:	**SHEN-0010C-102.422-L**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1950
***Wall Rating:**	80	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	A.T. crossing		

Wall Measurements

Wall Length (ft.):	44	**Face Area (sq.):**	264
Average Wall Height (ft.):	6	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	8	**Vertical Offset (ft.):**	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition	8
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	8
MORTAR 8.00	Good condition, some repointed	8
STONE MASONRY 8.00	Good condition	8
CULVERT 0.50	Good condition	8
WALL DRAINS 0.50	None visible, no problems	8
DOWNSLOPE 0.50	Mild slope	9
LATERAL SLOPE 0.50	Nearly Flat	9
ROAD/SIDEWALK/SHOULDER 0.50	Grassed shoulder	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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_102.422_L_1.jpg

Wall ID:	**SHEN-0010C-102.422-R**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1950
***Wall Rating:**	80	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	A.T. crossing		

Wall Measurements

Wall Length (ft.):	44	**Face Area (sq.):**	315
Average Wall Height (ft.):	7	**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 condition	8
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	8
MORTAR 8.00	Good condition, some repointed	8
STONE MASONRY 8.00	Good condition	8
CULVERT 0.50	Good condition	8
DOWNSLOPE 0.50	Mild	8
WALL DRAINS 0.50	None visible, no problems	8
LATERAL SLOPE 0.50	Nearly flat	9
ROAD/SIDEWALK/SHOULDER 0.50	Grassed shoulder	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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_102.422_R_1.jpg

Wall ID:	**SHEN-0010C-103.942-L**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1950
***Wall Rating:**	80	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	A.T. Crossing. Park designated Wall Id of SDRV103RW001		

Wall Measurements

Wall Length (ft.):	66	**Face Area (sq.):**	670
Average Wall Height (ft.):	10	**Face Angle (deg.):**	83
Maximum Wall Height (ft.):	15	**Vertical Offset (ft.):**	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition	8
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	8
MORTAR 8.00	Good condition	8
STONE MASONRY 8.00	Good condition, some repointing	8
CULVERT 0.50	Good condition	8
WALL DRAINS 0.50	Two openings in wall	8
LATERAL SLOPE 0.50	Mild slope	9
ROAD/SIDEWALK/SHOULDER 0.50	Gravel shoulder	9
DOWNSLOPE 1.00	10-15 feet at 3:1, then 1:1 slope	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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_103.942_L_1.jpg

SHEN_0010C_103.942_L_2.jpg

Wall ID:	**SHEN-0010C-103.942-R**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1950
***Wall Rating:**	81	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	A.T. crossing		

Wall Measurements

Wall Length (ft.):	54	**Face Area (sq.):**	378
Average Wall Height (ft.):	7	**Face Angle (deg.):**	83
Maximum Wall Height (ft.):	12	**Vertical Offset (ft.):**	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition	8
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	8
MORTAR 8.00	Good condition	8
STONE MASONRY 8.00	Some repointing	8
CULVERT 0.50	Good condition	8
DOWNSLOPE 0.50	Short downslope	9
LATERAL SLOPE 0.50	Mild slope	9
ROAD/SIDEWALK/SHOULDER 0.50	Gravel shoulder	9
WALL DRAINS 0.50	None visible, no problems	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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_103.942_R_1.jpg

Wall ID:	**SHEN-0010C-105.144-R**		
Route Name:	SKYLINE DRIVE (SOUTH)		
Inspection Date:	May 15, 2007	**Approximate Year Built:**	2001
***Wall Rating:**	90	**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:	Geogrid Reinforced Soil Wall. Designed by EFLHD, design and as-built plans available		

Wall Measurements

Wall Length (ft.):	1000	**Face Area (sq.):**	14300
Average Wall Height (ft.):	14	**Face Angle (deg.):**	80
Maximum Wall Height (ft.):	27	**Vertical Offset (ft.):**	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	New construction, 6 years old	9
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	9
WIRE/GEOSYNTHETIC FACING 8.00	Good condition, no erosion	9
DOWNSLOPE 0.50	1:1 or flatter, variable soil and rock	8
LATERAL SLOPE 0.50	Relatively steep slope, average 10% slope	8
VEGETATION 0.50	Required based on design and construction	8
CULVERT 0.50	Functioning as designed and constructed	10
CURB/BERM/DITCH 0.50	Functioning as designed and constructed	10
ROAD/SIDEWALK/SHOULDER 0.50	Grassed	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.

Shenandoah National Park

ROUTE 0010C: SKYLINE DRIVE (SOUTH)

Retaining Wall Condition Photos

SHEN_0010C_105.144_R_1.jpg

SHEN_0010C_105.144_R_2.jpg

Wall ID:	**SHEN-0012-0.309-R**		
Route Name:	MATHEWS ARM ENTRANCE ROAD		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1987
***Wall Rating:**	82	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall and ditch drainage catchment.		

Wall Measurements

Wall Length (ft.):	66	**Face Area (sq.):**	264
Average Wall Height (ft.):	4	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	6	**Vertical Offset (ft.):**	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Performing very well with no signs of distress.	9
WALL FOUNDATION MATERIAL 8.00	Mortared rock drainage path. No signs of foundation settlement.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	8
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
CULVERT 0.50	Functioning as designed with no signs of distress, seepage, etc.	9
DOWNSLOPE 0.50	Mortared rock drainage. No signs of distress.	9
LATERAL SLOPE 0.50	Very stable soil embankment showing no signs of distress.	9
ROAD/SIDEWALK/SHOULDER 0.50	No wall-related distress.	9
WALL DRAINS 0.50	Drains are present and functioning as intended.	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.

Shenandoah National Park

ROUTE 0012: MATHEWS ARM ENTRANCE ROAD

Retaining Wall Condition Photos

SHEN_0012_0.309_R_1.jpg

SHEN_0012_0.309_R_2.jpg

Wall ID:	**SHEN-0012-0.435-R**		
Route Name:	MATHEWS ARM ENTRANCE ROAD		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1987
***Wall Rating:**	83	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall and ditch drainage catchment.		

Wall Measurements

Wall Length (ft.):	57	**Face Area (sq.):**	170
Average Wall Height (ft.):	2	**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 overall condition with no signs of element or global distress.	9
WALL FOUNDATION MATERIAL 8.00	Mortared rock drainage showing no signs of distress.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	8
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
VEGETATION 0.50	Minor vegetation growing along top of wall. No impacts to the wall.	8
CULVERT 0.50	No signs of seepage within or around the culvert. Functioning as designed and constructed.	9
DOWNSLOPE 0.50	Mortared rock drainage showing no signs of distress.	9
LATERAL SLOPE 0.50	Stable soil embankment showing no signs of distress.	9
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related 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.

Shenandoah National Park

ROUTE 0012: MATHEWS ARM ENTRANCE ROAD

Retaining Wall Condition Photos

SHEN_0012_0.435_R_1.jpg

SHEN_0012_0.435_R_2.jpg

Wall ID:	**SHEN-0012-0.499-R**		
Route Name:	MATHEWS ARM ENTRANCE ROAD		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1987
***Wall Rating:**	83	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall and ditch drainage catchment.		

Wall Measurements

Wall Length (ft.):	56	**Face Area (sq.):**	160
Average Wall Height (ft.):	2	**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 overall condition, with no signs of global or element distress.	9
WALL FOUNDATION MATERIAL 8.00	Mortared stone masonry drainage, with no signs of settlement distress.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	8
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
VEGETATION 0.50	Minor vegetation growing at top of wall. No impact to wall performance.	8
CULVERT 0.50	Functioning as intended, with no signs of distress.	9
DOWNSLOPE 0.50	Mortared stone drainage showing no signs of distress.	9
LATERAL SLOPE 0.50	Stable soil embankment showing no signs of distress.	9
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related 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.

Shenandoah National Park

ROUTE 0012: MATHEWS ARM ENTRANCE ROAD

Retaining Wall Condition Photos

SHEN_0012_0.499_R_1.jpg

SHEN_0012_0.499_R_2.jpg

Wall ID:	**SHEN-0012-0.648-R**		
Route Name:	MATHEWS ARM ENTRANCE ROAD		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1987
***Wall Rating:**	83	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Head Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Mortared stone masonry headwall and ditch drainage catchment.		

Wall Measurements

Wall Length (ft.):	52	**Face Area (sq.):**	208
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	No signs of global distress. Functioning as designed and constructed.	9
WALL FOUNDATION MATERIAL 8.00	Mortared stone masonry with no signs of settlement.	8
MORTAR 8.00	Sound, durable, intact, with minor weathering. No signs of significant cracking.	8
STONE MASONRY 8.00	Sound, durable, with minor weathering. No cracked or missing blocks.	8
VEGETATION 0.50	Minor vegetation at the top of the wall. No impact to wall performance.	8
CULVERT 0.50	Functioning as intended with no signs of distress.	9
DOWNSLOPE 0.50	Mortared stone drainage showing no signs of distress.	9
LATERAL SLOPE 0.50	Stable soil embankment showing no signs of distress.	9
ROAD/SIDEWALK/SHOULDER 0.50	Excellent condition with no signs of wall-related 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.

Shenandoah National Park

ROUTE 0012: MATHEWS ARM ENTRANCE ROAD

Retaining Wall Condition Photos

SHEN_0012_0.648_R_1.jpg

SHEN_0012_0.648_R_2.jpg

Wall ID:	**SHEN-0400-0.300-L**		
Route Name:	SNEAD FARM ROAD		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1987
***Wall Rating:**	70	**Maintenance Action:**	Maintenance

Wall Description

Wall Function:	Cut Wall	**Primary Wall Type:**	Other -Timber Pile/Timber-Lag
Surface Treatment:	Tar Coated	**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Timber-lagged, timber pile cut wall. Lagging was originally tarred, but highly weathered. Steel angle-iron bracing added to several piles. Tower Service Road is at MP 5.137 on Rte. 0010. Park-designated wall of DRRS000RW001.		

Wall Measurements

Wall Length (ft.):	65	**Face Area (sq.):**	423
Average Wall Height (ft.):	6	**Face Angle (deg.):**	82
Maximum Wall Height (ft.):	8	**Vertical Offset (ft.):**	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	No signs of global distress, though one pile needs repair.	7
WALL FOUNDATION MATERIAL 8.00	Dense, stable granular soil. No signs of distress or eroded foundation material.	8
PILES AND SHAFTS 8.00	Timber piles are generally dense and solid. One pile is split vertically along wood grain, but is still performing satisfactorily (though needs to be repaired).	6
LAGGING 8.00	Timber lagging was originally tarred, but has weathered substantially. Generally, wood is dense and solid, with only minor splitting. No timbers were broken.	7
LATERAL SLOPE 0.50	Well-vegetated side slopes with minor signs of erosion.	8
ROAD/SIDEWALK/SHOULDER 0.50	Gravel road at toe of wall showing no signs of wall-related distress.	8
UPSLOPE 0.50	Well-vegetated slope (approx. 1.5H:1V, 15-20 tall) with some signs of erosion. Stable slope.	8
WALL DRAINS 0.50	No wall drains present. No signs of seepage through the wall face or other types of water-related distress.	8
VEGETATION 1.00	Small trees growing along the top-line of the wall that should be removed to prevent damage to the wall.	5

Repair Recommendations

Failure Consequence:	LOW
Recommendation Narrative:	Clear small trees and brush along top of wall and repair/reinforce cracked timber pile. Labor to repair cracked timber pile: 2hrs @ $50/hr = $100. Lag bolts and plates: Lump Sum = $50. Clear small trees from around wall: 3hrs @ $50/hr = $150. Total = $300
Repair Cost:	$300

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

Shenandoah National Park

ROUTE 0400: SNEAD FARM ROAD

Retaining Wall Condition Photos

SHEN_0400_0.300_L_1.jpg

Wall ID:	**SHEN-0417-2.000-L**		
Route Name:	KEYSER RUN ROAD		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	1937
***Wall Rating:**	70	**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-laid stone wall supporting gravel access road. Park-designated of KYSR002RW001.		

Wall Measurements

Wall Length (ft.):	85	**Face Area (sq.):**	380
Average Wall Height (ft.):	4	**Face Angle (deg.):**	80
Maximum Wall Height (ft.):	7	**Vertical Offset (ft.):**	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Wall is poorly constructed by rockery standards, but is stable. Minor vegetation does not need to be removed. Fines migration through the wall face should be monitored.	7
WALL FOUNDATION MATERIAL 8.00	Difficult to see - possibly rock fill from road construction. No signs of erosion or settlement.	7
PLACED STONE 8.00	Medium-to-large boulder (2 to 4-ft diameter) construction. No chinking (or missing). Poorly laid stones. Portions of the wall were difficult to see. Some retained soil fines migrating through face.	7
ROAD/SIDEWALK/SHOULDER 0.50	Gravel roadway shows no signs of wall-related distress.	8
DOWNSLOPE 1.00	Well-vegetated, moderately stable downslope showing minor erosion.	7
LATERAL SLOPE 1.00	Well-vegetated, stable side slopes.	7
VEGETATION 1.00	Small trees growing at wall toe may actually be supporting the wall. Some deadfall across the wall, but not impacting wall performance.	7
WALL DRAINS 1.00	Free-draining wall. No signs of water-related distress other than fines migration through the face.	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.

Shenandoah National Park

ROUTE 0417: KEYSER RUN ROAD

Retaining Wall Condition Photos

Condition photos are not available for SHEN-0417-2.000-L.

Wall ID:	**SHEN-0974-0.000-P1**		
Route Name:	UPPER THORNTON GAP PARKING		
Inspection Date:	May 15, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	82	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Cut Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	GM retaining wall along the back slope of the Upper Panorama Parking lot wall founded at base of moderately sloping hillside low consequence of failure		

Wall Measurements

Wall Length (ft.):	442	**Face Area (sq.):**	3094
Average Wall Height (ft.):	7	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	7	**Vertical Offset (ft.):**	1

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent performance of wall; no evidence of movement or distress	8
WALL FOUNDATION MATERIAL 8.00	Wall founded on firm soil; no evidence of settlement or rotation	9
MORTAR 8.00	Generally good condition; shows sign of normal seasonal weathering	8
STONE MASONRY 8.00	Stone blocks are in good condition; no sign of distress	8
CURB/BERM/DITCH 0.50	Stone curb; in good condition	8
LATERAL SLOPE 0.50	No evidence of erosion or distress	8
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement parking area; generally in good condition with minor alligator cracking; vegetated shoulder	8
VEGETATION 0.50	One small tree in close proximity to wall; tree does not impact wall	8
WALL DRAINS 0.50	No visible drainage outlets; possible underdrain behind wall; evidence of seepage along face of wall; seepage does not compromise the wall	8

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.

Shenandoah National Park

ROUTE 0974: UPPER THORNTON GAP PARKING

Retaining Wall Condition Photos

Condition photos are not available for SHEN-0974-0.000-P1.

Wall ID:	**SHEN-0974-0.000-P2**		
Route Name:	UPPER THORNTON GAP PARKING		
Inspection Date:	May 15, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	85	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Cut Wall	**Primary Wall Type:**	Gravity - Mortared Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	GW retaining wall supporting the southwest corner of Upper Panorama Parking lot wall height varies to a maximum of 6.8 ft low consequence of failure		

Wall Measurements

Wall Length (ft.):	95	**Face Area (sq.):**	646
Average Wall Height (ft.):	6	**Face Angle (deg.):**	90
Maximum Wall Height (ft.):	7	**Vertical Offset (ft.):**	-2

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent performance of wall; no evidence of movement or distress	9
WALL FOUNDATION MATERIAL 8.00	Wall founded on firm soil; no evidence of settlement or rotation	9
MORTAR 8.00	Generally good condition; shows sign of normal seasonal weathering	8
STONE MASONRY 8.00	Stone blocks are in good condition; no sign of distress	8
LATERAL SLOPE 0.50	No evidence of erosion or distress	8
ROAD/SIDEWALK/SHOULDER 0.50	Asphalt pavement exit road below wall; road is in good condition	8
TRAFFIC BARRIER/FENCE 0.50	GM guard wall along top of wall: mortar and blocks are in good condition; no evidence of distress	8
UPSLOPE 0.50	Relatively flat vegetated area behind wall with a 2-ft wide concrete sidewalk; both show no evidence of distress	8
VEGETATION 0.50	A couple of medium diameter trees adjacent to wall; trees do not appear to impact the wall	8

Repair Recommendations

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

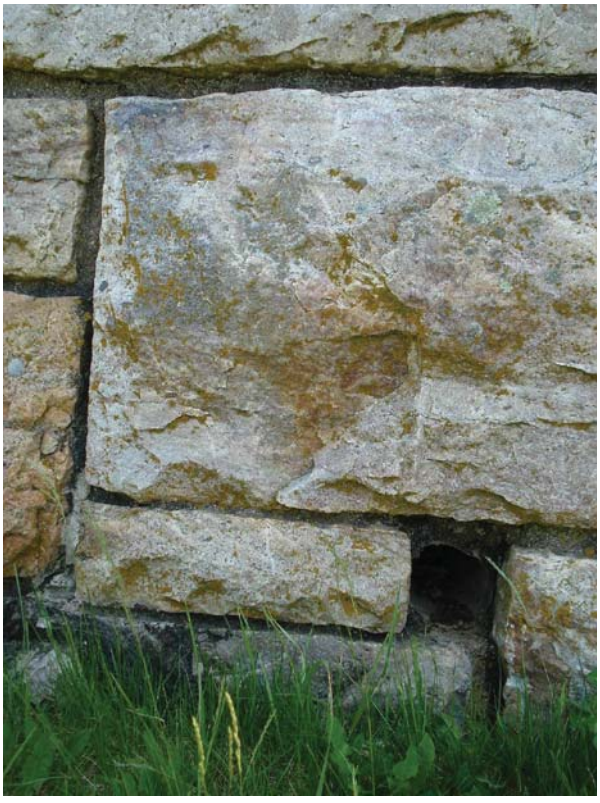
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.

Shenandoah National Park

ROUTE 0974: UPPER THORNTON GAP PARKING

Retaining Wall Condition Photos

SHEN_0974_0.000_P2_1.jpg



SHEN_0974_0.000_P2_2.jpg

Wall ID:	**SHEN-1025-0.000-P1**		
Route Name:	JEWELL HOLLOW OVERLOOK PARKING		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	76	**Maintenance Action:**	Repair Elements

Wall Description

Wall Function:	Cut Wall	**Primary Wall Type:**	Gravity - Dry Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Dry laid gravity retaining wall along backslope of Jewel Hollow Overlook parking lot supporting gentle to moderately sloping hillside base of wall abuts directly with pavement low consequence of failure		

Wall Measurements

Wall Length (ft.):	230	**Face Area (sq.):**	920
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	Generally good wall performance; wall requires routine maintenance and repair	7
WALL FOUNDATION MATERIAL 8.00	Wall appears to be founded on bedrock outcrop; no evidence of settlement or rotation	9
PLACED STONE 8.00	Some loose and dislodged stones; some missing stones	7
WALL DRAINS 0.50	Wall is self-draining; no evidence of drainage-related issues	8
LATERAL SLOPE 0.50	No evidence of erosion or distress	9
UPSLOPE 0.50	Gentle to moderately sloping vegetated hillside; bedrock outcrop immediate behind wall; no evidence of slope movement or distress	9
VEGETATION 1.00	Large bush growing from face of wall has loosened and dislodged some blocks; bush should be removed	6
ROAD/SIDEWALK/SHOULDER 1.00	Asphalt pavement parking lot at base of wall; minor to moderate alligator cracking	7

Repair Recommendations

Failure Consequence:	LOW
Recommendation Narrative:	(1) Remove bush from wall - General labor = $55/hr (2 workers) (2 hrs) = $220. (2) Remove/replace/reset stones - Material cost = $50/sqft (72 sqft) = $3600, General labor = $55/hr (2 workers) (24 hrs) = $2640. Total = $6,500
Repair Cost:	$6,500

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

Shenandoah National Park

ROUTE 1025: JEWELL HOLLOW OVERLOOK PARKING

Retaining Wall Condition Photos

SHEN_1025_0.000_P1_1.jpg

SHEN_1025_0.000_P1_2.jpg

Wall ID:	**SHEN-1025-0.000-P2**		
Route Name:	JEWELL HOLLOW OVERLOOK PARKING		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	Unknown
***Wall Rating:**	70	**Maintenance Action:**	No Action

Wall Description

Wall Function:	Cut Wall	**Primary Wall Type:**	Gravity - Dry Stone
Surface Treatment:		**Secondary Wall Type:**	
Secondary Surface Treatment:		**Architectural Facing:**	
General Description:	Dry laid stone wall supporting the Jewel Hollow Overlook constructed with large diameter cobbles and boulders 2 ft high GM guard wall at top of wall low consequence of failure		

Wall Measurements

Wall Length (ft.):	230	**Face Area (sq.):**	920
Average Wall Height (ft.):	4	**Face Angle (deg.):**	80
Maximum Wall Height (ft.):	4	**Vertical Offset (ft.):**	0

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Generally good performance of the wall; wall requires some minor repair and routine maintenance	7
WALL FOUNDATION MATERIAL 8.00	Appears to be founded on rock and soil	8
PLACED STONE 8.00	Some loose and dislodged stone	6
DOWNSLOPE 0.50	Asphalt pavement grades away from the toe of wall	8
WALL DRAINS 0.50	Wall is self-draining; no evidence of drainage-related issues	8
LATERAL SLOPE 0.50	N evidence of erosion or distress	9
UPSLOPE 0.50	Gentle to moderate vegetated slope; bedrock outcrop; no evidence of slope movement	9
TRAFFIC BARRIER/FENCE 1.00	GM guard wall; loose and missing sections seemingly from car impact; collapsed sections should be repaired; some minor repointing required	5
VEGETATION 1.00	Large bush growing out of wall face has caused localized damage/distress to wall	6

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.

Shenandoah National Park

ROUTE 1025: JEWELL HOLLOW OVERLOOK PARKING

Retaining Wall Condition Photos

SHEN_1025_0.000_P2_1.jpg

SHEN_1025_0.000_P2_2.jpg

Wall ID:	**SHEN-1026-0.000-P1**		
Route Name:	STONY MAN HUGHES OVERLOOK PARKING		
Inspection Date:	May 16, 2007	**Approximate Year Built:**	Unknown
***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:	Dry stacked gravity wall at base of steep slope supporting overlook above the Appalachian Trail low consequence of failure		

Wall Measurements

Wall Length (ft.):	180	**Face Area (sq.):**	1620
Average Wall Height (ft.):	9	**Face Angle (deg.):**	80
Maximum Wall Height (ft.):	9	**Vertical Offset (ft.):**	45

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Good performance of the wall; observed distress to overlook suggests slope or wall movement though no evidence of movement observed.	8
WALL FOUNDATION MATERIAL 8.00	Wall founded on rock; no evidence of settlement or rotation	9
PLACED STONE 8.00	Dry laid stones; in good condition	8
DOWNSLOPE 0.50	Vegetated slope of soil and rock; no evidence of slope movement	8
ROAD/SIDEWALK/SHOULDER 1.00	Asphalt pavement at top of slope is in poor to fair condition with extensive cracking, rutting, and evidence of settlement	4
UPSLOPE 0.50	Loose riprap slope protection along slope; no evidence of slope movement	8
LATERAL SLOPE 0.50	Lateral slope is consists of rock and soil; no evidence of erosion	9
VEGETATION 0.50	No large vegetation immediate to the wall	9
WALL DRAINS 0.50	Wall is self-draining; no observed drainage-related issues	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.

Shenandoah National Park

ROUTE 1026: STONY MAN HUGHES OVERLOOK PARKING

Retaining Wall Condition Photos

Condition photos are not available for SHEN-1026-0.000-P1.

Wall ID:	**SHEN-1044-0.000-P1**		
Route Name:	SWIFT RUN OVERLOOK PARKING		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1931
***Wall Rating:**	67	**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:	Rubble Rock Fill		

Wall Measurements

Wall Length (ft.):	250	**Face Area (sq.):**	5000
Average Wall Height (ft.):	20	**Face Angle (deg.):**	45
Maximum Wall Height (ft.):	25	**Vertical Offset (ft.):**	-10

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Somewhat deteriorated	6
WALL FOUNDATION MATERIAL 8.00	No settlement or erosion	7
PLACED STONE 8.00	Rubble, deteriorated, overgrown, mixed or covered with soil	6
LATERAL SLOPE 0.50	Mild slope	8
WALL DRAINS 1.00	None	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.

Shenandoah National Park

ROUTE 1044: SWIFT RUN OVERLOOK PARKING

Retaining Wall Condition Photos

Condition photos are not available for SHEN-1044-0.000-P1.

Wall ID:	**SHEN-1047-0.000-P1**		
Route Name:	BACON HOLLOW OVERLOOK PARKING		
Inspection Date:	May 17, 2007	**Approximate Year Built:**	1931
***Wall Rating:**	71	**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 Laid, Rock Fill. Park designated Wall Id of SDRV069RW002.		

Wall Measurements

Wall Length (ft.):	520	**Face Area (sq.):**	26000
Average Wall Height (ft.):	50	**Face Angle (deg.):**	45
Maximum Wall Height (ft.):	100	**Vertical Offset (ft.):**	20

Assessed Elements

Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)
PERFORMANCE 8.00	Performing well	7
WALL FOUNDATION MATERIAL 8.00	Unknown, possibly rock or soil	7
PLACED STONE 8.00	Moderate movement and disintegration of stone wall	7
WALL DRAINS 0.50	Face draining well	8
LATERAL SLOPE 0.50	Flat	9
CULVERT 1.00	Drop inlet appears to go toward wall	7
DOWNSLOPE 1.00	Steep, 1:1 or more	7
ROAD/SIDEWALK/SHOULDER 1.00	Sidewalk	7
VEGETATION 1.00	Throughout 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.

Shenandoah National Park

ROUTE 1047: BACON HOLLOW OVERLOOK PARKING

Retaining Wall Condition Photos

SHEN_1047_0.000_P1_1.jpg

SHEN_1047_0.000_P1_2.jpg

Appendix A
Summary of WIP Definitions

Shenandoah 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 ≥ 45˚ (≥ 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

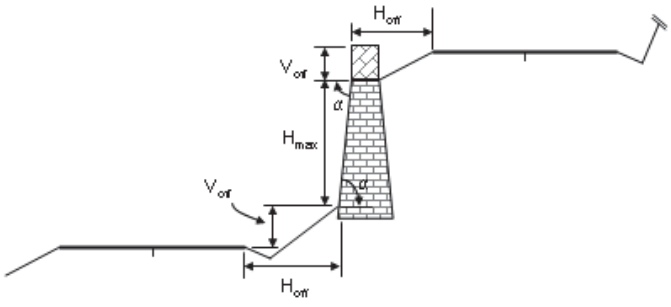
[**BV**] Brick Veneer	[**PF**] Planted Face	[**SS**] Simulated Stone
[**CO**] Cementitious Overlay	[**SC**] Sculpted Shotcrete	[**SV**] Stone Veneer
[**FF**] Fractured Fin Concrete	[**SH**] Shotcrete (nozzle finish)	[**TI**] Timber
[**FL**] Formlined Concrete	[**SM**] Steel/Metal	[**OT**] Other, User 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 *newly constructed or fabricated* 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.



H_{max}	Maximum exposed wall height, ft
V_{off}	Average vertical distance from pavement to cut wall toe or groundline at top of fill wall (+ above/ - below roadway), ft
H_{off}	Horizontal distance to wall face from edge of roadway, ft
α	Wall face angle measured from the horizontal, degrees
L	Maximum earth retaining length of the wall (excluding guardwalls). Wall length is the actual length of the structure, not simply the projected length along the roadway, ft