

BAWA WIP Report

NPS Retaining Wall Inventory Program Baltimore - Washington Parkway National Capital



**Federal Lands Highway
Road Inventory Program**

Prepared By:

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

Data Collection Date: August 2007
Report Date: October 2015

Baltimore - Washington Parkway National Capital Parks - East in Maryland

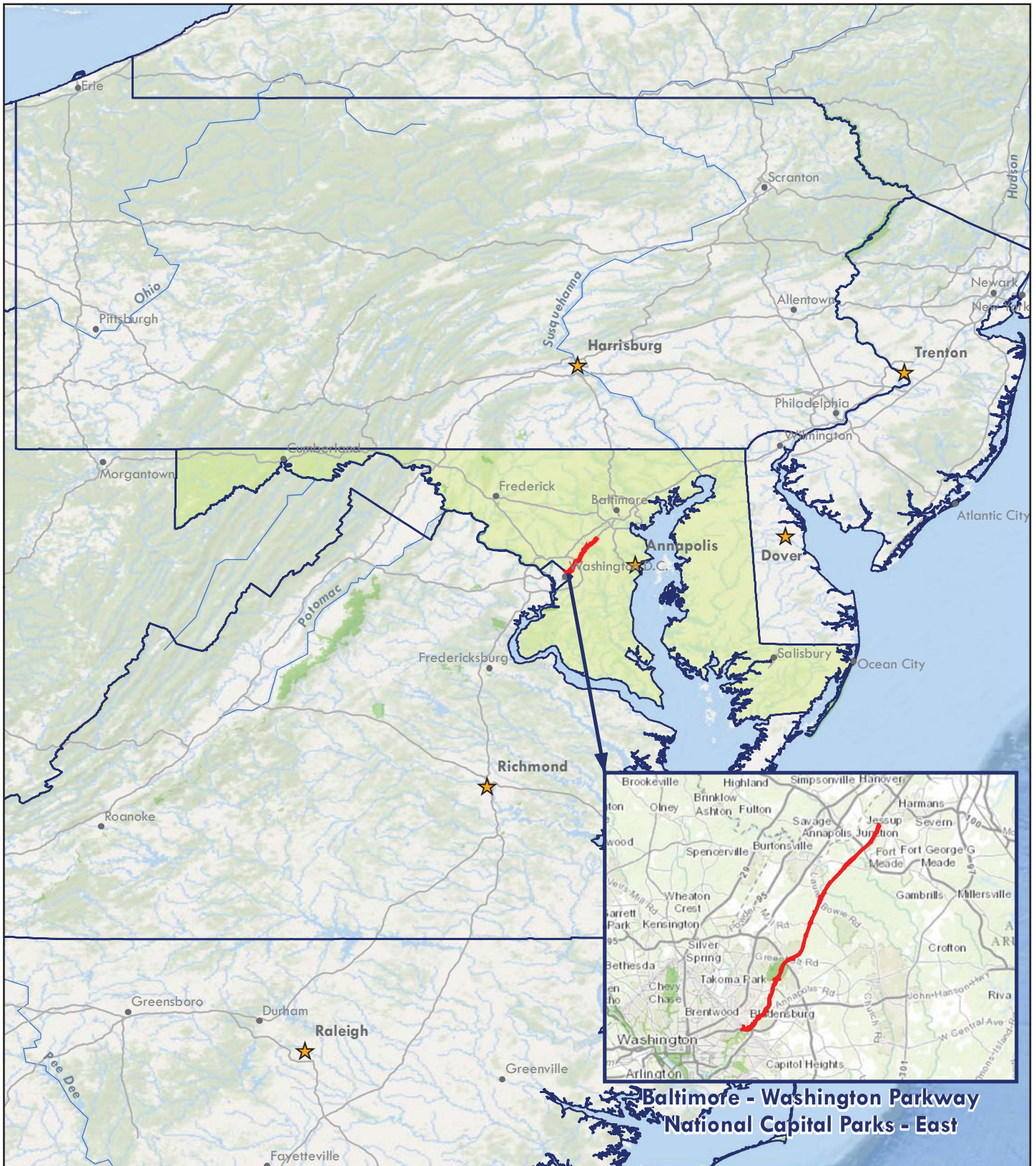


Table of Contents

SECTION	PAGE NO.
1. INTRODUCTION	1 - 1
2. PARK RETAINING WALL LOCATION MAPS Retaining Wall Location Maps	2 - 1
3. TIER 1 - PARK RETAINING WALL OVERVIEW	3 - 1
4. TIER 2 - ROUTE RETAINING WALL OVERVIEW	4 - 1
5. TIER 3 - RETAINING WALL DETAILS	5 - 1
6. APPENDIX A - SUMMARY OF WIP DEFINITIONS AND ASSESSMENT CATEGORIES	A - 1

Introduction



Baltimore - Washington Parkway National Capital Parks - East



**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



Baltimore - Washington Parkway National Capital Parks - East

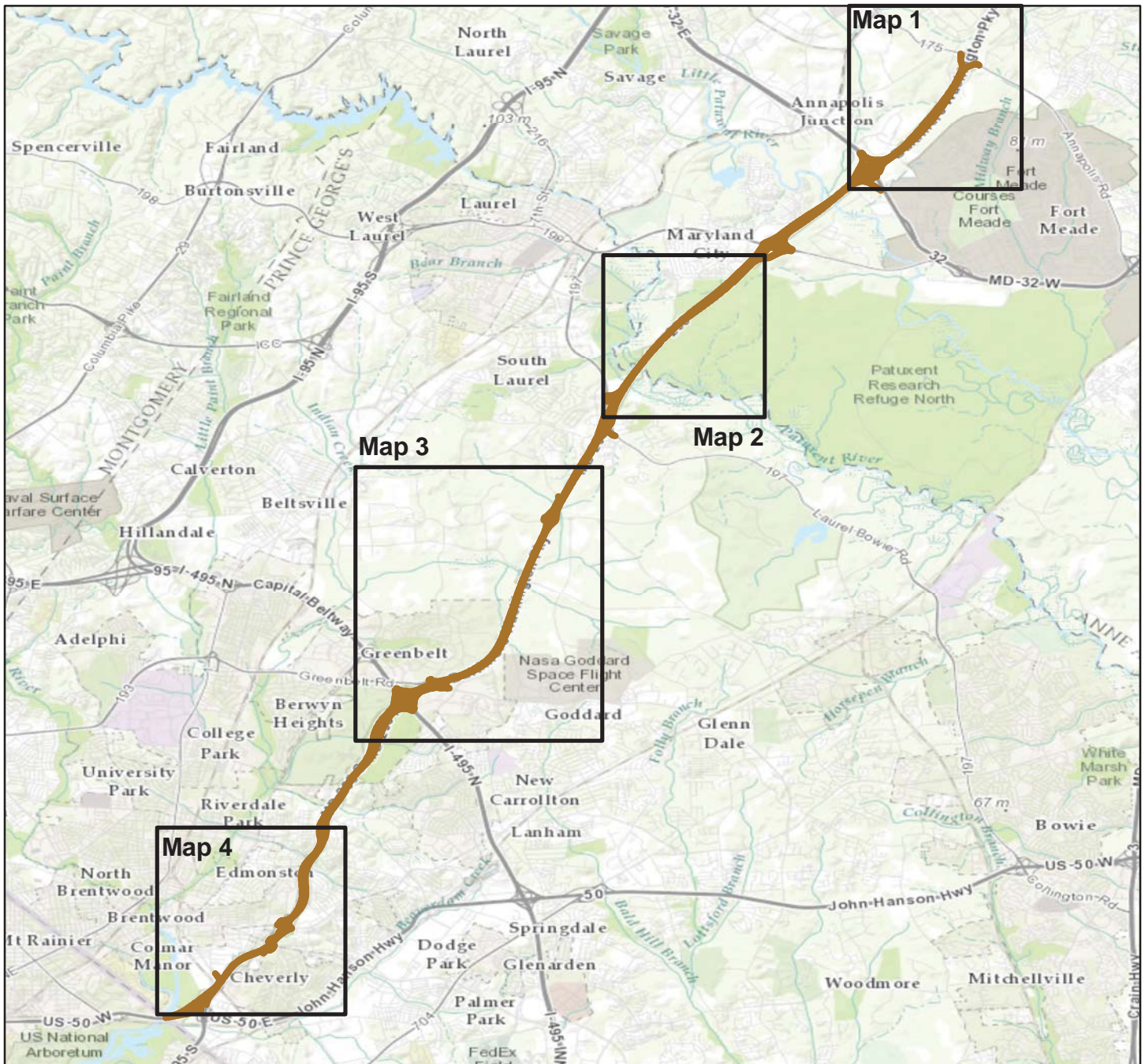


**Federal Lands Highway
Road Inventory Program**

Baltimore-Washington Parkway

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

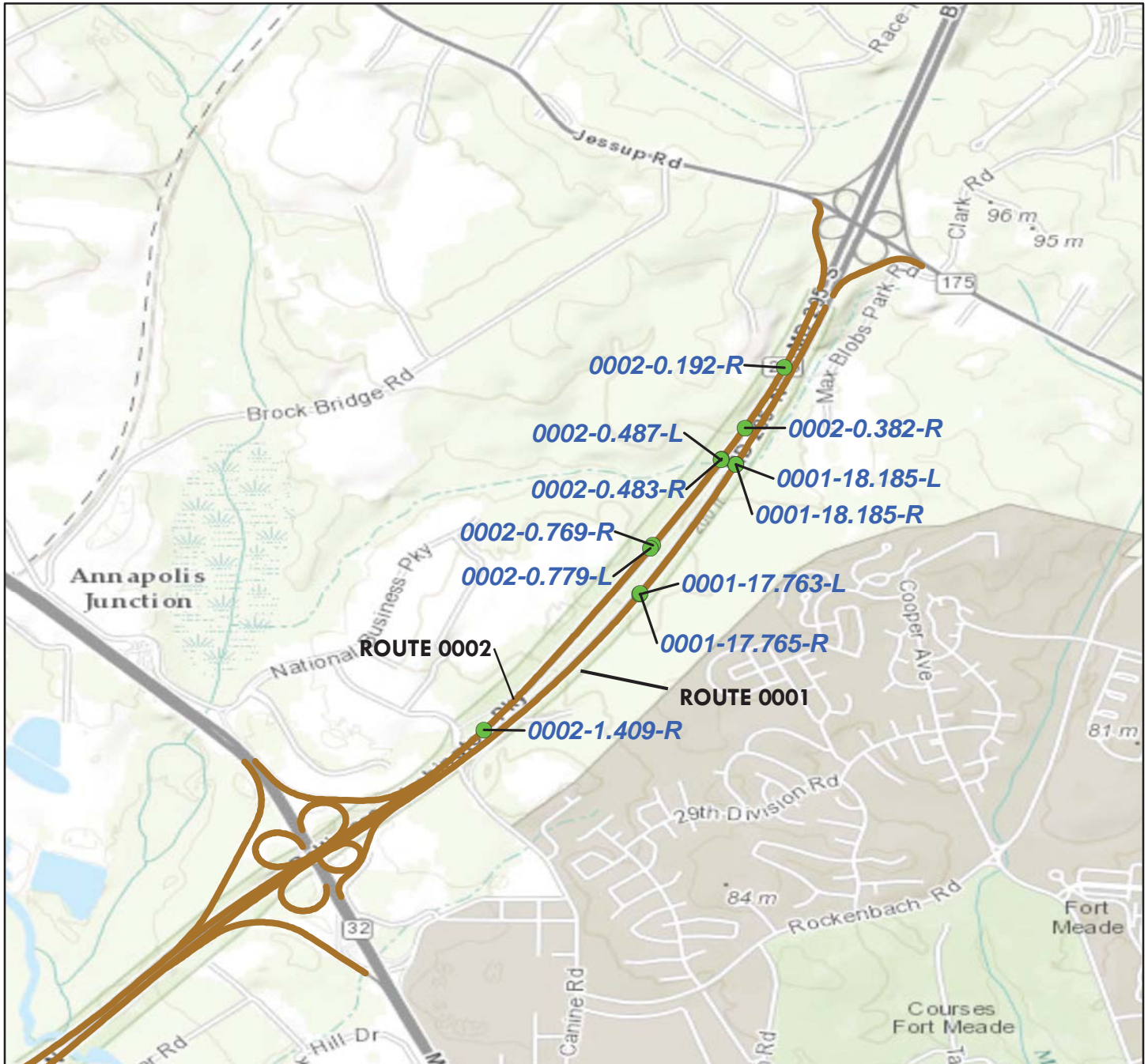
— RIP Collected Routes



Baltimore-Washington Parkway

WALL LOCATION MAP

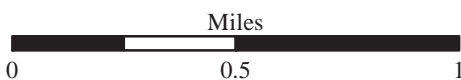
Map 1



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



Baltimore-Washington Parkway

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

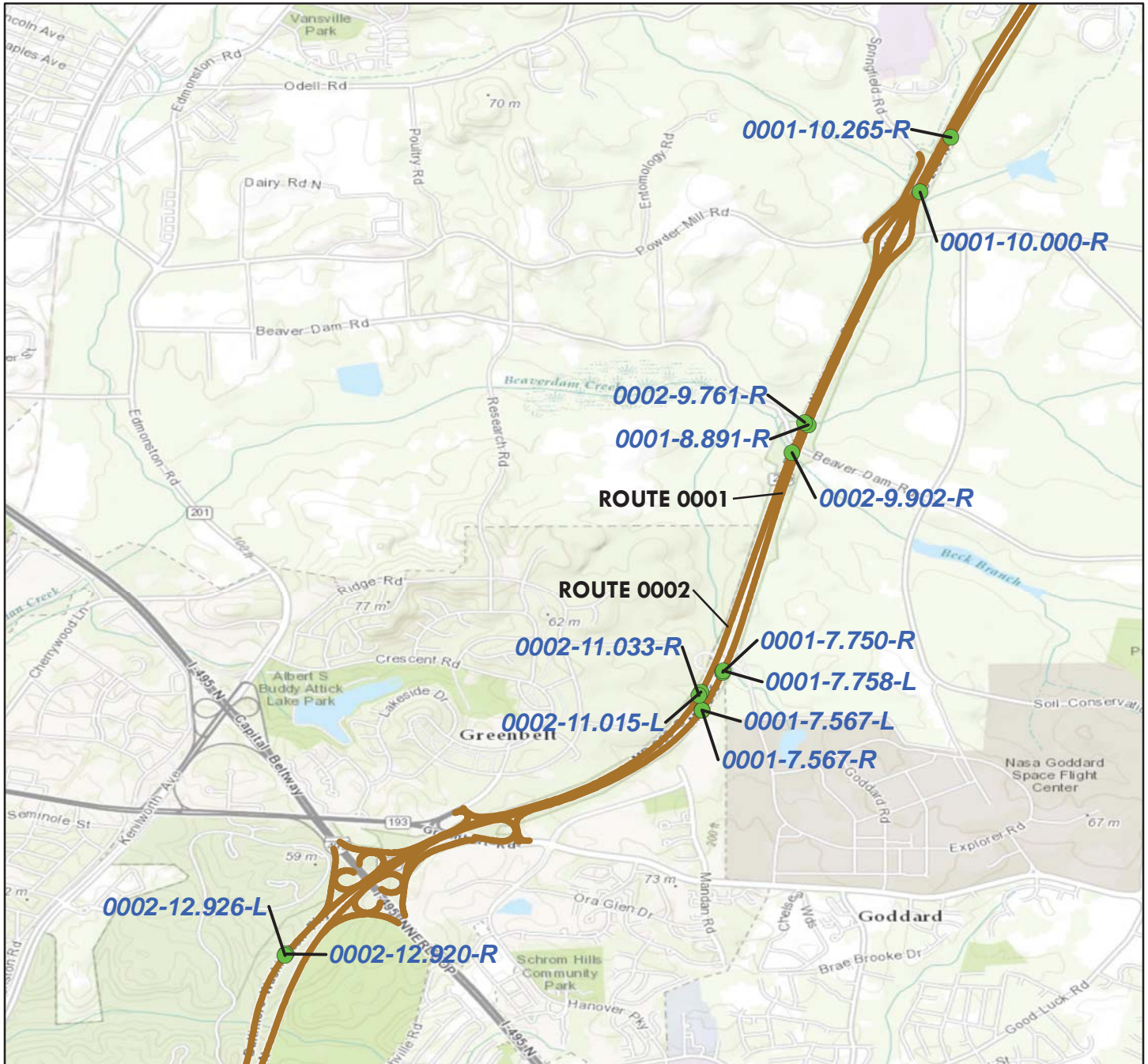
— RIP Collected Routes



Baltimore-Washington Parkway

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**

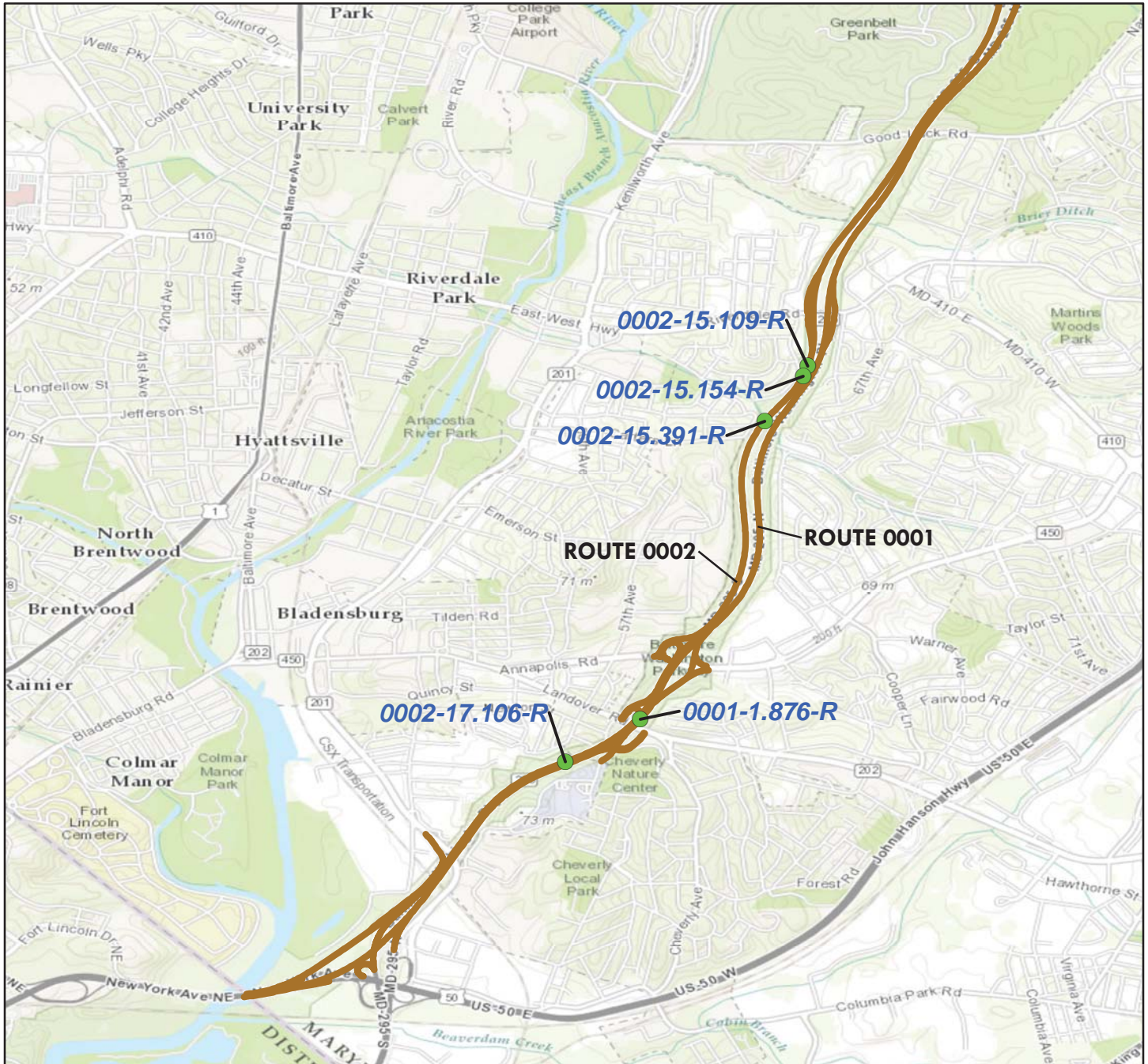
Miles
0 0.75 1.5



Baltimore-Washington Parkway

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**



Tier 1 Park Retaining Wall Overview



Baltimore - Washington Parkway National Capital Parks - East



Federal Lands Highway
Road Inventory Program

Parkwide Summary: Baltimore - Washington Parkway

Initial retaining wall inspections were conducted at Baltimore - Washington Parkway 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 Baltimore - Washington Parkway 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, 37 walls were inventoried on the routes listed below.

Table 1: Number of Walls by Route

Route Number	Route Name	No. of Walls
0001	BALTIMORE-WASHINGTON PARKWAY (NB)	14
0002	BALTIMORE-WASHINGTON PARKWAY (SB)	21
0506ZZ	POWDER MILL ROAD RAMPS (MD ROUTE 212 INTERCHANGE)	1
0507ZZ	LAUREL-BOWIE ROAD RAMPS (MD ROUTE 197 INTERCHANGE)	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
FW - Fill Wall	2
HW - Head Wall	35

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
GC, Gravity - Mass Concrete	9
GM, Gravity - Mortared Stone	27
MP, MSE - Precast Panel	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	4
Monitor	\$0	0
Maintenance	\$112,536	26
Repair Elements	\$185,952	7
Replace Elements	\$0	0
Replace Wall	\$0	0
Totals	\$298,488	37

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

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

Table 5: Number of Walls Grouped by Associated 2007 Cost

Cost Range*	No. of Walls
\$0	4
\$1 - \$25,000	31
\$25,001 - \$50,000	1
\$50,001 - \$100,000	0
\$100,001 - \$250,000	1
\$250,001 - \$500,000	0
\$500,001 - \$1,000,000	0
\$1,000,001 - \$2,000,000	0
\$2,000,001 - \$3,000,000	0
\$3,000,001 - \$4,000,000	0
Total Number of Walls	37

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

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

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

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 Baltimore - Washington Parkway 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⁾
BAWA-0002-17.106-R	LOW	43	REPAIR ELEMENTS	\$125,585

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



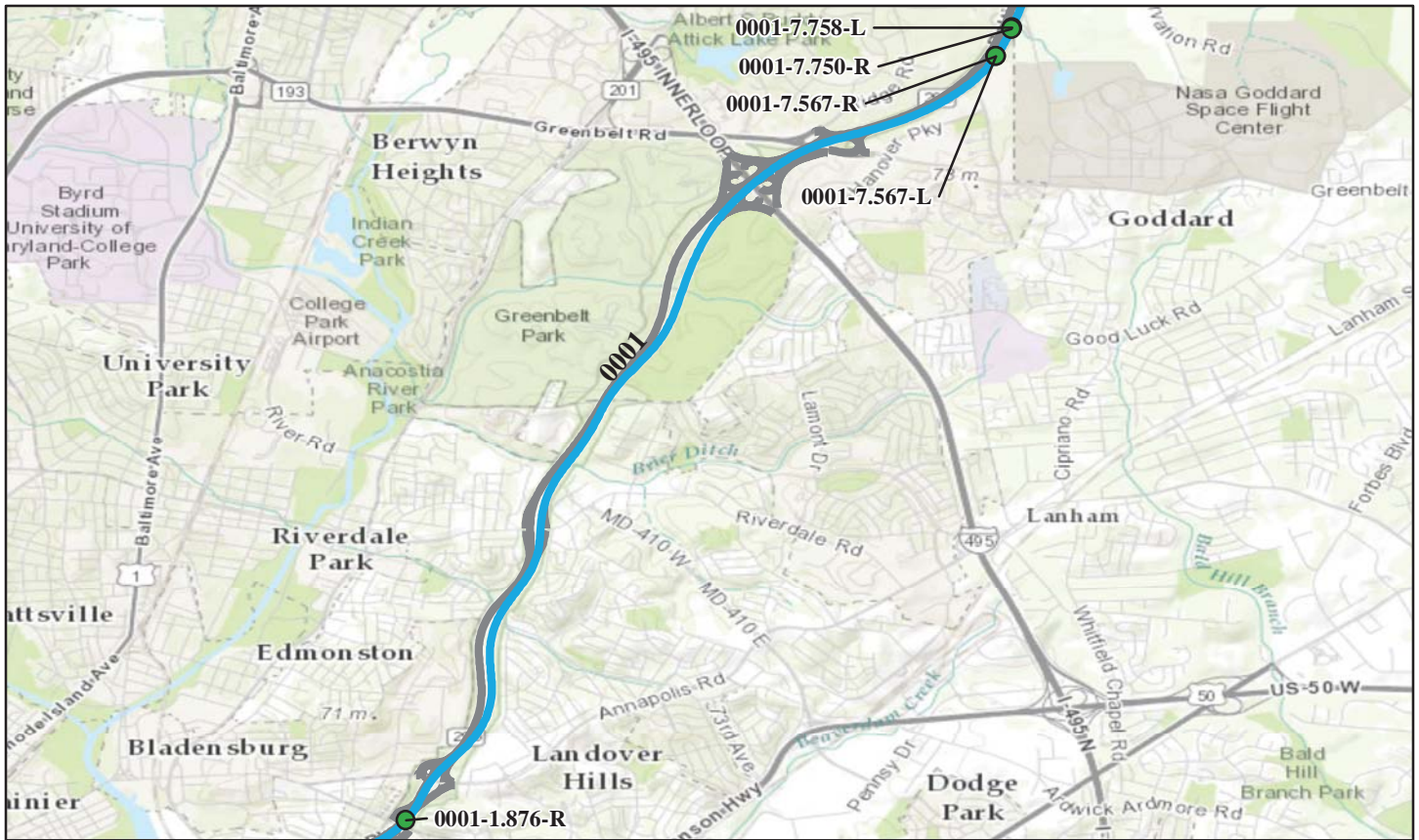
Baltimore - Washington Parkway National Capital Parks - East



**Federal Lands Highway
Road Inventory Program**

Baltimore - Washington Parkway National Capital Parks - East

ROUTE 0001: BALTIMORE-WASHINGTON PARKWAY (NB)



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
BAWA-0001-1.876-R 8/14/2007	769	90	Gravity - Mass Concrete	Head Wall	86	\$220.00
BAWA-0001-7.567-L 8/15/2007	254	46	Gravity - Mortared Stone	Head Wall	81	\$2,510.00
BAWA-0001-7.567-R 8/15/2007	348	60	Gravity - Mortared Stone	Head Wall	83	\$880.00
BAWA-0001-7.750-R 8/14/2007	374	60	Gravity - Mortared Stone	Head Wall	76	\$5,519.00
BAWA-0001-7.758-L 8/15/2007	356	58	Gravity - Mortared Stone	Head Wall	74	\$44,133.00

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

Baltimore - Washington Parkway National Capital Parks - East

ROUTE 0001: BALTIMORE-WASHINGTON PARKWAY (NB)



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

Retaining Wall Condition Legend – Wall Condition Rating

Critical / Poor (0 - 49)

Fair (50 - 69)

Good to Excellent (70 - 100)

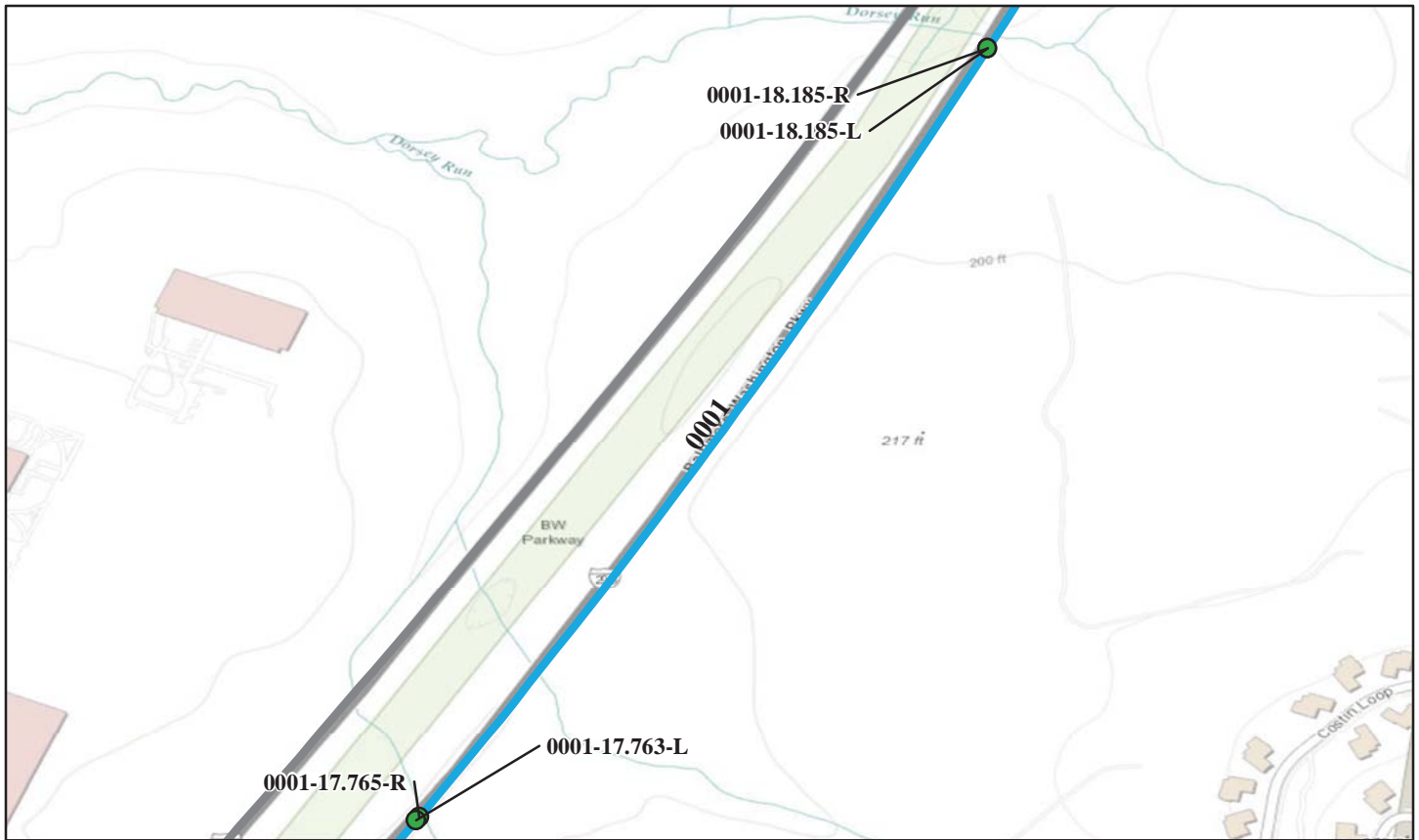
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Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
BAWA-0001-8.891-R 8/14/2007	773	85	Gravity - Mass Concrete	Head Wall	85	\$1,320.00
BAWA-0001-10.000-R 8/14/2007	376	60	Gravity - Mortared Stone	Head Wall	71	\$16,875.00
BAWA-0001-10.265-R 8/14/2007	204	40	Gravity - Mortared Stone	Head Wall	81	\$550.00
BAWA-0001-12.185-R 8/11/2007	161	30	Gravity - Mass Concrete	Head Wall	87	\$2,520.00
BAWA-0001-14.489-R 8/15/2007	850	100	Gravity - Mortared Stone	Head Wall	74	\$6,076.00

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

Baltimore - Washington Parkway National Capital Parks - East

ROUTE 0001: BALTIMORE-WASHINGTON PARKWAY (NB)



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

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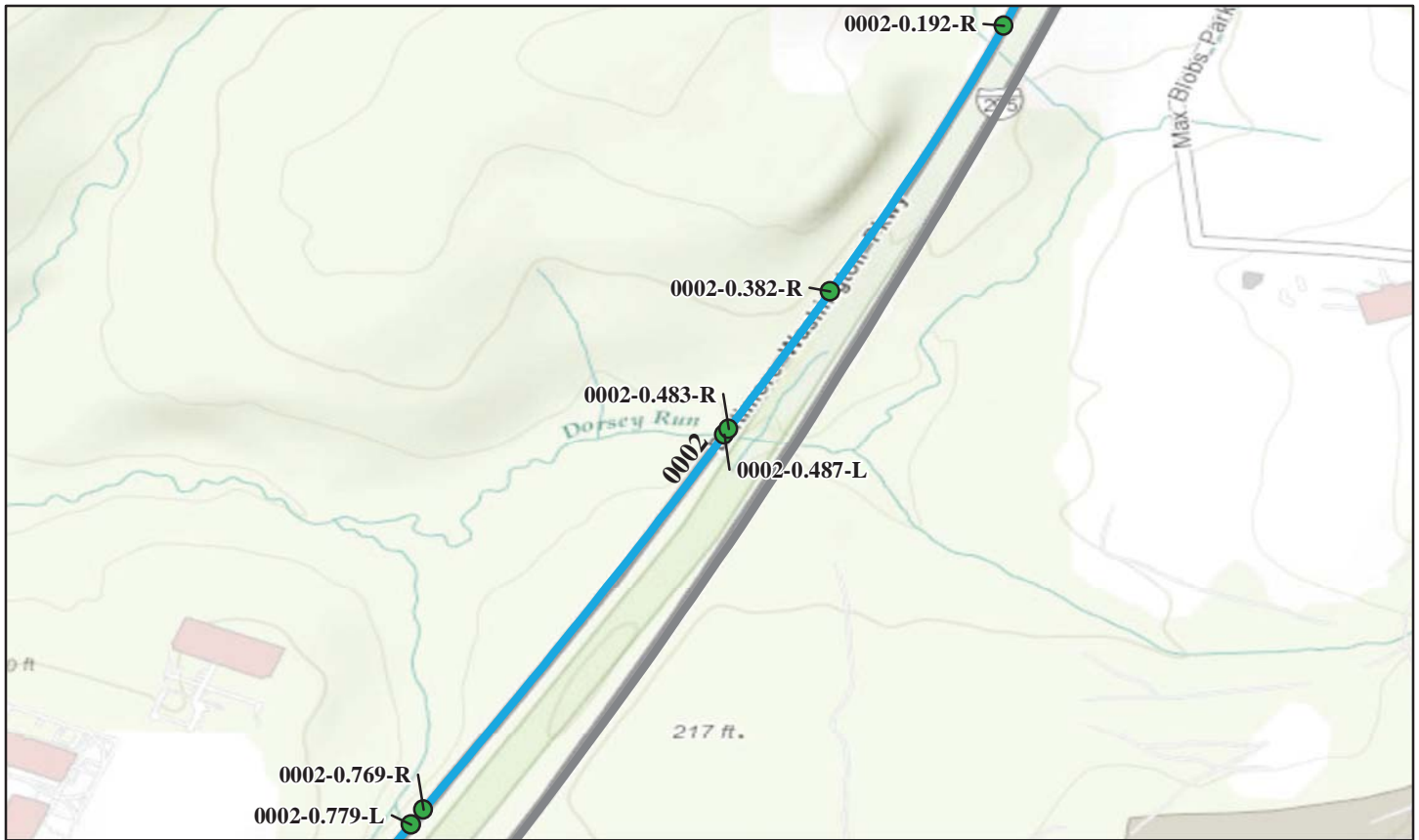
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Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
BAWA-0001-17.763-L 8/15/2007	87	25	Gravity - Mortared Stone	Head Wall	85	\$1,491.00
BAWA-0001-17.765-R 8/15/2007	133	33	Gravity - Mortared Stone	Head Wall	83	\$1,320.00
BAWA-0001-18.185-L 8/15/2007	531	75	Gravity - Mortared Stone	Head Wall	86	\$0.00
BAWA-0001-18.185-R 8/15/2007	456	65	Gravity - Mortared Stone	Head Wall	88	\$0.00

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

Baltimore - Washington Parkway National Capital Parks - East

ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)



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

Retaining Wall Condition Legend – Wall Condition Rating

Critical / Poor (0 - 49)

Fair (50 - 69)

Good to Excellent (70 - 100)

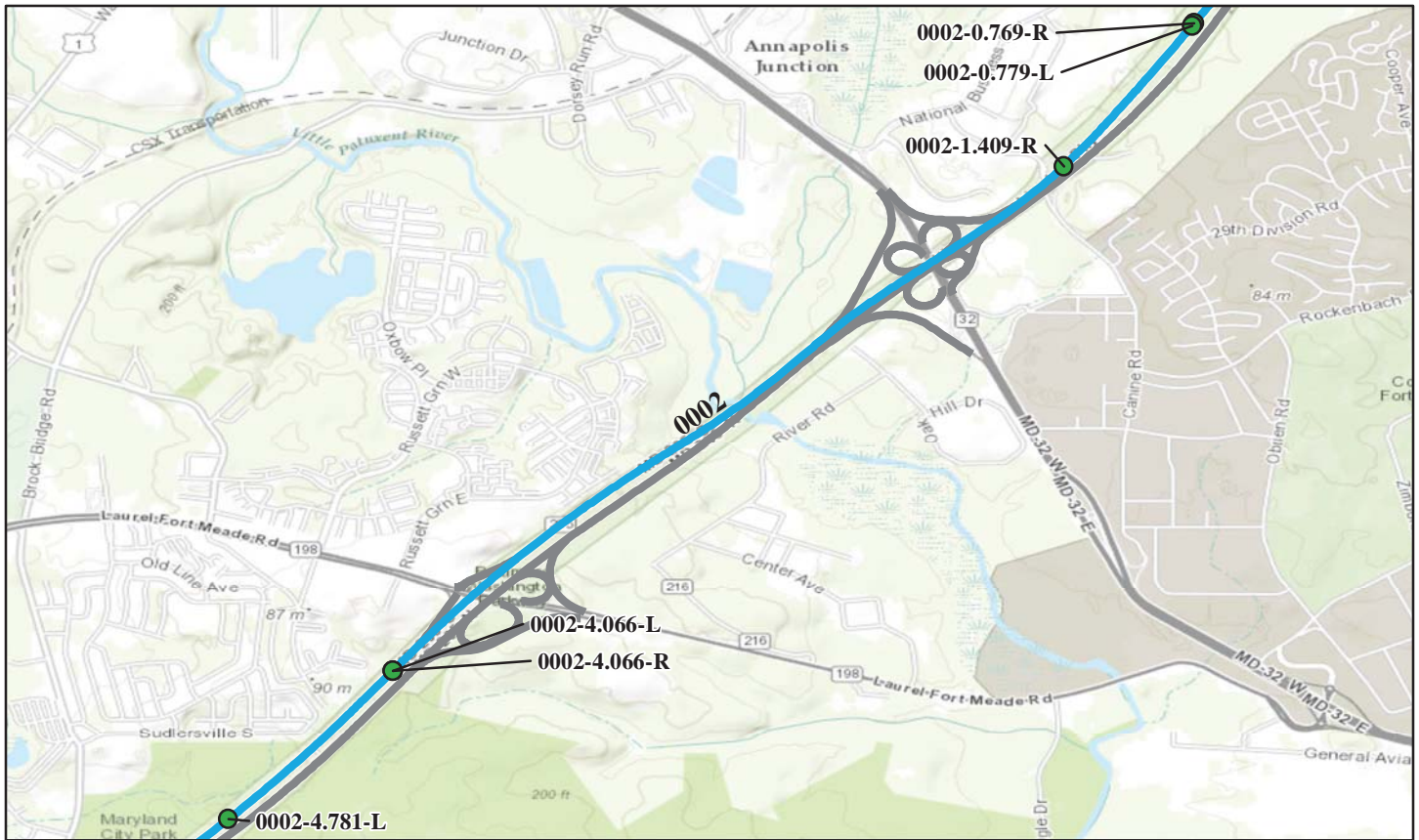
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Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
BAWA-0002-0.192-R 8/14/2007	165	38	Gravity - Mortared Stone	Head Wall	85	\$2,684.00
BAWA-0002-0.382-R 8/15/2007	86	38	Gravity - Mortared Stone	Head Wall	88	\$1,628.00
BAWA-0002-0.483-R 8/14/2007	396	81	Gravity - Mortared Stone	Head Wall	90	\$880.00
BAWA-0002-0.487-L 8/14/2007	422	74	Gravity - Mortared Stone	Head Wall	88	\$400.00
BAWA-0002-0.769-R 8/14/2007	259	45	Gravity - Mortared Stone	Head Wall	83	\$4,521.00

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

Baltimore - Washington Parkway National Capital Parks - East

ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)



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
BAWA-0002-0.779-L 8/14/2007	159	26	Gravity - Mortared Stone	Head Wall	84	\$626.00
BAWA-0002-1.409-R 8/14/2007	95	32	Gravity - Mortared Stone	Head Wall	79	\$1,300.00
BAWA-0002-4.066-L 8/14/2007	90	26	Gravity - Mortared Stone	Head Wall	81	\$1,422.00
BAWA-0002-4.066-R 8/14/2007	106	32	Gravity - Mass Concrete	Head Wall	76	\$15,022.00
BAWA-0002-4.781-L 8/14/2007	108	30	Gravity - Mortared Stone	Head Wall	86	\$220.00

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

Baltimore - Washington Parkway National Capital Parks - East

ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)



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

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Good to Excellent (70 - 100)

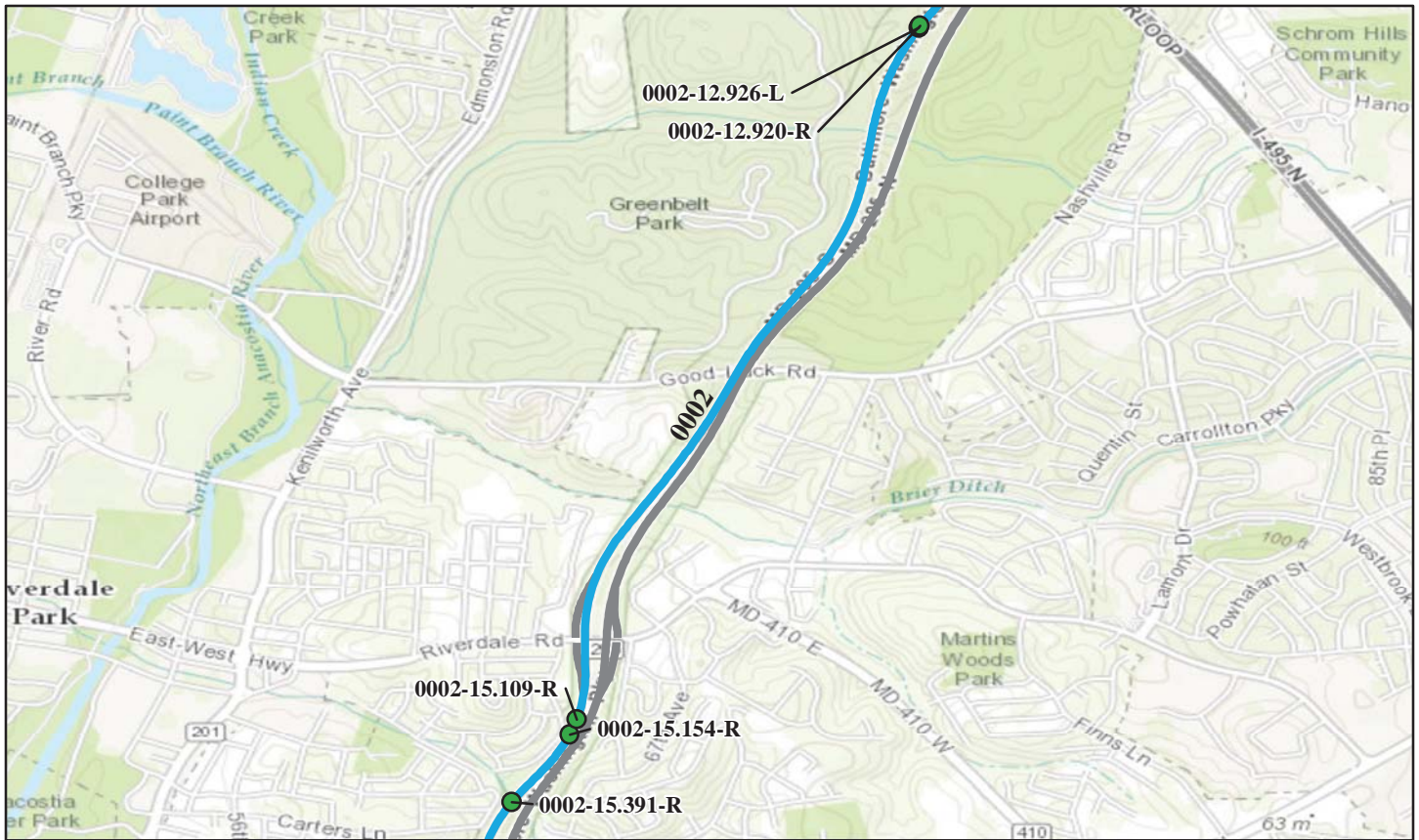
No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
BAWA-0002-6.441-R 8/14/2007	112	28	Gravity - Mass Concrete	Head Wall	60	\$23,329.00
BAWA-0002-9.761-R 8/15/2007	248	68	Gravity - Mass Concrete	Head Wall	79	\$1,750.00
BAWA-0002-9.902-R 8/15/2007	407	75	Gravity - Mass Concrete	Head Wall	97	\$440.00
BAWA-0002-11.015-L 8/15/2007	190	45	Gravity - Mortared Stone	Head Wall	87	\$3,077.00
BAWA-0002-11.033-R 8/15/2007	453	56	Gravity - Mortared Stone	Head Wall	90	\$1,910.00

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

Baltimore - Washington Parkway National Capital Parks - East

ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)



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)

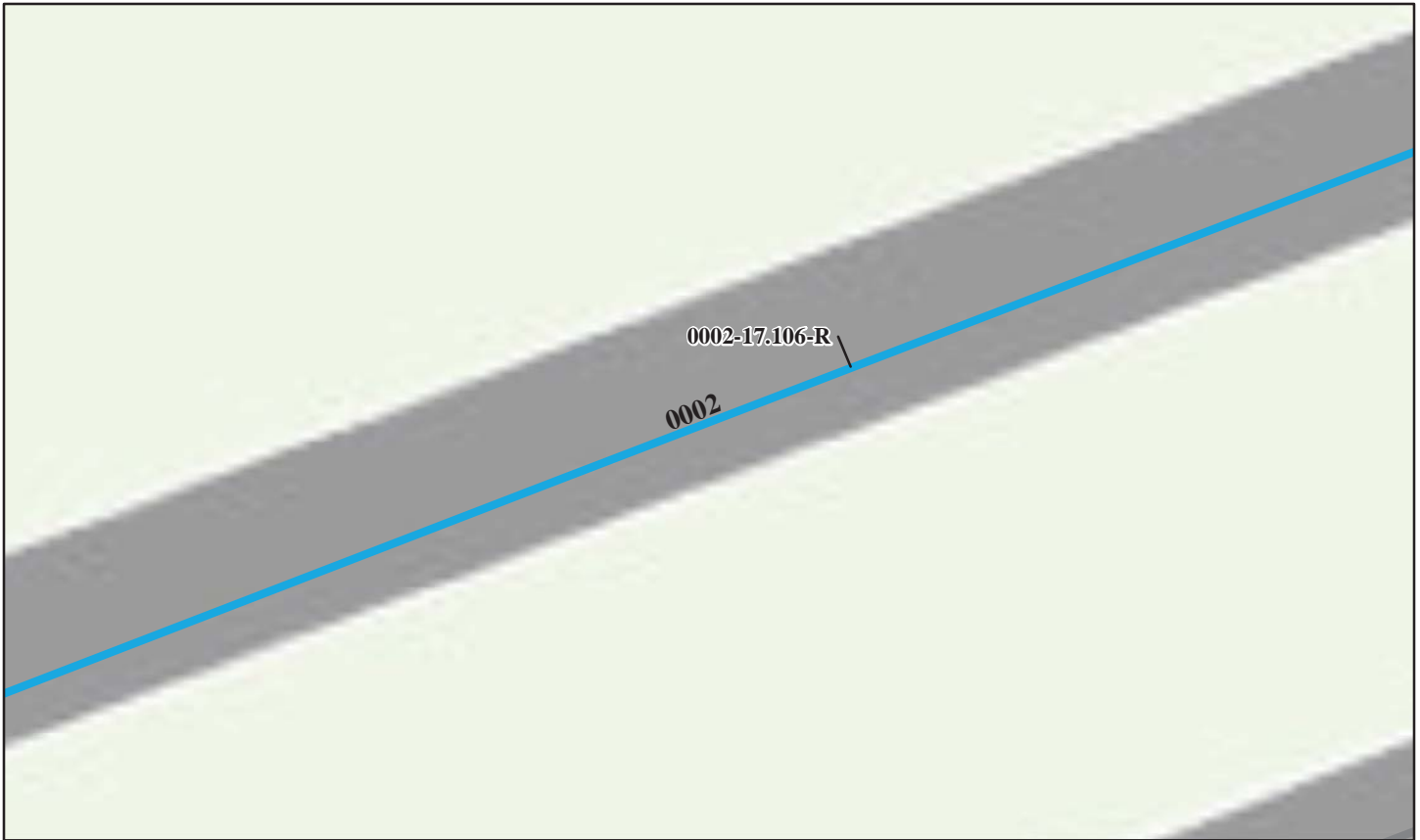
No Data

Wall ID Inspection Date:	Wall Area (Sq. Ft.)	Wall Length (Ft.)	Wall Type	Wall Function	Overall Rating	Repair Cost
BAWA-0002-12.920-R 8/15/2007	521	70	Gravity - Mortared Stone	Head Wall	74	\$18,545.00
BAWA-0002-12.926-L 8/15/2007	590	70	Gravity - Mass Concrete	Head Wall	80	\$3,150.00
BAWA-0002-15.109-R 8/16/2007	2,312	578	Gravity - Mass Concrete	Fill Wall	95	\$0.00
BAWA-0002-15.154-R 8/15/2007	91	30	Gravity - Mortared Stone	Head Wall	88	\$330.00
BAWA-0002-15.391-R 8/16/2007	329	60	Gravity - Mortared Stone	Head Wall	88	\$500.00

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

Baltimore - Washington Parkway National Capital Parks - East

ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)



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
BAWA-0002-17.106-R 8/16/2007	103	20	Gravity - Mortared Stone	Head Wall	43	\$125,585.00

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

Baltimore - Washington Parkway National Capital Parks - East

ROUTE 0506ZZ: POWDER MILL ROAD RAMPS (MD ROUTE 212 INTERCHANGE)



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
BAWA-0506ZZ-0.010-R 8/15/2007	368	60	Gravity - Mortared Stone	Head Wall	87	\$0.00

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

Baltimore - Washington Parkway National Capital Parks - East

ROUTE 0507ZZ: LAUREL-BOWIE ROAD RAMPS (MD ROUTE 197 INTERCHANGE)



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
BAWA-0507ZZ-0.075-R 8/15/2007	8,760	690	MSE - Precast Panel	Fill Wall	87	\$7,755.00

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

Tier 3 Retaining Wall Details



Baltimore - Washington Parkway National Capital Parks - East



Federal Lands Highway
Road Inventory Program

Wall ID:	BAWA-0001-1.876-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (NB)		
Inspection Date:	August 14, 2007	Approximate Year Built:	1965
*Wall Rating:	86	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mass Concrete
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Concrete headwall underneath a guard wall constructed along right shoulder and directly supports a high ADT roadway high consequence of failure due to size and proximity to roadway		
Wall Measurements			
Wall Length (ft.):	90	Face Area (sq.):	769
Average Wall Height (ft.):	8	Face Angle (deg.):	90
Maximum Wall Height (ft.):	14	Vertical Offset (ft.):	-3
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition; relatively new construction with no observed distress; vegetation growing in channel may promote water accumulation along base of wall		8
WALL FOUNDATION MATERIAL 8.00	Appears to be founded on a soil subgrade; no evidence of wall movement		9
CONCRETE 8.00	Good condition; relatively new construction with no evidence of distress		9
CULVERT 0.50	No observed distress to 5 ft x 3 ft concrete box culvert		8
DOWNSLOPE 0.50	No observed distress to well-forested slope; vegetation growing in channel may impede the flow of water		8
LATERAL SLOPE 0.50	No observed distress		8
VEGETATION 0.50	Area adjacent to wall is well-forested; no observed distress from vegetation growing near wall		8
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter		9
ROAD/SIDEWALK/SHOULDER 0.50	No distress to pavement or paved shoulder		9
Repair Recommendations			
Failure Consequence:	HIGH		
Recommendation Narrative:	Clear vegetation - 4 labor hrs (\$55/hr) = \$220		
Repair Cost:	\$220		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0001: BALTIMORE-WASHINGTON PARKWAY (NB)

Retaining Wall Condition Photos



BAWA_0001_1.876_R_1.jpg



BAWA_0001_1.876_R_2.jpg

Wall ID:	BAWA-0001-7.567-L		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (NB)		
Inspection Date:	August 15, 2007	Approximate Year Built:	1965
*Wall Rating:	81	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone masonry outlet headwall for a 6.5 ft x 12 ft concrete box culvert constructed along the left shoulder and partially supports a high ADT roadway high consequence of failure		
Wall Measurements			
Wall Length (ft.):	46	Face Area (sq.):	254
Average Wall Height (ft.):	5	Face Angle (deg.):	90
Maximum Wall Height (ft.):	10	Vertical Offset (ft.):	-2
Assessed Elements			
Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)	
PERFORMANCE 8.00	Good condition of wall; several trees growing adjacent to wall threaten it's long-term stability	8	
WALL FOUNDATION MATERIAL 8.00	Appears to be founded on a soil subgrade; no evidence of wall movement	9	
MORTAR 8.00	Good condition; general age-related weathering; minor efflorescence across wall	8	
STONE MASONRY 8.00	Good condition; no observed distress to blocks	9	
CULVERT 0.50	No distress to 6.5 ft x 12 ft concrete box culvert	8	
DOWNSLOPE 0.50	Good drainage away from wall; no observed distress to relatively-flat, forested slope	8	
LATERAL SLOPE 0.50	Good condition; no observed distress to well-vegetated slope	8	
UPSLOPE 0.50	No observed distress to gently-sloping, well-vegetated slope	8	
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter	10	
Repair Recommendations			
Failure Consequence:	HIGH		
Recommendation Narrative:	Cut trees - 2 large diameter trees (\$955/tree) = \$1,910, 3 medium diameter trees (\$200/tree) = \$600		
Repair Cost:	\$2,510		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0001: BALTIMORE-WASHINGTON PARKWAY (NB)

Retaining Wall Condition Photos



BAWA_0001_7.567_L_1.jpg



BAWA_0001_7.567_L_2.jpg

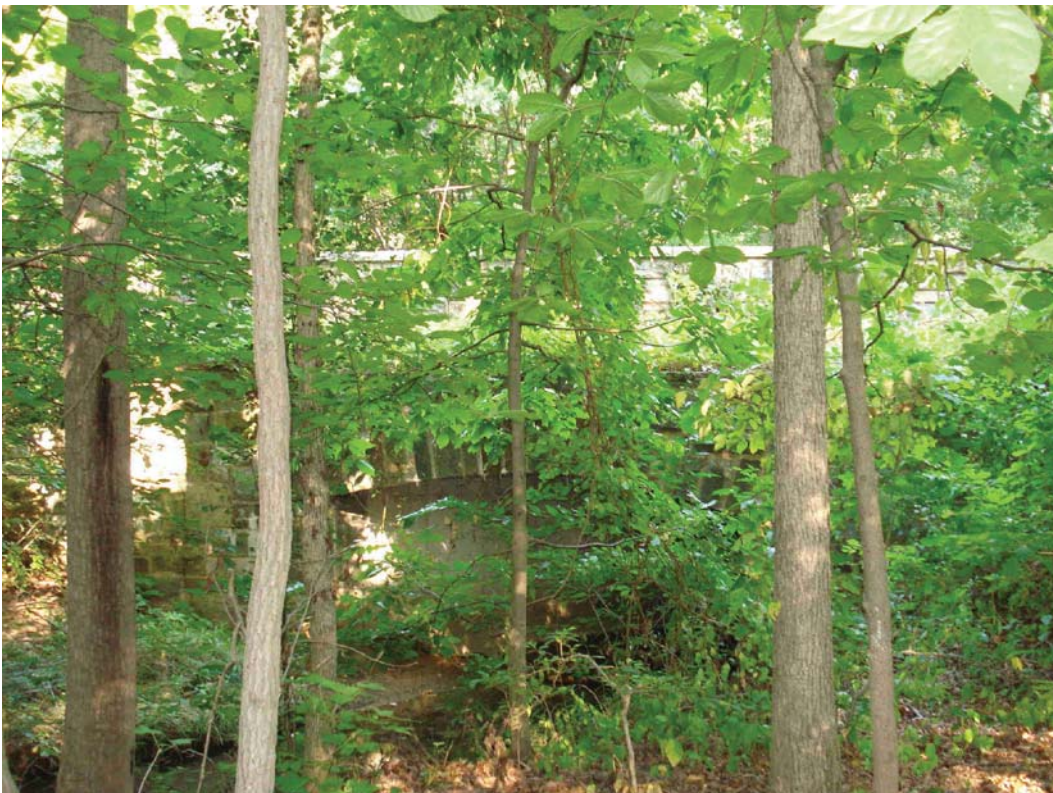
Wall ID:	BAWA-0001-7.567-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (NB)		
Inspection Date:	August 15, 2007	Approximate Year Built:	1965
*Wall Rating:	83	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone masonry headwall for a 6 ft x 12 ft concrete arch culvert constructed along right shoulder and partially supports a high ADT roadway high consequence of failure		
Wall Measurements			
Wall Length (ft.):	60	Face Area (sq.):	348
Average Wall Height (ft.):	5	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; no distress to wall; ongoing minor erosion of south bank due migration of the channel resulting from the accumulation of gravel along the north bank.		8
WALL FOUNDATION MATERIAL 8.00	Appears to be founded on a soil subgrade; no observed distress		8
MORTAR 8.00	Good condition; general age-related weathering		8
STONE MASONRY 8.00	Good condition; no distress to blocks		9
CULVERT 0.50	No observed distress to 6 ft x 12 ft concrete box culvert		8
LATERAL SLOPE 0.50	Good condition; no observed distress to well-vegetated slope		8
ROAD/SIDEWALK/SHOULDER 0.50	Good condition; minor fatigue cracking of pavement and paved shoulder		8
VEGETATION 0.50	Good condition; no impact from vegetation growing near wall		9
WALL DRAINS 0.50	No observed drainage-related distress		9
Repair Recommendations			
Failure Consequence:	HIGH		
Recommendation Narrative:	Clear debris from channel - 16 labor hrs (\$55/hr) = \$880		
Repair Cost:	\$880		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0001: BALTIMORE-WASHINGTON PARKWAY (NB)

Retaining Wall Condition Photos



BAWA_0001_7.567_R_1.jpg



BAWA_0001_7.567_R_2.jpg

Wall ID:	BAWA-0001-7.750-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (NB)		
Inspection Date:	August 14, 2007	Approximate Year Built:	1965
*Wall Rating:	76	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone masonry inlet headwall for twin 5.52 ft x 6 ft concrete box culverts constructed along right shoulder and partially supports a high ADT roadway high consequence of failure due to size and proximity to roadway		
Wall Measurements			
Wall Length (ft.):	60	Face Area (sq.):	374
Average Wall Height (ft.):	6	Face Angle (deg.):	90
Maximum Wall Height (ft.):	10	Vertical Offset (ft.):	-3
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition; scour hole is undermining the foundation and threatens the wall's stability; several small diameter trees growing adjacent to wall threatens its long-term stability		7
WALL FOUNDATION MATERIAL 8.00	Fair to good; ongoing minor scour of foundation soils due to forming scour hole; scour hole threatens to undermine the foundation; no evidence of settlement or rotation		7
MORTAR 8.00	Good condition; general age-related weathering		8
STONE MASONRY 8.00	Good condition; no distress to cut blocks		8
CULVERT 0.50	No observed distress to twin 5.5 ft x 6 ft concrete box culverts		8
LATERAL SLOPE 0.50	No distress to lightly-vegetated slope		8
UPSLOPE 0.50	No distress to relatively-flat, narrow and lightly-vegetated slope		8
VEGETATION 0.50	Several small diameter trees are adjacent to wall; trees threaten the wall's long-term stability		8
TRAFFIC BARRIER/FENCE 0.50	No observe distress to concrete guard wall with mortared stone veneer		9
Repair Recommendations			
Failure Consequence:	HIGH		
Recommendation Narrative:	Backfill scour hole - earthwork geotextile, 69.4 sqft (\$5/sqft) = \$388.89. Place riprap, Class 3 - 23.15 cuyd (\$200/cuyd) = \$4,629.63. Cut trees - 1 medium diameter tree (\$200/tree) = \$200, 3 small diameter trees (\$100/tree) = \$300		
Repair Cost:	\$5,519		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0001: BALTIMORE-WASHINGTON PARKWAY (NB)

Retaining Wall Condition Photos



BAWA_0001_7.750_R_1.jpg



BAWA_0001_7.750_R_2.jpg

Wall ID:	BAWA-0001-7.758-L		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (NB)		
Inspection Date:	August 15, 2007	Approximate Year Built:	1965
*Wall Rating:	74	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone masonry outlet headwall for twin 9 ft x 9 ft concrete box culverts constructed along right shoulder and along base of relatively flat slope low consequence of failure		
Wall Measurements			
Wall Length (ft.):	58	Face Area (sq.):	356
Average Wall Height (ft.):	6	Face Angle (deg.):	90
Maximum Wall Height (ft.):	11	Vertical Offset (ft.):	-5
Assessed Elements			
Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)	
PERFORMANCE 8.00	Good condition; large scour hole is undermining the foundation and eroding banks; several medium diameter trees are growing atop and adjacent to wall; trees threaten the walls long-term stability	7	
WALL FOUNDATION MATERIAL 8.00	Appears to be founded on a soil subgrade; minor erosion of foundation soil due to scour hole	7	
MORTAR 8.00	Good condition; minor debonding along top of wall; minor efflorescence	8	
STONE MASONRY 8.00	Good condition; no observed distress to cut blocks	8	
CULVERT 0.50	No observed distress to twin 8.5 ft x 9 ft concrete box culverts	8	
LATERAL SLOPE 0.50	No observed distress	8	
UPSLOPE 0.50	No observed distress to relatively flat, moderately-forested slope	8	
WALL DRAINS 0.50	No evidence of drainage-related distress	9	
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter	10	
Repair Recommendations			
Failure Consequence:	LOW		
Recommendation Narrative:	Backfill scour hole - earthwork geotextile = 400 sqyd (\$5/sqyd) = 2,000, placed riprap, Class 3 = 133.33 cuyd (\$200/cuyd) = \$26,666.70, select borrow backfill = 133.33 cuyd (\$60/cuyd) = \$13,466.70. Cut trees - 10 medium diameter trees (\$200/		
Repair Cost:	\$44,133		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0001: BALTIMORE-WASHINGTON PARKWAY (NB)

Retaining Wall Condition Photos



BAWA_0001_7.758_L_1.jpg



BAWA_0001_7.758_L_2.jpg

Wall ID:	BAWA-0001-8.891-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (NB)		
Inspection Date:	August 14, 2007	Approximate Year Built:	1965
*Wall Rating:	85	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mass Concrete
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Concrete outlet headwall for two 9 ft x 9 ft concrete box culverts constructed along right shoulder and along base of moderate slope supporting a high ADT roadway moderate consequence of failure		
Wall Measurements			
Wall Length (ft.):	85	Face Area (sq.):	773
Average Wall Height (ft.):	9	Face Angle (deg.):	90
Maximum Wall Height (ft.):	11	Vertical Offset (ft.):	-8
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition; poor drainage away from wall promotes the accumulation of water at outlet		8
WALL FOUNDATION MATERIAL 8.00	Appears to be founded on a soil subgrade; no observed distress		8
CONCRETE 8.00	Good condition; relatively new construction with no observed distress		9
DOWNSLOPE 0.50	Poor drainage away from wall has resulted in approximately 12-in. of water at outlet		8
CULVERT 0.50	No observed distress to 9 ft x 9 ft concrete box culverts		9
LATERAL SLOPE 0.50	No observed distress		9
UPSLOPE 0.50	No observed distress to moderately-sloping, well-vegetated slope		9
WALL DRAINS 0.50	No evidence of drainage-related distress		9
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter		10
Repair Recommendations			
Failure Consequence:	MODERATE		
Recommendation Narrative:	Clear channel - 24 labor hrs (\$55/hr) = \$1,320.		
Repair Cost:	\$1,320		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0001: BALTIMORE-WASHINGTON PARKWAY (NB)

Retaining Wall Condition Photos



BAWA_0001_8.891_R_1.jpg



BAWA_0001_8.891_R_2.jpg

Wall ID:	BAWA-0001-10.000-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (NB)		
Inspection Date:	August 14, 2007	Approximate Year Built:	1965
*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:	Stone masonry headwall for 7.5 ft x 15 ft concrete box culvert constructed along right shoulder and along base of embankment supporting a high ADT roadway moderate consequence of failure		
Wall Measurements			
Wall Length (ft.):	60	Face Area (sq.):	376
Average Wall Height (ft.):	6	Face Angle (deg.):	90
Maximum Wall Height (ft.):	10	Vertical Offset (ft.):	-10
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Fair condition; wall has rotated forward about its base; moderate cracking and debonding of mortar at wall/culvert interface		6
WALL FOUNDATION MATERIAL 8.00	Evidence that wall has rotated forward about its base; possible seepage under the wall		6
MORTAR 8.00	Minor to moderate cracking and debonding; moderate efflorescence across face		7
STONE MASONRY 8.00	Good condition; no observed distress to cut blocks		9
DOWNSLOPE 0.50	No distress to riprap-lined channel; good drainage towards wall		8
LATERAL SLOPE 0.50	No observe distress		8
ROAD/SIDEWALK/SHOULDER 0.50	No distress to roadway; no shoulder		9
TRAFFIC BARRIER/FENCE 0.50	Good condition; no observed distress to concrete guard wall with mortared stone veneer		9
UPSLOPE 0.50	No observed distress to steep moderately-forested slope		9
Repair Recommendations			
Failure Consequence:	MODERATE		
Recommendation Narrative:	Cut trees - 10 medium diameter trees (\$200/tree) = \$2,000. Repair wall - Injection grouting, 75 sqft (\$105/sqft) = \$7,875. Shoring and bracing 200 sqft (\$35/sqft) = \$7,000.		
Repair Cost:	\$16,875		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0001: BALTIMORE-WASHINGTON PARKWAY (NB)

Retaining Wall Condition Photos



BAWA_0001_10.000_R_1.jpg



BAWA_0001_10.000_R_2.jpg

Wall ID:	BAWA-0001-10.265-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (NB)		
Inspection Date:	August 14, 2007	Approximate Year Built:	1965
*Wall Rating:	81	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone masonry inlet headwall for a 4 ft x 9 ft concrete box culvert constructed along right shoulder and along base of a relatively flat embankment supporting a high ADT roadway moderate consequence of failure		
Wall Measurements			
Wall Length (ft.):	40	Face Area (sq.):	204
Average Wall Height (ft.):	5	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 condition; approximately 6-in. of gravel along invert of culvert and in channel		8
WALL FOUNDATION MATERIAL 8.00	No distress; no evidence of movement		8
MORTAR 8.00	General age-related weathering; minor efflorescence along wall		8
STONE MASONRY 8.00	No observed distress to cut blocks		8
CULVERT 0.50	4 ft x 9 ft concrete box culvert; approximately 6-in of deposited gravel along invert		8
DOWNSLOPE 0.50	Approximately 6-in. of gravel deposit within the channel; gravel deposit constricts flow		8
TRAFFIC BARRIER/FENCE 0.50	Good condition overall; minor impact damage to concrete guard wall with a mortared stone veneer facing		8
LATERAL SLOPE 0.50	No observed distress		9
ROAD/SIDEWALK/SHOULDER 0.50	No distress to roadway or paved shoulder		9
Repair Recommendations			
Failure Consequence:	MODERATE		
Recommendation Narrative:	Clean culvert in-place - 10 labor hrs (\$55/hr) = \$550.		
Repair Cost:	\$550		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0001: BALTIMORE-WASHINGTON PARKWAY (NB)

Retaining Wall Condition Photos



BAWA_0001_10.265_R_1.jpg



BAWA_0001_10.265_R_2.jpg

Wall ID:	BAWA-0001-12.185-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (NB)		
Inspection Date:	August 11, 2007	Approximate Year Built:	2006
*Wall Rating:	87	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mass Concrete
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Relatively new concrete headwall for two 42 in diameter concrete pipe culverts constructed along right shoulder and along base of steep embankment supporting a high ADT roadway low consequence of failure		
Wall Measurements			
Wall Length (ft.):	30	Face Area (sq.):	161
Average Wall Height (ft.):	5	Face Angle (deg.):	90
Maximum Wall Height (ft.):	6	Vertical Offset (ft.):	15
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition; poor drainage away from wall promotes the accumulation of water along the face of wall; standing water at outlet threatens the long term stability of the wall		8
WALL FOUNDATION MATERIAL 8.00	Founded on a soil foundation with no evidence of movement		9
CONCRETE 8.00	Excellent condition; relatively new construction with no observed distress		9
CULVERT 0.50	No distress to two 42-in. diameter concrete pipes		8
LATERAL SLOPE 0.50	Minor erosion along both ends of wall; some riprap erosion protection along the lateral slope		8
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter		10
ROAD/SIDEWALK/SHOULDER 0.50	Good condition; no distress to roadway or paved shoulder		10
UPSLOPE 0.50	No distress to steep grassy slope		10
VEGETATION 0.50	No vegetation growing close to wall		10
Repair Recommendations			
Failure Consequence:	LOW		
Recommendation Narrative:	Regrade downslope - 24 labor hrs (\$55/hr) = \$1,320, Backhoe for 8 hrs (\$150/hr) = \$1,200.		
Repair Cost:	\$2,520		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0001: BALTIMORE-WASHINGTON PARKWAY (NB)

Retaining Wall Condition Photos



BAWA_0001_12.185_R_1.jpg



BAWA_0001_12.185_R_2.jpg

Wall ID:	BAWA-0001-14.489-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (NB)		
Inspection Date:	August 15, 2007	Approximate Year Built:	1965
*Wall Rating:	74	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone masonry outlet headwall for two 11 ft x 12.5 ft concrete box culverts constructed along right shoulder and along base of steep embankment supporting a high ADT roadway moderate consequence of failure		
Wall Measurements			
Wall Length (ft.):	100	Face Area (sq.):	850
Average Wall Height (ft.):	8	Face Angle (deg.):	90
Maximum Wall Height (ft.):	15	Vertical Offset (ft.):	-10
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good conditions; poor drainage away from wall promotes the accumulation of water along face of wall and threatens to undermine the foundation and erode the lateral slope		7
WALL FOUNDATION MATERIAL 8.00	Appears to be founded on a soil subgrade; ongoing erosion of foundation soil resulting from scour hole at outlet		7
STONE MASONRY 8.00	No distress to cut blocks		8
CULVERT 0.50	No observed distress to two 11 ft x 12.5 ft concrete box culverts		8
LATERAL SLOPE 0.50	No distress		8
VEGETATION 0.50	Area around wall is heavily vegetated; wall is being overgrown with brush and creeping vines; vegetation is not impairing the function of the wall, but should be curt back		8
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter		10
ROAD/SIDEWALK/SHOULDER 0.50	Good condition; no distress to roadway or paved and grassy shoulder		10
TRAFFIC BARRIER/FENCE 0.50	No observed distress to concrete guard wall with mortared stone veneer facing		10
Repair Recommendations			
Failure Consequence:	MODERATE		
Recommendation Narrative:	Clear vegetation/trees - 4 small trees (\$100/tree) = \$400, clear vegetation = 16 labor hrs (\$55/hr) = \$880. Backfill Scour Hole - Structure Excavation = 33.33 cuyd (\$40/cuyd) = \$1,333.33, Earthwork geotextile = 100 sqyd (\$5/sqyd) = \$500.		
Repair Cost:	\$6,076		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0001: BALTIMORE-WASHINGTON PARKWAY (NB)

Retaining Wall Condition Photos



BAWA_0001_14.489_R_1.jpg



BAWA_0001_14.489_R_2.jpg

Wall ID:	BAWA-0001-17.763-L		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (NB)		
Inspection Date:	August 15, 2007	Approximate Year Built:	1965
*Wall Rating:	85	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:	Stone masonry outlet headwall for a 6 ft diameter concrete arch culvert constructed along left shoulder and along base of a gently sloping embankment supporting a high ADT roadway low consequence of failure		
Wall Measurements			
Wall Length (ft.):	25	Face Area (sq.):	87
Average Wall Height (ft.):	3	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	Good condition; minor localized spalling of mortar; small trees growing adjacent to wall	8	
WALL FOUNDATION MATERIAL 8.00	Appears to be founded on a soil subgrade; no evidence of movement	9	
MORTAR 8.00	Good condition; localized spalling of mortar at outlet	8	
STONE MASONRY 8.00	No distress to cur blocks	9	
CULVERT 0.50	No distress to 3 ft x 9 ft concrete arch culvert; approximately 12-in. of sedimentation along invert of pipe	8	
DOWNSLOPE 0.50	Good drainage away from wall; some debris in channel	8	
LATERAL SLOPE 0.50	No observed distress	8	
UPSLOPE 0.50	No distress to gentle, well-vegetated slope	8	
VEGETATION 0.50	Several small diameter trees growing adjacent to wall	8	
Repair Recommendations			
Failure Consequence:	LOW		
Recommendation Narrative:	Stone Masonry Repointing - 0.10(86.86 sqft)(\$75/sqft) = \$651.45. Clear Channel - 8 labor hrs (\$55/hr) = \$440. Cut Trees - 4 small trees (\$100/hr) = \$400.		
Repair Cost:	\$1,491		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0001: BALTIMORE-WASHINGTON PARKWAY (NB)

Retaining Wall Condition Photos



BAWA_0001_17.763_L_1.jpg

Wall ID:	BAWA-0001-17.765-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (NB)		
Inspection Date:	August 15, 2007	Approximate Year Built:	1965
*Wall Rating:	83	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone masonry outlet headwall for a 4 ft x 9 ft diameter arch culvert constructed along right shoulder and along base of moderate slope supporting a high ADT roadway low consequence of failure		
Wall Measurements			
Wall Length (ft.):	33	Face Area (sq.):	133
Average Wall Height (ft.):	4	Face Angle (deg.):	90
Maximum Wall Height (ft.):	6	Vertical Offset (ft.):	-12
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition; accumulating debris at outlet has forced channel left where it is eroding the bank		8
WALL FOUNDATION MATERIAL 8.00	Appears to be founded on a soil subgrade; no evidence of movement		9
MORTAR 8.00	Minor cracking and debonding		8
STONE MASONRY 8.00	No distress to cut blocks		8
CULVERT 0.50	No distress to 4 ft x 9 ft concrete arch culvert		8
LATERAL SLOPE 0.50	No distress		8
UPSLOPE 0.50	No distress to moderately-sloping, lightly-forested slope		9
VEGETATION 0.50	No impact from vegetation from in the vicinity of the wall		9
WALL DRAINS 0.50	No evidence of drainage-related distress		9
Repair Recommendations			
Failure Consequence:	LOW		
Recommendation Narrative:	Clear debris from channel - 24 labor hrs (\$55/hr) = \$1,320.		
Repair Cost:	\$1,320		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0001: BALTIMORE-WASHINGTON PARKWAY (NB)

Retaining Wall Condition Photos



BAWA_0001_17.765_R_1.jpg



BAWA_0001_17.765_R_2.jpg

Wall ID:	BAWA-0001-18.185-L		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (NB)		
Inspection Date:	August 15, 2007	Approximate Year Built:	1965
*Wall Rating:	86	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:	Stone masonry outlet headwall for a 12 ft square concrete box culvert constructed along left shoulder and along base of moderately sloping embankment supporting a high ADT roadway moderate consequence of failure		
Wall Measurements			
Wall Length (ft.):	75	Face Area (sq.):	531
Average Wall Height (ft.):	7	Face Angle (deg.):	90
Maximum Wall Height (ft.):	15	Vertical Offset (ft.):	-4
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition; minor cracking inside of culvert; minor efflorescence along face of wall and inside culvert; minor cracking and debonding of mortar		8
WALL FOUNDATION MATERIAL 8.00	No observed distress; no evidence of movement		9
MORTAR 8.00	Good condition; minor cracking; minor debonding; moderate efflorescence across face		8
STONE MASONRY 8.00	No distress to cut blocks		9
CULVERT 0.50	12 ft square concrete box culvert; minor cracking; minor efflorescence		8
DOWNSLOPE 0.50	No observed distress; a concrete apron extends out from the face of wall		8
VEGETATION 0.50	The wall is overgrown with creeping vines; no impact from vegetation growing across face of wall		8
LATERAL SLOPE 0.50	No distress		9
UPSLOPE 0.50	No distress to moderately-sloping, well-vegetated slope		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.			

Baltimore - Washington Parkway
ROUTE 0001: BALTIMORE-WASHINGTON PARKWAY (NB)

Retaining Wall Condition Photos



BAWA_0001_18.185_L_1.jpg



BAWA_0001_18.185_L_2.jpg

Wall ID:	BAWA-0001-18.185-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (NB)		
Inspection Date:	August 15, 2007	Approximate Year Built:	1965
*Wall Rating:	88	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:	Stone masonry headwall for a 12 ft square concrete box culvert constructed along right shoulder and along base of relatively flat embankment supporting a high ADT roadway high consequence of failure		
Wall Measurements			
Wall Length (ft.):	65	Face Area (sq.):	456
Average Wall Height (ft.):	7	Face Angle (deg.):	90
Maximum Wall Height (ft.):	15	Vertical Offset (ft.):	-4
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent condition		9
WALL FOUNDATION MATERIAL 8.00	Appears to be founded on a soil subgrade; no evidence of wall movement		9
MORTAR 8.00	Good condition; general age-related weathering with moderate efflorescence across the face		8
STONE MASONRY 8.00	No distress to cut blocks		9
CULVERT 0.50	No observed distress to 12 ft square concrete box culvert		9
DOWNSLOPE 0.50	A concrete aprons extends out from the face of wall with no observed distress; no distress to channel		9
LATERAL SLOPE 0.50	No distress		9
ROAD/SIDEWALK/SHOULDER 0.50	No distress to roadway or to paved shoulder		9
UPSLOPE 0.50	No distress to relatively-flat, grassy slope		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.			

Baltimore - Washington Parkway
ROUTE 0001: BALTIMORE-WASHINGTON PARKWAY (NB)

Retaining Wall Condition Photos



BAWA_0001_18.185_R_1.jpg



BAWA_0001_18.185_R_2.jpg

Wall ID:	BAWA-0002-0.192-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 14, 2007	Approximate Year Built:	1954
*Wall Rating:	85	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone masonry inlet headwall for a 5 ft x 6.5 ft concrete arch culvert constructed along right shoulder and along base of embankment supporting a high ADT roadway moderate consequence of failure		
Wall Measurements			
Wall Length (ft.):	38	Face Area (sq.):	165
Average Wall Height (ft.):	4	Face Angle (deg.):	90
Maximum Wall Height (ft.):	8	Vertical Offset (ft.):	-12
Assessed Elements			
Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)	
PERFORMANCE 8.00	Good condition; minor cracking and debonding of mortar; small tree growing atop wall; debris at inlet	7	
WALL FOUNDATION MATERIAL 8.00	No distress; no evidence of settlement, rotation, undermining or seepage	9	
MORTAR 8.00	General age-related weathering; minor cracking through the joints; evidence of recent repointing	8	
STONE MASONRY 8.00	No distress to cur blocks	10	
DOWNSLOPE 0.50	Dry creek channel; small amounts of debris adjacent to wall face; good drainage towards the wall	8	
CULVERT 0.50	No observed distress to 5 ft x6.5 ft concrete arch culvert	10	
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter	10	
LATERAL SLOPE 0.50	No distress	10	
ROAD/SIDEWALK/SHOULDER 0.50	No distress to roadway	10	
Repair Recommendations			
Failure Consequence:	MODERATE		
Recommendation Narrative:	Stone masonry repointing - 0.20(164.92 sqft)(\$75/sqft) = \$2,474. Clear Debris - 2 labor (\$55/hr) = \$110. Cut trees - 1 tree (\$100) = \$100.		
Repair Cost:	\$2,684		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_0.192_R_1.jpg



BAWA_0002_0.192_R_2.jpg

Wall ID:	BAWA-0002-0.382-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 15, 2007	Approximate Year Built:	1965
*Wall Rating:	88	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone masonry outlet headwall for a 4.75 ft x 9.5 ft concrete box culvert constructed along right shoulder and directly supports a high ADT roadway high consequence of failure due to size and proximity to roadway		
Wall Measurements			
Wall Length (ft.):	38	Face Area (sq.):	86
Average Wall Height (ft.):	2	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; ongoing erosion of channel at threatens the long-term stability of the wall		8
WALL FOUNDATION MATERIAL 8.00	No distress; no evidence of settlement, rotation, undermining or seepage		10
MORTAR 8.00	General age-related weathering; minor efflorescence		8
STONE MASONRY 8.00	No distress to cut blocks		9
TRAFFIC BARRIER/FENCE 0.50	Concrete guard wall with a stone veneer facing; minor degradation of joint compound		9
CULVERT 0.50	No observed distress to 4,75 ft x 9.5 ft concrete box culvert		10
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter		10
LATERAL SLOPE 0.50	No distress		10
ROAD/SIDEWALK/SHOULDER 0.50	No distress to roadway or paved shoulder		10
Repair Recommendations			
Failure Consequence:	HIGH		
Recommendation Narrative:	Line outlet - Earthwork geotextile = 29.3 sqyd (\$5/sqyd) = \$147, Placed riprap, Class 3 = 7.41 cuyd (\$200/cuyd) = \$1,481		
Repair Cost:	\$1,628		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_0.382_R_1.jpg



BAWA_0002_0.382_R_2.jpg

Wall ID:	BAWA-0002-0.483-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 14, 2007	Approximate Year Built:	1965
*Wall Rating:	90	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone masonry inlet headwall for 10 ft x 12 ft concrete box culvert constructed along right shoulder and directly supports a high ADT roadway high consequence of failure due to size and proximity to roadway		
Wall Measurements			
Wall Length (ft.):	81	Face Area (sq.):	396
Average Wall Height (ft.):	4	Face Angle (deg.):	90
Maximum Wall Height (ft.):	14	Vertical Offset (ft.):	0
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition; evidence of possible leak from catch basin at along roadway; minor to moderate efflorescence inside culvert		8
WALL FOUNDATION MATERIAL 8.00	No distress; no evidence of settlement, rotation undermining or seepage		9
MORTAR 8.00	General age-related weathering; minor efflorescence across face		9
STONE MASONRY 8.00	No distress to cut blocks		10
DOWNSLOPE 0.50	Minor scour and some sedimentation at inlet		8
VEGETATION 0.50	No distress from small brush growing adjacent to wall		9
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter		10
LATERAL SLOPE 0.50	No distress; no evidence of movement; no erosion		10
ROAD/SIDEWALK/SHOULDER 0.50	No distress to roadway or paved shoulder		10
Repair Recommendations			
Failure Consequence:	HIGH		
Recommendation Narrative:	Cut Vegetation - 8 labor hrs (\$55/hr) = \$440. Investigate Leak - 8 labor hrs (\$55/hr) = \$440.		
Repair Cost:	\$880		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_0.483_R_1.jpg

Wall ID:	BAWA-0002-0.487-L		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 14, 2007	Approximate Year Built:	1965
*Wall Rating:	88	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone masonry outlet headwall for a 10 ft x 12 ft concrete box culvert constructed along left shoulder and partially supports a high ADT roadway high consequence of failure due to size and proximity to roadway		
Wall Measurements			
Wall Length (ft.):	74	Face Area (sq.):	422
Average Wall Height (ft.):	5	Face Angle (deg.):	90
Maximum Wall Height (ft.):	15	Vertical Offset (ft.):	-2
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition; efflorescence across face of wall; several small diameter trees growing within 3 ft of wall		8
WALL FOUNDATION MATERIAL 8.00	No distress; no evidence of settlement, rotation, undermining or seepage		9
MORTAR 8.00	General age-related weathering; minor efflorescence across 20% of wall		8
STONE MASONRY 8.00	No distress to cut blocks		10
CULVERT 0.50	10 ft x12 ft concrete box culvert; minor spalling inside culvert		8
VEGETATION 0.50	Small brush and several small diameter trees are growing within 3 ft of wall; vegetation is not currently causing distress but should be removed		8
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter		10
DOWNSLOPE 0.50	No distress; a concrete apron extends from the face of wall to a headwall on the northbound side of roadway		10
LATERAL SLOPE 0.50	No distress; no evidence of movement; no erosion		10
Repair Recommendations			
Failure Consequence:	HIGH		
Recommendation Narrative:	Cut trees and brush - 4 small diameter trees (\$100/tree) = \$400.		
Repair Cost:	\$400		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_0.487_L_1.jpg



BAWA_0002_0.487_L_2.jpg

Wall ID:	BAWA-0002-0.769-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 14, 2007	Approximate Year Built:	1965
*Wall Rating:	83	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone masonry outlet headwall for a 6 ft x 12 ft concrete arch culvert constructed along right shoulder and along base of moderately sloping embankment supporting a high ADT roadway low consequence of failure		
Wall Measurements			
Wall Length (ft.):	45	Face Area (sq.):	259
Average Wall Height (ft.):	5	Face Angle (deg.):	90
Maximum Wall Height (ft.):	8	Vertical Offset (ft.):	-6
Assessed Elements			
Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)	
PERFORMANCE 8.00	Good condition; minor cracking and spalling or mortar; 12-in. of sedimentation within the channel and inside of culvert	7	
WALL FOUNDATION MATERIAL 8.00	No distress; no evidence of settlement, rotation, undermining or seepage	9	
MORTAR 8.00	Minor cracking with minor spalling; evidence of recent repointing	8	
STONE MASONRY 8.00	No distress to cut blocks	9	
CULVERT 0.50	6 ft x 12 ft concrete are culvert ; approximately 12-in. of sedimentation along the invert and extends approximately 20 ft inside the culvert	8	
VEGETATION 0.50	Several small diameter trees are growing atop wall; one medium diameter tree is adjacent to wall along its base	8	
LATERAL SLOPE 0.50	No distress; recently placed riprap erosion protection	9	
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter	10	
ROAD/SIDEWALK/SHOULDER 0.50	No distress to roadway or paved shoulder	10	
Repair Recommendations			
Failure Consequence:	LOW		
Recommendation Narrative:	Stone Masonry Repointing - 0.20(258.75 sqft)(\$75/sqft) = \$3,881. Clean Culvert In-place - 20 lnft (\$10/lnft) = \$200. Clear Channel - 8 labor hrs (\$55/hr) = \$440		
Repair Cost:	\$4,521		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_0.769_R_1.jpg



BAWA_0002_0.769_R_2.jpg

Wall ID:	BAWA-0002-0.779-L		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 14, 2007	Approximate Year Built:	1965
*Wall Rating:	84	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone masonry inlet headwall for a 4 ft x 8 ft concrete arch culvert constructed along left shoulder and along base of gently sloping embankment supporting a high ADT roadway low consequence failure		
Wall Measurements			
Wall Length (ft.):	26	Face Area (sq.):	159
Average Wall Height (ft.):	6	Face Angle (deg.):	90
Maximum Wall Height (ft.):	9	Vertical Offset (ft.):	-5
Assessed Elements			
Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)	
PERFORMANCE 8.00	Good condition; there is an approximate 2-in. annulus between the headwall and the culvert resulting from the cracking and spalling of mortar	7	
WALL FOUNDATION MATERIAL 8.00	No distress; no evidence of settlement, rotation, undermining or seepage	9	
MORTAR 8.00	General age-related weathering; minor debonding	8	
STONE MASONRY 8.00	No distress to cut blocks	10	
VEGETATION 0.50	Small vegetation has overgrown the wall, but not affecting performance of the wall	8	
WALL DRAINS 0.50	No evidence of drainage-related distress	9	
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter	10	
ROAD/SIDEWALK/SHOULDER 0.50	No distress to roadway or to grassy shoulder	10	
TRAFFIC BARRIER/FENCE 0.50	No observed distress to concrete guard wall with stone veneer facing	10	
Repair Recommendations			
Failure Consequence:	LOW		
Recommendation Narrative:	Clean culvert in place - 50 lnft (\$10/lnft) = \$500. Fill annulus around culvert (concrete repair) - 25.13 lnft (\$5/lnft) = \$126		
Repair Cost:	\$626		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_0.779_L_1.JPG

Wall ID:	BAWA-0002-1.409-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 14, 2007	Approximate Year Built:	1965
*Wall Rating:	79	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone masonry outlet headwall for a 8 ft x 14 ft concrete arch culvert constructed along right shoulder and along base of moderately sloping embankment supporting a high ADT roadway moderate consequence of failure		
Wall Measurements			
Wall Length (ft.):	32	Face Area (sq.):	95
Average Wall Height (ft.):	2	Face Angle (deg.):	90
Maximum Wall Height (ft.):	6	Vertical Offset (ft.):	-8
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition; approximately 12-in. of sedimentation along invert if culvert and within channel ; several small diameter trees are growing atop and along base of wall		8
WALL FOUNDATION MATERIAL 8.00	No distress; no evidence of settlement, rotation, undermining or seepage		9
MORTAR 8.00	Moderate to severe degradation across 70% of wall; moderate debonding with some spalling		5
STONE MASONRY 8.00	No distress to cut blocks		9
CULVERT 0.50	4 ft x 8 ft concrete arch culvert; approximately 12-in. of sedimentation along invert of pipe		8
DOWNSLOPE 0.50	Approximately 12-in. of sedimentation at culvert opening		8
VEGETATION 0.50	Small brush and several small diameter trees growing atop and along northern end of wall; trees threaten the long-term stability of wall		8
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter		10
LATERAL SLOPE 0.50	No distress; no evidence of movement; no erosion		10
Repair Recommendations			
Failure Consequence:	MODERATE		
Recommendation Narrative:	Clean culverts in place - 50 lnft (\$10/lnft) = \$500. Cut small diameter trees - 8 trees (\$100/tree) = \$800.		
Repair Cost:	\$1,300		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_1.409_R_1.jpg

Wall ID:	BAWA-0002-4.066-L		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 14, 2007	Approximate Year Built:	1965
*Wall Rating:	81	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone masonry outlet headwall for two 48 in diameter concrete pipe culverts constructed along left shoulder and along base of a steep embankment supporting a high ADT roadway low consequence of failure		
Wall Measurements			
Wall Length (ft.):	26	Face Area (sq.):	90
Average Wall Height (ft.):	3	Face Angle (deg.):	90
Maximum Wall Height (ft.):	6	Vertical Offset (ft.):	-18
Assessed Elements			
Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)	
PERFORMANCE 8.00	Good condition; scour hole at outlet is causing foundation undermining and threatens the long-term stability of wall	7	
WALL FOUNDATION MATERIAL 8.00	Moderate ongoing undermining of foundation due to the formation of a scour hole along the face of wall	7	
MORTAR 8.00	General age-related weathering	9	
STONE MASONRY 8.00	No observed distress to cut blocks	9	
LATERAL SLOPE 0.50	No distress; no evidence of movement; no erosion	9	
VEGETATION 0.50	Small brush is growing adjacent to wall; not causing distress to wall	9	
WALL DRAINS 0.50	No evidence of drainage-related distress	9	
CULVERT 0.50	No observed distress to two 48-in. diameter concrete pipes	10	
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter	10	
Repair Recommendations			
Failure Consequence:	LOW		
Recommendation Narrative:	Excavate Channel - 12 labor hrs (\$55/hr) = \$660. Backfill Scour Hole - earthwork geotextile = 33.33 sqyd (\$5/sqyd) = \$168, placed riprap, Class 3 = 2.96 cuyd (\$200/cuyd) = \$594		
Repair Cost:	\$1,422		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_4.066_L_1.jpg



BAWA_0002_4.066_L_2.jpg

Wall ID:	BAWA-0002-4.066-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 14, 2007	Approximate Year Built:	1965
*Wall Rating:	76	Maintenance Action:	Repair Elements
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mass Concrete
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Concrete inlet headwall for two 48 in diameter culverts constructed along right shoulder and along base of a steep embankment supporting a high ADT roadway low consequence of failure		
Wall Measurements			
Wall Length (ft.):	32	Face Area (sq.):	106
Average Wall Height (ft.):	3	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	Fair to good condition; severe delamination with moderate spalling of concrete across face of wall; scour hole and medium diameter trees growing adjacent to wall and threatens the wall's long-term stability		6
WALL FOUNDATION MATERIAL 8.00	No distress; no evidence of settlement, rotation, undermining or seepage; wall appears to be founded on a concrete footing on a soil subgrade		9
CONCRETE 8.00	Moderate to severe delamination with moderate spalling across the face; there is an approximate 1/4-in. gap between the wall and the concrete cap		7
VEGETATION 0.50	Several medium diameter trees are growing adjacent to wall; trees are not currently causing distress, but do threaten the long-term stability of wall		8
CULVERT 0.50	No observed distress to two 48-in. diameter concrete pipes		9
WALL DRAINS 0.50	No evidence of drainage-related distress		9
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter		10
DOWNSLOPE 1.00	Moderate to severe scouring of channel with a large diameter scour hole along face of wall; scour hole threatens the long-term stability of wall		5
LATERAL SLOPE 0.50	No distress; no evidence of movement; no erosion		10
Repair Recommendations			
Failure Consequence:	LOW		
Recommendation Narrative:	Concrete Repair - 88 sqft (\$150/sqft) = \$13,200. Backfill Scour Hole - earthwork geotextile = 22.22 sqyd (\$5/sqyd) = \$111, - placed riprap, Class 3 = 3.55 cuyd (\$200/cuyd) = \$711. Cut Trees - 5 medium diameter trees (\$200/tree) = \$1,000.		
Repair Cost:	\$15,022		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_4.066_R_1.jpg



BAWA_0002_4.066_R_2.jpg

Wall ID:	BAWA-0002-4.781-L		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 14, 2007	Approximate Year Built:	1965
*Wall Rating:	86	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone masonry inlet headwall for two 48 in diameter concrete culverts constructed along left shoulder and along base of gently sloping embankment supporting a high ADT roadway low consequence of failure		
Wall Measurements			
Wall Length (ft.):	30	Face Area (sq.):	108
Average Wall Height (ft.):	3	Face Angle (deg.):	90
Maximum Wall Height (ft.):	6	Vertical Offset (ft.):	-7
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent condition; debris in channel will impede the flow of water and promote water accumulation at inlet		8
WALL FOUNDATION MATERIAL 8.00	No distress; no evidence of settlement, rotation, undermining or seepage		9
MORTAR 8.00	General age-related weathering; minor debonding across 10% of wall evidence of recent repointing		8
STONE MASONRY 8.00	Excellent condition of cut blocks		9
DOWNSLOPE 0.50	Debris at inlet will impede flow of water; no observed distress to riprap-lined channel		8
CULVERT 0.50	No distress to two 48-in. diameter concrete pipes		9
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter		10
LATERAL SLOPE 0.50	No distress; no evidence of movement; no erosion		10
ROAD/SIDEWALK/SHOULDER 0.50	No distress to asphalt pavement or grassy shoulder		10
Repair Recommendations			
Failure Consequence:	LOW		
Recommendation Narrative:	Clear Debris at Inlet - 4 labor hrs (\$55/hr) = \$220.		
Repair Cost:	\$220		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_4.781_L_1.jpg



BAWA_0002_4.781_L_2.jpg

Wall ID:	BAWA-0002-6.441-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 14, 2007	Approximate Year Built:	1965
*Wall Rating:	60	Maintenance Action:	Repair Elements
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mass Concrete
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Concrete inlet headwall for two 42 in diameter concrete pipe culverts constructed along right shoulder and along base of moderately sloping embankment supporting a high ADT roadway moderate consequence of failure		
Wall Measurements			
Wall Length (ft.):	28	Face Area (sq.):	112
Average Wall Height (ft.):	4	Face Angle (deg.):	90
Maximum Wall Height (ft.):	5	Vertical Offset (ft.):	-13
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Poor condition; ongoing erosion and undermining of foundation material; misaligned culvert end sections due to rotation of headwall		5
WALL FOUNDATION MATERIAL 8.00	Founded on a concrete footing; ongoing undermining of foundation due to scour; evidence that the wall has rotated forward along the southern third of wall resulting in misalignment of culvert end sections		6
CONCRETE 8.00	Generally good condition; 1/16-in. crack emanating from crown of right culvert and extends thru the wall		6
CULVERT 1.00	Two 42-in. diameter concrete pipes; the end sections of both pipes are separated and misaligned resulting in water infiltration behind the headwall and the erosion of backfill material		5
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter		10
ROAD/SIDEWALK/SHOULDER 0.50	No distress to roadway or grassy shoulder		10
DOWNSLOPE 1.00	Large diameter scour hole at inlet and extending downstream with approximately 24-in. of standing water		6
LATERAL SLOPE 1.00	Ongoing erosion of lateral slope due to scour hole		7
UPSLOPE 1.00	Moderately-sloping, lightly-forested slope grading to relatively flat within 3 ft of wall; evidence of ongoing loss of soil behind headwall		7
Repair Recommendations			
Failure Consequence:	MODERATE		
Recommendation Narrative:	Clean, repair concrete cracks - 4 lnft (\$5/lnft) = \$20. Remove & Reset Concrete Culvert, Structure excavation = 51.85 cuyd (\$40/cuyd) = \$2,074, Removal of culvert end sections = 2 sections (\$400/section) = \$800, Structure backfill = 52 cuyd		
Repair Cost:	\$23,329		

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

Baltimore - Washington Parkway
ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_6.441_R_1.jpg



BAWA_0002_6.441_R_2.jpg

Wall ID:	BAWA-0002-9.761-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 15, 2007	Approximate Year Built:	1965
*Wall Rating:	79	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mass Concrete
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Concrete headwall for a 10 ft x 12 ft double box culvert constructed along right shoulder and along base of moderately sloping embankment supporting a high ADT roadway high consequence of failure		
Wall Measurements			
Wall Length (ft.):	68	Face Area (sq.):	248
Average Wall Height (ft.):	3	Face Angle (deg.):	90
Maximum Wall Height (ft.):	12	Vertical Offset (ft.):	-6
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition; several 1/16 to 1/8 inch cracks along top of wall; several medium diameter trees growing adjacent to wall and threatens the wall's long-term stability		7
WALL FOUNDATION MATERIAL 8.00	No distress; no evidence of settlement, rotation, undermining or seepage		9
CONCRETE 8.00	Minor cracking, mostly along top of wall; cracks threaten the long-term stability of wall; minor efflorescence		7
DOWNSLOPE 0.50	Approximately 36-in. of standing water in the channel; poor down slope drainage; no observed distress		8
LATERAL SLOPE 0.50	No distress; no evidence of movement; no erosion		9
CULVERT 0.50	10 ft x 12 ft double box culvert; no observed distress		10
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter		10
ROAD/SIDEWALK/SHOULDER 0.50	No distress to roadway		10
TRAFFIC BARRIER/FENCE 0.50	No distress to stone guard wall with a stone veneer facing		10
Repair Recommendations			
Failure Consequence:	HIGH		
Recommendation Narrative:	Cut medium diameter trees, 8 trees (\$200/tree) = \$1,600, crack cleaning, routing and sealing, 30 lnft (\$5/lnft) = \$150.		
Repair Cost:	\$1,750		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_9.761_R_1.jpg



BAWA_0002_9.761_R_2.jpg

Wall ID:	BAWA-0002-9.902-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 15, 2007	Approximate Year Built:	1986
*Wall Rating:	97	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mass Concrete
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Concrete inlet headwall for a 9 ft x 17 ft concrete box culvert constructed along right shoulder and along base of gently sloping embankment supporting a high ADT roadway high consequence of failure		
Wall Measurements			
Wall Length (ft.):	75	Face Area (sq.):	407
Average Wall Height (ft.):	5	Face Angle (deg.):	90
Maximum Wall Height (ft.):	11	Vertical Offset (ft.):	-6
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good to excellent condition; small vegetation has overgrown the wall; wall is functioning properly as intended		9
WALL FOUNDATION MATERIAL 8.00	No distress; no evidence of settlement, rotation, undermining or seepage		10
CONCRETE 8.00	No distress; relatively recent construction		10
VEGETATION 0.50	The wall is overgrown with vegetation		8
WALL DRAINS 0.50	No evidence of drainage-related distress		9
CULVERT 0.50	No observed distress to 9 ft x 12 ft concrete box culvert		10
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter		10
DOWNSLOPE 0.50	No distress to riprap-lined channel		10
LATERAL SLOPE 0.50	No distress; riprap erosion protection along lateral slope		10
Repair Recommendations			
Failure Consequence:	HIGH		
Recommendation Narrative:	Clear vegetation - 8 labor hrs (\$55/hr) = \$440		
Repair Cost:	\$440		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_9.902_R_1.jpg



BAWA_0002_9.902_R_2.jpg

Wall ID:	BAWA-0002-11.015-L		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 15, 2007	Approximate Year Built:	1965
*Wall Rating:	87	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone masonry inlet headwall for a 6 ft x 14 ft concrete box culvert constructed along left shoulder of a high ADT roadway high consequence of failure due to size and proximity to roadway		
Wall Measurements			
Wall Length (ft.):	45	Face Area (sq.):	190
Average Wall Height (ft.):	4	Face Angle (deg.):	90
Maximum Wall Height (ft.):	8	Vertical Offset (ft.):	-3
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition; spalling along wall/culvert interface; minor cracking of mortar		7
WALL FOUNDATION MATERIAL 8.00	No distress; no evidence of settlement, rotation, undermining or seepage		10
MORTAR 8.00	General age-related weathering; minor cracking along joints		8
STONE MASONRY 8.00	No distress to cut blocks		10
LATERAL SLOPE 0.50	No evidence of movement or erosion; medium diameter trees growing both ends of wall		8
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter		10
ROAD/SIDEWALK/SHOULDER 0.50	No distress to roadway or paved shoulder		10
TRAFFIC BARRIER/FENCE 0.50	No distress to concrete guard wall with stone veneer facing		10
UPSLOPE 0.50	No distress to relatively-flat, heavily-vegetated slope		10
Repair Recommendations			
Failure Consequence:	HIGH		
Recommendation Narrative:	Stone masonry repointing- 10 % of wall = 0.10(190.25 sqft)(\$75/sqft) = \$1,427, repoint interface = 26 ft (4/12) (\$75/sqft) = \$650. Cut medium diameter trees - 5 trees (\$200/tree) = \$1,000.		
Repair Cost:	\$3,077		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway

ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_11.015_L_1.jpg



BAWA_0002_11.015_L_2.jpg

Wall ID:	BAWA-0002-11.033-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 15, 2007	Approximate Year Built:	1965
*Wall Rating:	90	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone masonry outlet headwall for a 6 ft x 14 ft concrete box culvert constructed along right shoulder of a high ADT roadway high consequence of failure due to size and proximity to roadway		
Wall Measurements			
Wall Length (ft.):	56	Face Area (sq.):	453
Average Wall Height (ft.):	8	Face Angle (deg.):	90
Maximum Wall Height (ft.):	9	Vertical Offset (ft.):	-4
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition; minor cracking through mortar along the top of wall; minor erosion of lateral slope		8
WALL FOUNDATION MATERIAL 8.00	No distress; no evidence of settlement, rotation, undermining or seepage		10
MORTAR 8.00	General age-related weathering with minor cracking, mostly along the top of wall; evidence of recent repointing		8
STONE MASONRY 8.00	No distress to cut blocks		10
LATERAL SLOPE 0.50	Minor erosion along the north end of wall		8
CULVERT 0.50	No observed distress to 6 ft x 14 ft concrete box culvert		9
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter		10
DOWNSLOPE 0.50	No distress to riprap-lined channel; good drainage away from wall		10
ROAD/SIDEWALK/SHOULDER 0.50	No distress to roadway or paved shoulder		10
Repair Recommendations			
Failure Consequence:	HIGH		
Recommendation Narrative:	Cut large diameter trees - 2 trees (\$955/tree) = \$1,910		
Repair Cost:	\$1,910		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_11.033_R_1.jpg



BAWA_0002_11.033_R_2.jpg

Wall ID:	BAWA-0002-12.920-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 15, 2007	Approximate Year Built:	1965
*Wall Rating:	74	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone masonry outlet headwall for two 8 ft x 10 ft concrete box culverts hiking trail across the top of headwall constructed along right shoulder and along base of steep embankment supporting a high ADT roadway		
Wall Measurements			
Wall Length (ft.):	70	Face Area (sq.):	521
Average Wall Height (ft.):	7	Face Angle (deg.):	90
Maximum Wall Height (ft.):	14	Vertical Offset (ft.):	-25
Assessed Elements			
Element (Weighting Factor)	Narrative	Condition Rating (0 - 10)	
PERFORMANCE 8.00	Good condition; minor cracking and spalling of mortar; moderate degradation of mortar below openings; large scour hole forming along face of wall	6	
WALL FOUNDATION MATERIAL 8.00	Minor erosion at outlet; no evidence of settlement, rotation, undermining or seepage	7	
MORTAR 8.00	Minor cracking and spalling; moderate degradation below the outlets	7	
STONE MASONRY 8.00	No distress to cut blocks	9	
VEGETATION 0.50	Medium diameter trees growing within 3 ft of wall; trees not currently causing distress to wall, but do threaten the wall's long-term stability	8	
CULVERT 0.50	No observed distress to two 8 ft x 10 ft concrete box culverts	9	
LATERAL SLOPE 0.50	Medium diameter trees growing along both ends of wall; no evidence of movement; no erosion	9	
WALL DRAINS 0.50	No evidence of drainage-related distress	9	
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter	10	
Repair Recommendations			
Failure Consequence:	LOW		
Recommendation Narrative:	Cut trees - 3 medium diameter trees (\$200/tree) = \$600. Backfill scour hole - earthwork geotextile = 40 sqyd (\$5/sqyd) = \$200, placed riprap, Class 3 = 8.89 cuyd (\$200/cuyd) = \$1, 778. Clear debris - 6 labor hrs (\$55/hr) = \$330. Stone masonry		
Repair Cost:	\$18,545		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_12.920_R_1.jpg



BAWA_0002_12.920_R_2.jpg

Wall ID:	BAWA-0002-12.926-L		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 15, 2007	Approximate Year Built:	1965
*Wall Rating:	80	Maintenance Action:	Repair Elements
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mass Concrete
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	Stone Veneer
General Description:	Concrete inlet headwall for two 8 ft x 10 ft concrete box culvert constructed along right shoulder and along base of steep slope supporting a high ADT roadway low consequence of failure due to distance from roadway		
Wall Measurements			
Wall Length (ft.):	70	Face Area (sq.):	590
Average Wall Height (ft.):	8	Face Angle (deg.):	90
Maximum Wall Height (ft.):	14	Vertical Offset (ft.):	-20
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition; debris piled along face of wall is impeding flow and causing realignment of the channel; spalled concrete with exposed and moderately rusted rebar; peeling joint compound		7
WALL FOUNDATION MATERIAL 8.00	No distress; no evidence of settlement, rotation, undermining or seepage		9
CONCRETE 8.00	Minor hairline cracking observed along exposed ends of wall with minor efflorescence		8
MORTAR 8.00	General age-related weathering; minor cracking; minor debonding		8
ARCHITECTURAL FACING 0.50	Minor cracking or mortar with minor debonding; blocks are in excellent condition		9
LATERAL SLOPE 0.50	No distress; no evidence of movement; no erosion		9
ROAD/SIDEWALK/SHOULDER 0.50	No distress to roadway		10
TRAFFIC BARRIER/FENCE 0.50	No distress to concrete guard wall with a stone veneer facing		10
UPSLOPE 0.50	No distress to moderately-sloping, well-vegetated slope		10
Repair Recommendations			
Failure Consequence:	LOW		
Recommendation Narrative:	Concrete repair - 5 sqft (\$150/sqft) = \$750. Reseal Joint - 56 lnft (\$5/lnft) = \$280. Clear debris - 24 labor hrs (\$55/hr) = \$1,320. Cut trees - 4 trees (\$200/tree) = \$800.		
Repair Cost:	\$3,150		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_12.926_L_1.jpg



BAWA_0002_12.926_L_2.jpg

Wall ID:	BAWA-0002-15.109-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 16, 2007	Approximate Year Built:	1965
*Wall Rating:	95	Maintenance Action:	No Action
Wall Description			
Wall Function:	Fill Wall	Primary Wall Type:	Gravity - Mass Concrete
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	Stone Veneer
General Description:	Concrete fill wall with an integral concrete guard wall stone veneer facing on both wall and guard wall constructed along right shoulder and directly supports a high ADT roadway high consequence of failure		
Wall Measurements			
Wall Length (ft.):	578	Face Area (sq.):	2312
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 condition		9
WALL FOUNDATION MATERIAL 8.00	No distress; no evidence of settlement or rotation		10
OTHER PRIMARY ELEMENT 8.00	Partially exposed concrete footing; no observed distress		9
CONCRETE 8.00	Not able to observe; however no observed projection of distress to stone veneer facing		10
VEGETATION 0.50	Base of wall is overgrown with creeping vines; vegetation is not affecting nor threatens the performance of wall		9
WALL DRAINS 0.50	No visible drains; no evidence of drainage-related distress		9
ARCHITECTURAL FACING 0.50	No distress to stone veneer facing		10
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter		10
DOWNSLOPE 0.50	No distress to well-vegetated slope		10
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.			

Baltimore - Washington Parkway
ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_15.109_R_1.jpg



BAWA_0002_15.109_R_2.jpg

Wall ID:	BAWA-0002-15.154-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 15, 2007	Approximate Year Built:	1965
*Wall Rating:	88	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Head Wall	Primary Wall Type:	Gravity - Mortared Stone
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	
General Description:	Stone masonry inlet headwall for a 4 ft x 6 ft concrete arch culvert constructed along right shoulder and along base of a fill wall supporting a high ADT roadway high consequence of failure		
Wall Measurements			
Wall Length (ft.):	30	Face Area (sq.):	91
Average Wall Height (ft.):	3	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 condition; minor cracking of mortar; minor to moderate cracking of concrete apron; wall is overgrown with vegetation		8
WALL FOUNDATION MATERIAL 8.00	No distress; no evidence of settlement, rotation, undermining or seepage		10
MORTAR 8.00	General age-related weathering; minor cracking along joints		8
STONE MASONRY 8.00	No distress to cut blocks		9
DOWNSLOPE 0.50	A concrete apron extends from face of wall and down slope approximately 60 ft; minor to moderate cracking of apron; no distress to gently-sloping, well-vegetated slope		8
VEGETATION 0.50	Small brush and creeping vines have overgrown the wall; vegetation is not currently causing distress, but should be cut back from the wall face		8
CULVERT 0.50	No distress to 4 ft x 6 ft concrete arch culvert		9
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter		10
LATERAL SLOPE 0.50	No distress; no evidence of movement; no erosion		10
Repair Recommendations			
Failure Consequence:	HIGH		
Recommendation Narrative:	Clear vegetation - 6 labor hrs (\$55/hr) = \$330		
Repair Cost:	\$330		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_15.154_R_1.jpg

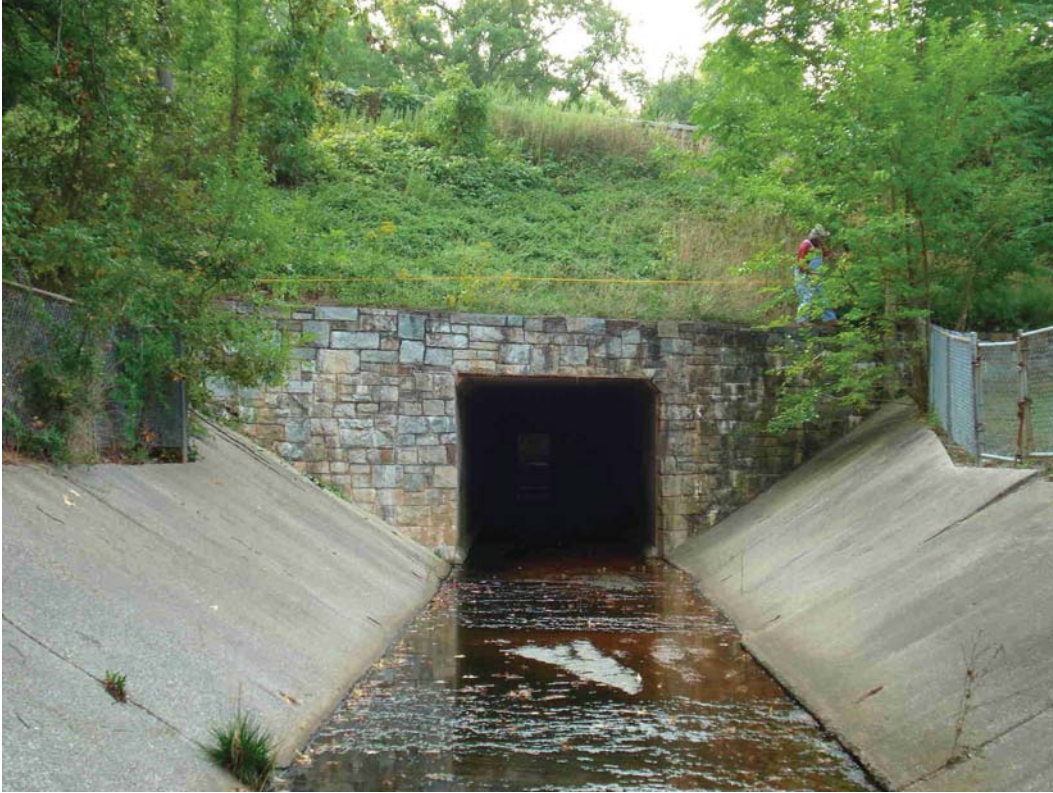


BAWA_0002_15.154_R_2.jpg

Wall ID:	BAWA-0002-15.391-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 16, 2007	Approximate Year Built:	1965
*Wall Rating:	88	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:	Stone masonry outlet headwall for a 9 ft x 11 ft concrete box culvert constructed along right shoulder and at base of a steep embankment supporting a high ADT roadway moderate consequence of failure		
Wall Measurements			
Wall Length (ft.):	60	Face Area (sq.):	329
Average Wall Height (ft.):	5	Face Angle (deg.):	90
Maximum Wall Height (ft.):	12	Vertical Offset (ft.):	-10
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition; moderate spalling of concrete inside culvert resulting in exposure and moderate rusting of rebar; distress does not pose significant risk to culvert or headwall, but should be repaired		8
WALL FOUNDATION MATERIAL 8.00	No distress; no evidence of settlement, rotation, undermining or seepage		10
MORTAR 8.00	Minor to moderate degradation of mortar; minor weeping		8
STONE MASONRY 8.00	No distress to cut blocks		9
CULVERT 0.50	9 ft x 11 ft concrete box culvert; some moderate spalling of concrete causing exposure and moderate rusting of rebar		8
VEGETATION 0.50	Small brush and one medium diameter trees growing immediately adjacent to wall		8
DOWNSLOPE 0.50	A concrete apron extends well down slope from the face of wall; some of the sidewall panels are misaligned and may promote water infiltration		9
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter		10
LATERAL SLOPE 0.50	No distress; no evidence of movement; no erosion		10
Repair Recommendations			
Failure Consequence:	MODERATE		
Recommendation Narrative:	Cut tree - 1 medium diameter tree (\$200/tree) = \$200. Concrete repair - 0.926 cuyd (\$150/cuyd) = \$139.		
Repair Cost:	\$500		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_15.391_R_1.jpg

Wall ID:	BAWA-0002-17.106-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 16, 2007	Approximate Year Built:	1954
*Wall Rating:	43	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:	Stone masonry outlet headwall for a 36 in diameter concrete pipe culvert constructed along right shoulder and along base of a steep embankment supporting a high ADT roadway low consequence of failure		
Wall Measurements			
Wall Length (ft.):	20	Face Area (sq.):	103
Average Wall Height (ft.):	5	Face Angle (deg.):	90
Maximum Wall Height (ft.):	6	Vertical Offset (ft.):	-13
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Critical condition; severely undermined foundation possibly due to the formation of a large diameter scour hole; footing is critically cracked through; movement of headwall has caused misalignment of the culvert; misaligned culverts discharge water into b		2
WALL FOUNDATION MATERIAL 8.00	Founded on a soil subgrade; foundation is critically eroded resulting in foundation undermining; there is a large void below the wall; wall has rotated forward approximately 4 to 6 inches		1
CONCRETE 8.00	Exposed 18-in. concrete footing with an approximate 2 to 3 inch wide crack below the culvert opening		3
MORTAR 8.00	Moderate degradation; moderate cracking with moderate spalling across approximately 30% of face		6
STONE MASONRY 8.00	No distress to cut blocks		9
DOWNSLOPE 1.00	There is a 15 ft diameter scour hole, approximately 30-in. deep at the outfall; ongoing scour of the foundation soil and lateral slope; debris in channel in impeding the flow of water away from wall		4
UPSLOPE 1.00	There is an approximate 2 ft. x 6 ft deep hole behind the headwall; hole appears to have resulted from the ongoing erosion of backfill material		4
CURB/BERM/DITCH 0.50	No distress to concrete curb and gutter		9
VEGETATION 0.50	Small vines growing atop the wall, but not affecting nor threatening stability of the wall		9

Wall ID:	BAWA-0002-17.106-R		
Route Name:	BALTIMORE-WASHINGTON PARKWAY (SB)		
Inspection Date:	August 16, 2007	Approximate Year Built:	1954
*Wall Rating:	43	Maintenance Action:	Repair Elements
Repair Recommendations			
Failure Consequence:	LOW		
Recommendation Narrative:	Remove/reset headwall - 1 HW (\$4,430 each) =\$4,430. Structure excavation - 1,111.11 cuyd (\$40/cuyd) = \$44,444. Remove/reset pipe culvert - 20 lnft (\$165/lnft) = \$3,300. Structural backfill - 1111.11 cuyd (\$60/cuyd) = \$66,667. Clear debris		
Repair Cost:	\$125,585		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway
ROUTE 0002: BALTIMORE-WASHINGTON PARKWAY (SB)

Retaining Wall Condition Photos



BAWA_0002_17.106_R_1.jpg



BAWA_0002_17.106_R_2.jpg

Wall ID:	BAWA-0506ZZ-0.010-R		
Route Name:	POWDER MILL ROAD RAMPS (MD ROUTE 212 INTERCHANGE)		
Inspection Date:	August 15, 2007	Approximate Year Built:	1965
*Wall Rating:	87	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:	Stone masonry inlet headwall for a 8 ft x 13 ft concrete box culvert constructed along right shoulder and along base of a gently sloping embankment supporting a high ADT roadway high consequence of failure		
Wall Measurements			
Wall Length (ft.):	60	Face Area (sq.):	368
Average Wall Height (ft.):	6	Face Angle (deg.):	90
Maximum Wall Height (ft.):	11	Vertical Offset (ft.):	-8
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition; weeping of mortar as evidence by moderate efflorescence across face of wall		8
WALL FOUNDATION MATERIAL 8.00	No distress; no evidence of settlement, rotation, undermining or seepage		9
MORTAR 8.00	Moderate efflorescence across 30% of wall; minor cracking; minor debonding		8
WIRE/GEOSYNTHETIC FACING 8.00	Minor degradation of epoxy joint compound		8
STONE MASONRY 8.00	No distress to cut blocks		9
CONCRETE 8.00	No distress		10
LATERAL SLOPE 0.50	Minor erosion; general good condition		8
CULVERT 0.50	No observed distress to 8 ft x 13 ft concrete box culvert		9
DOWNSLOPE 0.50	No observed distress to riprap-lined channel		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.			

Baltimore - Washington Parkway

ROUTE 0506ZZ: POWDER MILL ROAD RAMPS (MD ROUTE 212 INTERCHANGE)

Retaining Wall Condition Photos



BAWA_0506ZZ_0.010_R_1.jpg



BAWA_0506ZZ_0.010_R_2.jpg

Wall ID:	BAWA-0507ZZ-0.075-R		
Route Name:	LAUREL-BOWIE ROAD RAMPS (MD ROUTE 197 INTERCHANGE)		
Inspection Date:	August 15, 2007	Approximate Year Built:	1986
*Wall Rating:	87	Maintenance Action:	Maintenance
Wall Description			
Wall Function:	Fill Wall	Primary Wall Type:	MSE - Precast Panel
Surface Treatment:		Secondary Wall Type:	
Secondary Surface Treatment:		Architectural Facing:	Stone Veneer
General Description:	MSE fill wall with a stone masonry facing constructed along right shoulder or ramp to the BW Parkway from eastbound Laurel Bowie Road supporting a relatively flat forested hill high consequence of failure		
Wall Measurements			
Wall Length (ft.):	690	Face Area (sq.):	8760
Average Wall Height (ft.):	12	Face Angle (deg.):	90
Maximum Wall Height (ft.):	14	Vertical Offset (ft.):	1
Assessed Elements			
Element (Weighting Factor)	Narrative		Condition Rating (0 - 10)
PERFORMANCE 8.00	Good condition; several small trees growing within 3 ft of the top of wall; cracked concrete ditch		7
WALL FOUNDATION MATERIAL 8.00	No evidence of settlement or rotation		10
WIRE/GEOSYNTHETIC FACING 8.00	Minor degradation of epoxy joint compound		8
CONCRETE 8.00	No distress		10
WALL DRAINS 0.50	No weepholes were observed along face of wall; likely water infiltration due to cracks in ditch along top of wall; evidence of weeping along base of wall		8
LATERAL SLOPE 0.50	No distress; no evidence of movement; no erosion		10
ROAD/SIDEWALK/SHOULDER 0.50	No distress to roadway or to relatively-flat grassy shoulder		10
UPSLOPE 0.50	No distress to gently-sloping, relatively flat and moderately-forested slope		10
CURB/BERM/DITCH 1.00	4 ft wide concrete ditch along top of wall; ditch has 1/8 to 1/4 inch cracks at several locations; cracks are promoting the infiltration of water behind the wall		7
Repair Recommendations			
Failure Consequence:	HIGH		
Recommendation Narrative:	Clear ditch - 24 labor hrs (\$55/hr) = \$1,320. Cut trees within 3 ft of wall - 12 trees (\$100/tree) = \$1,200. Repair cracks (30% of ditch) - 0.30(690 lnft)(\$5/lnft) = \$1,035. Repair joints - 14 lnft (\$60/lnft)(5 joints) = \$4,200.		
Repair Cost:	\$7,755		
2007 cost estimate (ASTM Class D), preliminary for comparison to other repair costs only.			

Baltimore - Washington Parkway

ROUTE 0507ZZ: LAUREL-BOWIE ROAD RAMPS (MD ROUTE 197 INTERCHANGE)

Retaining Wall Condition Photos



BAWA_0507ZZ_0.075_R_1.jpg



BAWA_0507ZZ_0.075_R_2.jpg

Appendix A

Summary of WIP Definitions



Baltimore - Washington Parkway National Capital Parks - East



**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 <i>newly constructed or fabricated</i> elements. -Defects may include those typically caused from fabrication or construction.	
7-8 (Good)	-Low-to-moderate extent of low severity distress. -Distress present does not significantly compromise the element function, nor is there significantly severe distress to major structural components of an element.	
5-6 (Fair)	-High extent of low severity distress and/or low-to-medium extent of medium to high severity distress. -Distress present does not compromise element function, but lack of treatment may lead to impaired function/elevated risk of element failure in the near term.	
3-4 (Poor)	-Medium-to-high extent of medium-to-high severity distress. -Distress present threatens element function, and strength is obviously compromised and/or structural analysis is warranted. -The element condition does not pose an immediate threat to wall stability and road closure is not necessary.	
1-2 (Critical)	-Medium-to-high extent of high severity distress. -Element is no longer serving intended function. Element performance threatening overall stability of the wall at the time of inspection.	
Wall Performance Condition Ratings		
Performance	Evaluation of overall wall performance as indicated by observations not necessarily captured by observed distresses for specific elements, including global wall distresses (rotation, settlement, translation, displacement, etc.) and/or evidence of prior repairs that may further indicate component problems.	Good to Excellent - No observation of distresses not already captured by individual element condition assessment. No combination of element distresses indicating unseen problems or creating significant performance problems. No history of remediation or repair to wall or adjacent elements.
		Fair - Some observed global distress is not associated with specific elements. Some observation of element distress combinations that indicate wall component problems. Minor work on primary elements or major work on secondary elements has occurred improving overall wall function.
		Poor to Critical - Global wall rotation, settlement, and/or overturning is readily apparent. Combined element distresses clearly indicate serious stability problems with components or global wall stability. Major repairs have occurred to wall structural elements, though functionality has not improved significantly.

