



# 2015 RETAINING WALL CONDITION REPORT



**City of Cincinnati**

**Department of Transportation and Engineering**

**Division of Engineering**

**Structures and Geotechnical Sections**

**2015**

## Table of Contents

### Section

1. Wall Report
  - Introduction
  - Wall Inventory Tracking System (WITS)
  - Retaining Wall Inspection
  - Capital Improvement Projects 2015
    - Landslide Correction Projects
      - Clinton Springs
      - Ridgetop Way
    - Retaining Wall Stabilization Projects 2015
      - Hoadly Court
      - Tusculum Avenue
  - Landslide Debris Removal 2015
    - Columbia Parkway
  - Funding
    - 2016 Capital Improvement Projects
      - Hillside Avenue at Tyler Avenue
      - Colerain Avenue Retaining Wall Repairs
      - Dorchester Avenue Wall Rehabilitation
    - Significant Future Projects
      - Cummins Street
      - Art Museum Drive
      - Riverside Drive
2. Retaining Wall Rating Summary
  - List of Walls in Poor (3) and Critical Condition (4)
3. Wall Repair Priority and Estimated Funding
  - Priority and Estimated Funding – Landslide Stabilization Projects
4. 2015 Retaining Wall Inspection Summary
  - New Walls Added to Inventory
5. Inspection District Map

## SECTION 1 WALL REPORT

### INTRODUCTION

Retaining walls are an essential part of Cincinnati's transportation network, protecting roadways, sidewalks and stairways from landslides and hillside slippage. Timely maintenance is important for the safety and welfare of the traveling public. The Department of Transportation and Engineering (DOT E) is the city agency responsible for inspecting, maintaining and improving the transportation system within the City of Cincinnati. The Wall Stabilization & Landslide Correction Program is the specific program within DOT E charged with the responsibility of maintaining the retaining walls within this transportation system. This report is the second of an annual update of the Wall Stabilization and Landslide Correction Program including the condition of DOT E's walls.

### WALL INVENTORY TRACKING SYSTEM (WITS)

Essentially every retaining wall within or adjacent to the right-of-way has been inventoried and is included in the Wall Inventory Tracking System (WITS) database. The database contains the following number of walls grouped by ownership:

Wall Owner	Number	Length - Feet	Length - Miles
Transportation & Engineering (DOT E)	1,548	264,506	50.10
Other Departments	216	46,706	8.85
Maintenance Agreements	101	9,521	1.80
Unknown	40	7,638	1.45
Hamilton County	14	563	0.11
ODOT	192	4,356.00	0.83
Private	5,125	513,096.00	97.18
<b>TOTALS:</b>	<b>7,248.00</b>	<b>846,386</b>	<b>160.32</b>

WITS was created in 1991 and used Foxpro as the database software. This software has become outdated and is not compatible with current standard computer hardware. In 2015, with the assistance of staff from the Cincinnati Area Geographical Information System (CAGIS), WITS was converted to a server based Oracle, cloud enabled, geodata system. WITS can now be directly accessed through ArcGIS. The wall inventory data from the Foxpro database has been successfully transferred to the Oracle database. Although there is still work to be done to customize the system, the ArcGIS WITS is now operating, fully functional and vastly improved.

In addition to upgrading WITS, a wall inspection application was created in 2014. This application was used in the 2014 and 2015 annual wall inspections. The application allows the inspector to complete the inspection documentations using a tablet in the field, eliminating the need to complete hand written documents and then reentering the data into a computer file. The wall inspection application is intergraded with WITS.

## **RETAINING WALL INSPECTION**

DOTE personnel only inspect DOTE walls and walls owned and maintained by other city departments. The city is divided into six inspection districts (Inspection District Map Section 5 of report). Each district is inspected once every six years. In addition to the individual inspection district, all walls that are rated 3 (Poor) or 4 (Critical) condition are inspected yearly. Other inspections are performed if a wall is damaged in an automobile accident or if a complaint is received. All newly constructed, replaced or repaired walls are inventoried and inspected.

The objectives of the inspections are to:

1. Locate and determine the extent of any weakness or damage so that appropriate corrective actions can be taken to ensure public safety.
2. Provide a current information database on the condition of City owned retaining walls within Cincinnati so that maintenance, repair, and replacement projects can be scheduled efficiently.

The goal of the Retaining Wall Program is to preserve the structural integrity of all walls maintained by DOTE. DOTE established the following performance measures to track progress towards accomplishing this objective.

1. DOTE personnel will annually inspect all City walls (excluding flood walls) in one inspection district and all walls that are rated 3 (Poor) or 4 (Critical) condition. DOTE personnel will also inspect new, replaced, repaired, and damaged walls. They will maintain an inventory of all walls that are in or near public streets within the City of Cincinnati and annually submit a report summarizing the condition of City owned walls.
2. Within the limits of available funding, retaining wall personnel will develop and manage a wall maintenance, repair, and replacement work program so as to maintain a Satisfactory Structural Rating for 80% or more of the walls maintained by DOTE.

DOTE personnel inspected a total of 224 walls having a total length of 7.12 miles in the 2015 inspection district. These walls were in the communities of:

1. Queensgate
2. West End
3. CBD - Riverfront
4. Over the Rhine
5. Mt. Adams
6. Pendleton

Section Four (4) of the report summarizes the results of the 2015 Inspection.

A summary of the Structural Retaining Wall Ratings for DOTE walls and other city maintained walls are shown in Section Two (2) of this report. Tables of all DOTE walls and other city maintained walls with a Poor (3) or Critical (4) condition rating are also listed in Section Two (2) of the report. Eighty-four (84) of the 1,548 (5.4%) walls maintained by DOTE have a Structural Rating of Poor (3) or Critical (4) Structural Rating.

Section Three (3) of the report lists the priority and estimated costs to repair all of the DOTE walls that are have a Poor (3) or Critical (4) condition rating. The lists identifies whether the cost to repair is a capital or maintenance expense. The total estimated maintenance and capital cost to repair/replace the walls is \$5,595,000. Section Three (3) of the report also includes a list of seven (6) landslide correction projects. The estimated cost to correct the landslides is estimated at \$2,050,000.

## **CAPITAL IMPROVEMENT PROJECTS 2015**

### **Landslide Correction Projects 2015**

#### **Clinton Springs**

The Clinton Springs retaining wall east of Laymen Avenue was stabilized in Calendar Year (CY) 2015. The retaining wall originally constructed in 1948 was built within a landslide mass which continually moved down slope. Movement of the landslide mass and the wall impacted the westbound lanes of Clinton Springs. The Capital Improvement Project consisted of underpinning the existing wall by the installation of 26 Drilled Shafts, construction of a wall cap and replacement of the railing. The piers were attached to the wall with reinforced concrete buttresses. The piers were anchored in stable bedrock to immobilize the wall and retain the earth under the street. The retaining wall stabilization was done as part of the Clinton Springs and Mitchell Rehabilitation (SCIP) Project. Fifty percent (50%) of the construction cost, \$67,172.55 was certified for construction from the Wall Stabilization and Landslide Correction Program. The other fifty percent (50%) was funded by the State Capital Improvement Program (SCIP).



Clinton Springs looking west prior to repairs.



Clinton Springs looking west after repairs.

## **Ridgetop Way**

The original Ridgetop Way Pier Wall was constructed in 2003 by the developer of the Woodcrest Park Development to separate a landslide from Ridgetop Way. The wall consists of thirty-two (32) thirty (30) inch diameter piers. Overtime the landslide on the downhill side of the pier wall enlarged and extended beyond the limits of the original pier wall. The enlargement of the landslide damaged existing sidewalk. Additional movement would eventually affect the roadway pavement.

The Ridgetop Way Pier Wall Extension Project was bid and awarded in CY 2015. The project was awarded at a cost of \$64,856. Construction began in February of 2016 and is expected to be completed in April of 2016.

This contract involves the extension of the existing pier wall on Ridgetop Way. The extension consists of the installation of eight (8) thirty inch diameter drilled shafts. Precast concrete panels are to be placed between the piers. A cast in place wall cap will be constructed on top of the proposed panels and a section of the existing panels. A section of the existing sidewalk is to be removed and replaced.



Ridgetop Way looking towards Queen City Avenue showing existing wall and undermining of sidewalk. Headscarp of landslide extends into the forward lawn area.



Forming for wall cap on Ridgetop Way Pier Wall Extension.

## **Retaining Wall Stabilization Projects 2015**

### **Hoadly Court**

The Hoadly Court retaining wall was originally constructed in 1930. The wall is a gravity wall composed of mortared limestone. The wall has a length of 312 feet with heights varying between two and four-and-a-half feet. The retaining wall had a Structural Rating of 4 (Critical) due to several wall failures along its length. Sections of the wall were rebuilt by the Transportation and Roadway Operation Division (TROD) in 2015 by Interdepartmental billing at an expense of \$15,856.





Hoadly Court looking south prior to wall repairs.



Hoadly Court looking south after wall repairs.

## **Tusculum Avenue**

A twenty-five foot section of a reinforced cantilevered retaining wall began to tilt in 2015. The wall eventually failed due to corrosion of the vertical steel which connected the wall stem to the footing for the wall. Under the direction DOTE, TROD replaced the wall with a segmental wall which was then faced with concrete to maintain original character of the wall. The section of wall was replaced at a cost of \$15,965.



Tusculum Avenue after wall failure. Failed wall stem has been removed.



Tusculum Avenue after completion of wall stem and prior to backfilling and sidewalk replacement.

In addition to Hoadly and Tusculum TROD made the following wall repairs in CY 2015:

WALL#	STREET	CONDITION	REPAIR
252-021	Ruberg Av	delaminated cap	TROD, chip and patch
286-043C	Harrison Av	broken pilasters	Repair existing
298-050	Barvac Av	Cap & loose stones	Repair existing
325-018	Este Av	four wrecked areas	Rebuild Walls
289-083	Elberon Ave	Automobile Accident	Replace End Pilaster
330-090	Goethe Ave	Slope repair	Regrade slope
299-001	Hamilton Ave	Automobile Accident	Repair existing
452-001	Kennedy Ave	Bulged Wall	Rebuild bulged area
201-003	Hillside Ave	Stolen Fence	Install Fence
284-003	Baltimore Ave	Insufficient railing grout at posts	Grout posts
283-005	Cass Ave	Automobile Accident	Replace section of wall & Railing
371-058	Edgecliff Pt	Broken cap	Replace cap & mortar

## LANDSLIDE DEBRIS REMOVAL 2015

### Columbia Parkway

Slide debris was removed from Columbia Parkway on two occurrences in CY 2015. The first occurrence was a preventive removal at two locations which threatened to slide onto the roadway.



Small debris removed from atop Columbia Parkway Wall.



Removal of slide debris from Columbia Parkway approximately 2,000 feet west of Kemper Lane.

The second occurrence was in response to a newly formed slide mass which slid to the top of the retaining wall and would have eventually slid onto the roadway if it was not removed.



Removal of slide debris from Columbia Parkway approximately 600 feet east of Kemper Lane.

Removal of the slide debris which affect the roadways was funded through Public Services budget under the direction of DOTE.

## **FUNDING**

Annual Capital funding for the Wall Stabilization and Landslide Correction Program has substantially declined over the years from a high point of \$1.84 million in 1995 to \$550,000 in Fiscal Year (FY) 2016. Maintenance Funds which were at an annual level of \$500,000 between 1989 and 1992 and \$200,000 between 1993 and 1995 have been completely eliminated since 1996.

Five-hundred-and-eighteen-thousand (\$518,000) is currently (March 28, 2016) available in the Wall Stabilization and Landslide Correction Program.

**WALL STABILIZATION & LANDSLIDE CORRECTION  
SIX YEAR PLAN**

*Program Expenses*

Carry-Over City Capital Funds	City Capital Funds	Projects by Year Contract was Awarded	Estimated Total Project Cost	Fund Split			Estimated Remaining Funds
				% Local	% Match	Outside Funding Secured	
\$518,000	\$713,400	<b>2016</b>					
		Wall Inspection & Program Management	\$50,000	100%	0%	N/A	
		Project Design & Management	\$250,000	100%	0%	N/A	
		TROD and Contract Maintenance Work	\$50,000	100%	0%	N/A	
		Hillside Avenue @ Tyler Landslide Correction	\$625,000	50%	50%	Yes	
		Colerain Avenue Retaining Wall Repairs	\$30,000	N/A	N/A	No	
		Dorchester Avenue Retaining Wall Rehabilitation	\$100,000	100%	0%	N/A	
		<b>Total Expenses</b>	<b>\$1,105,000</b>				<b>\$438,900</b>
\$438,900	\$850,000	<b>2017</b>					
		Wall Inspection & Program Management	\$50,000	100%	0%	N/A	
		Project Design & Management	\$250,000	100%	0%	N/A	
		TROD and Contract Maintenance Work	\$50,000	100%	0%	N/A	
		District Wall Repairs and Replacements	\$400,000	100%	0%	N/A	
		Riverside Drive Landslide Stabilization	\$350,000	100%	0%	N/A	
		<b>Total Expenses</b>	<b>\$1,100,000</b>				<b>\$188,900</b>
\$188,900	\$850,000	<b>2018</b>					
		Wall Inspection & Program Management	\$50,000	100%	0%	N/A	
		Project Design & Management	\$250,000	100%	0%	N/A	
		TROD and Contract Maintenance Work	\$10,000	100%	0%	N/A	
		Cummins Street Phase I	\$500,000	100%	0%	N/A	
		<b>Total Expenses</b>	<b>\$810,000</b>				<b>\$228,900</b>
\$228,900	\$850,000	<b>2019</b>					
		Wall Inspection & Program Management	\$50,000	100%	0%	N/A	
		Project Design & Management	\$250,000	100%	0%	N/A	
		TROD and Contract Maintenance Work	\$50,000	100%	0%	Yes	
		Cummins Street Phase II	\$500,000	100%	0%	N/A	
		<b>Total Expenses</b>	<b>\$850,000</b>				<b>\$228,900</b>
\$228,900	\$895,300	<b>2020</b>					
		Wall Inspection & Program Management	\$50,000	100%	0%	N/A	
		Project Design & Management	\$250,000	100%	0%	N/A	
		Cummins Street Phase III	\$500,000	100%	0%	N/A	
		TROD and Contract Maintenance Work	\$100,000	100%	0%	N/A	
		<b>Total Expenses</b>	<b>\$900,000</b>				<b>\$178,900</b>
\$178,900		<b>2021</b>					
		Wall Inspection & Program Management	\$50,000	100%	0%	N/A	
		Project Design & Management	\$250,000	100%	0%	N/A	
		TROD and Contract Maintenance Work	\$50,000	100%	0%	N/A	
		Riverside Drive Wall and Railing Repair	\$500,000	100%	0%	N/A	
		District Wall Repairs and Replacements	\$300,000	100%	0%	N/A	
		Hillside Avenue @ Henrietta Avenue Landslide Correction	\$300,000	100%	0%	N/A	
		Art Museum Drive Landslide Correction	\$425,000	100%	0%	N/A	
		<b>Total Expenses</b>	<b>\$1,875,000</b>				<b>(\$800,800)</b>

## 2016 Capital Improvement Projects

Capital Improvement Projects scheduled for construction in CY 2016 include Hillside Avenue at Tyler Avenue, Dorchester Avenue Wall Rehabilitation and Colerain Avenue Retaining Wall Repairs.

### **Hillside Avenue at Tyler Avenue** – Estimated cost - \$625,000

A landslide exists within Hillside Avenue east of its intersection with Tyler Avenue. The headscarp of the landslide is within Hillside Avenue and extends westward into Tyler Avenue. Vertical offset along the headscarp requires continued maintenance to level the pavement and the sealing of tension cracks in order to prevent the infiltration of surface water into the subsurface. The pavement condition and ride quality are in critical condition due to continuous damage caused by movement of a landslide. Permanent pavement repair cannot be performed until the landslide is stabilized. A subsurface investigation indicates the slip surface is at the top of rock which varies from twelve to thirty feet below the existing ground surface.



Hillside Avenue east of Tyler. Note sealing of tension cracks in roadway.

A 48 inch sewer line runs perpendicular to the slope and is located within the landslide. A twelve inch water main is located within Hillside Avenue at the edge of the pavement

of the inbound lane. Continued movement of the landslide will eventually affect the integrity of the utilities. A break of any of these utilities will cause the introduction of water into the landslide which could lead to a sudden a drastic movement requiring emergency closure of the road.

The City is in the process of accepting ownership of the foreclosed property below the roadway at 3891 Hillside Avenue. Stabilization of the landslide will be accomplished by grading the slope below Hillside Avenue and the construction of an earth buttress on this property. This buttress fill solution is more cost effective then building a wall.

A separate landslide also exists within Hillside Avenue on the west side of Tyler Avenue. This section of roadway will be stabilized with the installation of a drilled pier retaining wall. The 215 foot long wall will be comprised of 30 inch diameter by 20 foot long reinforced concrete drilled piers at 4 feet on center. The space between these piers will be filled with unreinforced concrete "plug" piers.

State of Ohio Capital Improvement Program (SCIP) funding in the amount of \$606,270 has been approved by the Ohio Public Works Commission (OPWC). The funding is at a 50% local match. The scope of the project presented in the SCIP application included the possible relocation of Tyler Avenue. This portion of the project will not be included in the final design due to lack of matching local funds from the Transportation Design Section. Previous applications for SCIP funding were submitted in 2008, 2009, 2010, 2012, and 2014.

**Colerain Avenue Retaining Wall Repairs** – Estimated cost - \$30,000

Automobile Accidents have damaged two sections of the retaining wall on the west side Colerain Avenue. The damaged sections are opposite Tranquility Lane and Raeburn Drive. Both locations are bus stop pad indents in the mile long wall. The repair is expected to be completed by TROD in the spring of 2016.



Damaged Colerain Avenue retaining wall opposite Tranquility Lane.





Damaged Colerain Avenue retaining wall opposite Raeburn Drive.

**Dorchester Avenue Wall Rehabilitation**- Estimated cost - \$100,000

The sidewalk on the south side of Dorchester Avenue had to be closed in 2012 due to ongoing undermining. This undermining began when a stone wall which originally served as a foundation for a structure along Sycamore Street partially collapsed. Building and Inspection has been unsuccessful in determining ownership and responsibility of the original stone wall failure. In order to reopen the sidewalk, a precast large block segmental wall will be constructed in front of the remaining portions of the stone wall. The proposed wall will protect the remaining portion of the wall from further damage and support the walk on Dorchester Avenue. The proposed wall acts primarily as a facing for a relatively stable bedrock cut. Future redevelopment of the parcel will likely involve constructing a new foundation wall as close to the Dorchester right-of-way as possible. This future wall would replace the function of the proposed segmental wall, allowing the blocks to be removed and repurposed by the City. Ownership of the parcel is now with the National Foundation for Community Partnership, Inc. Real Estate is in the process of obtaining a legal agreement that would allow the City to place the block wall on a temporary easement in the private property.



View of Dorchester Avenue from below on Sycamore Avenue. Note undermining of Dorchester wall cap and sidewalk. Shale and limestone bedrock exposed in face of slope.

## **Significant Future Projects**

Three future projects are described in the following text because of various significant reasons. Applications for SCIP funding were submitted in the past for each of the three projects. The Cummins Street project is significant because of its critical state and the estimated cost of the project which is 1.4 million. Art Museum drive is significant because if the project is to move forward a determination needs to be made whether the maintenance of the Art Museum Drive and the associated retaining wall is the responsibility of DOTE or the Park Board. Riverside Drive involves a landslide which occurs on Park Board property which slides over a retaining wall owned by a railroad. Significant movement of the landslide has not occurred since 2011 but the potential for massive movement does exist.

### **Cummins Street**

The existing retaining wall on Cummins Street was constructed in the 1930's. The retaining wall has a length of 1,810 feet and a maximum height of eighteen feet. The roadway of Cummins Street is 2 through lanes and one parking lane on the opposite side of the wall. The total width of the roadway is 30 feet.

The existing retaining wall is in fair condition, the coping which is attached to the wall and the concrete railing which is attached to the coping is in a failed critical condition. Sections of the railing have deteriorated, exposing reinforcing steel. Sections of the railing which appear visually sound crumble within a grasp of the hand. Soundings indicate that the majority of the railing is not sound. Even if sound, the existing railing does not meet crash standards. Applications for SCIP assistance were submitted in 2008 and 2009 but the project was not funded. Guardrail sections have been bolted to the pilasters throughout the years to temporarily repair the railing.

The existing concrete railing and coping needs to be replaced with a Texas Style railing by doweling into the existing retaining wall. The installation of the new concrete railing will require the removal and replacement of the curb. The existing retaining wall is in fair condition and requires removal of disintegrated concrete down to sound concrete and replacement of concrete removed. Soundings revealed approximately 2,000 square feet of unsound concrete. Joints between the panels need to be reconstructed and the entire wall will need to be sealed. The repairs to the retaining wall are essential in order to avoid complete replacement of the retaining structure. Pavement repair is limited to that disturbed due to the excavation for the installation of the concrete railing.

The total estimated cost to replace the railing and repair the wall is \$1,400,000.



Southern portion of Cummins Street retaining wall from below.



Disintegration of railing exposing steel reinforcement most likely due to salt spray.



Sections of concrete railing replaced with guardrail sections bolted to pilasters on Cummins Street.

### **Art Museum Drive**

Hillside movement affects Art Museum Drive for a distance of approximately 500 feet from its intersection with Eden Park Drive. The existing retaining wall constructed in the 1930's is founded within the overburden and is moving down slope within a slow moving slide mass. The movement has caused separation of the sidewalk from the curb, separation of the curb from the roadway and tension cracks within the pavement.

The roadway has an asphalt pavement surface which was resurfaced in 2006. Repairs were also made at this time to the existing sidewalk which contained numerous offsets of individual blocks due to tilting of the slabs. Repairs made in 2006 have since been damaged by the movement. Pavement patching has been performed throughout the years. Additional pavement repair will be required until the landslide is stabilized. A significant number of the wooden guardrail posts are rotted. Sections of the existing wall cap are deteriorated.

The preliminary subsurface investigation indicates that the movement is occurring at the top of rock which is at a depth of approximately 12 feet below the existing ground surface. Stabilization of the landslide could be accomplished by the installation of a drilled pier retaining wall. The piers would be located on the downhill side of the existing retaining wall and consist of twenty-four (24) inch diameter piers spaced on a center to center spacing of eight feet. A wall cap will be installed on top of the piers to connect and buttress the existing retaining wall to the piers eliminating the need for the installation of panels between the piers. The cap of the existing retaining wall would

also be repaired where required. The existing cable guardrail would be replaced with a different guardrail system, most likely a steel backed timber guardrail. The existing pavement of the roadway would be repaired within the limits of the pier wall.

Applications for SCIP assistance were submitted in 2008 and 2009 but the project was not funded. The total estimated cost of the project is approximately \$425,000. Maintenance responsibility of Art Museum Drive, whether DOTE or Parks has not been established.



Patchwork to fill gaps due to hillside movement between curb and pavement.

### **Riverside Drive**

A landslide occurs above the existing retaining wall on the north side of Riverside Drive, US Truck Route 50, immediately west of the Rookwood Railroad Overpass. It extends up the hillside to immediately below Kemper Lane and Columbia Parkway US Route 50. The slide area covers nearly 1.5 acres of hillside. Riverside Drive, US Truck Rt. 50 is one lane in each direction through the Rookwood Overpass. The road curves as it goes under the overpass. West bound traffic is blind to debris which topples over the wall onto the roadway.

Hillside creep and some small flow of debris have overtopped the wall at Riverside Drive for years. Significant movement has not occurred since the spring seasonal rains of 2011. Significant massive acceleration of the landslide however may occur which could result in the entire slide mass overtopping the retaining wall as a debris flow completely covering the road. Water continues to seep over the wall for extended periods of time following rain events, creating hazardous conditions, particularly during freezing weather.

The remediation of the landslide includes the installation of pier wall along the top of the existing wall, the construction of an earth buttress in front of the proposed pier wall and drainage of the hillside. The pier wall has an estimated length of 175 feet and consists of 23 piers each having a total length of 27 feet. Precast panels will be placed between

the piers at a depth of 6 ft. below the tops of the piers. The estimated total length of drainage ditches to divert surface water away from the landslide is 1,000 feet. The drainage ditches will outlet into a ditch inlet and be piped to existing storm sewer lines.

Applications for SCIP assistance were submitted in 2008 and 2009 but the project was not funded. The total estimated cost of the project is approximately \$350,000.



Aerial view of landslide on Riverside Drive west of the Rookwood Overpass. The property above the wall is owned by the Park Board. Note extent of headscarp. Plastic sheet left behind after test pits were dug in 2011 to prevent water from seeping along scarp line into the slide mass. Plastic has since deteriorated and no longer exists.

## SECTION 2

# Retaining Wall Rating Summary

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List of Walls in Poor (3) and Critical Condition



## Structural Condition Rating Definitions

### 0 to 1 Excellent

No-to-very-low extent of very low distress. Defects are minor, are within the normal range for *newly constructed or fabricated* elements, and may include those resulting from fabrication or construction. Ratings of 0-1 are only given to elements with very minor to no distress whatsoever –conditions typically seen only shortly after wall construction or substantial wall repairs.

### 1 to 2 Good

Low-to-moderate extent of low severity distress. Distress does not significantly compromise the element's function, nor is there significant severe distress to major structural components. Ratings of 1 to 2 indicate highly functioning wall elements that are only beginning to show the first signs of distress or weathering.

### 2 to 3 Satisfactory

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 and/or elevated risk of element failure in the long term. Ratings of 2 to 3 indicate functioning wall elements with specific distresses that need to be mitigated to avoid significant repairs or element replacement in the longer term.

### 3 to 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. A rating of 3 to 4 indicates marginally functioning, severely distressed wall elements in jeopardy of failing without element repair or in need of repair to prevent further deterioration at an accelerated rate.

### 4 Critical

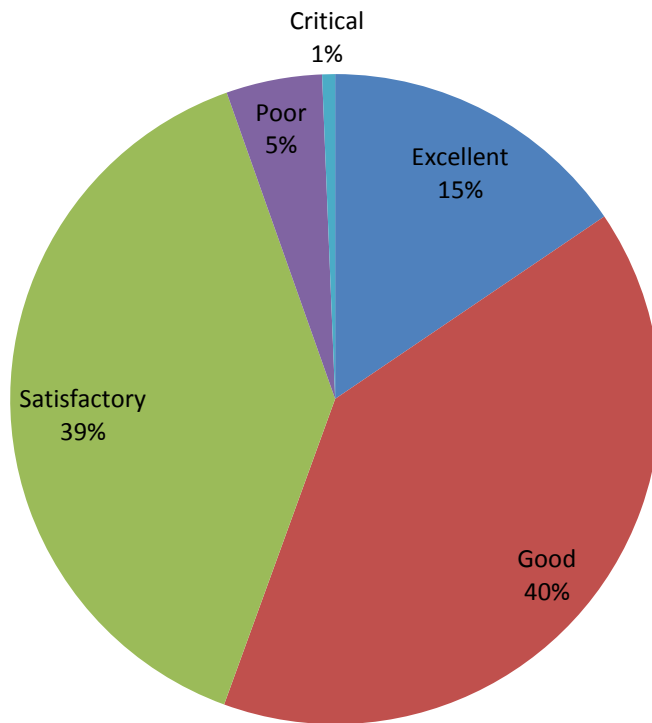
Medium-to-high extent of high severity distress. Element is no longer serving intended function. Element performance is threatening overall stability of the wall at the time of inspection. In practice, a rating of 4 indicates a wall that is no longer functioning as intended, and is in danger of failing.

**2015 Structural Rating Summary for Walls Maintained by DOTE**

RATING	COUNT	PERCENT by COUNT	LENGTH (FEET)	PERCENT by LENGTH	AREA (SQ. FEET)	PERCENT by AREA
Excellent	240	15.50%	38,669	14.62%	218,194	10.67%
Good	620	40.05%	110,526	41.79%	886,325	43.32%
Satisfactory	604	39.02%	98,334	37.18%	796,234	38.92%
Poor	74	4.78%	15,381	5.81%	130,335	6.37%
Critical	10	0.65%	1,596	0.60%	14,770	0.72%
<b>TOTALS</b>	<b>1,548</b>	<b>100%</b>	<b>264,506</b>	<b>100%</b>	<b>2,045,858</b>	<b>100%</b>

50.10  
MILES

**2015 DOTE Maintained Walls**

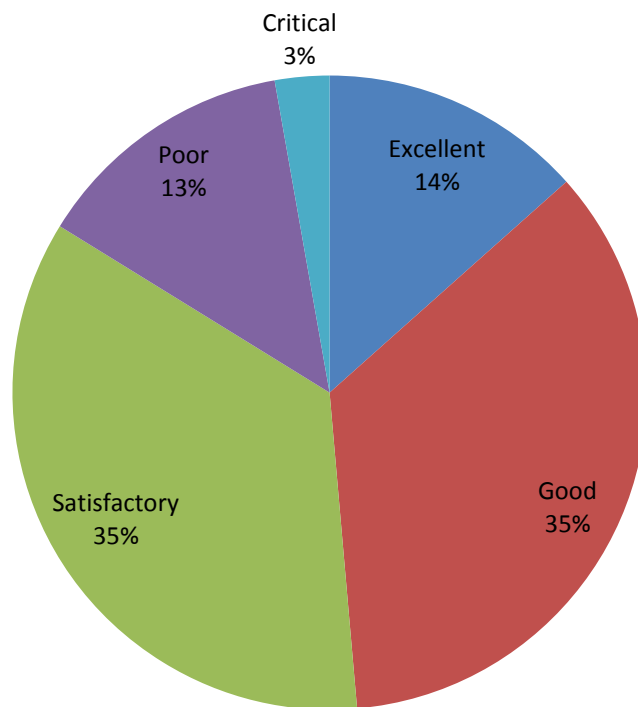


**2015 Stuctural Rating Summary for City Walls NOT MAINTAINED by DOTE**

RATING	COUNT	PERCENT BY COUNT	LENGTH (FEET)	PERCENT by LENGTH	AREA (SQ. FEET)	PERCENT by AREA
Excellent	29	13.43%	2,347	5.03%	28,660	9.66%
Good	76	35.19%	20,602	44.11%	115,410	38.88%
Satisfactory	76	35.19%	18,448	39.50%	120,195	40.49%
Poor	29	13.43%	4,964	10.63%	31,100	10.48%
Critical	6	2.78%	345	0.74%	1,465	0.49%
<b>TOTALS</b>	<b>216</b>	<b>100%</b>	<b>46,706</b>	<b>100%</b>	<b>296,830</b>	<b>100%</b>

8.85  
MILES

**2015 Other City (Non DOTE) Maintained Walls**



## DOTE Maintained Wall with Structural Rating of 3 (Poor Condition) to 4 (Critical Condition)

<u>Wall ID</u>	<u>Side</u>	<u>House Numbers</u>	<u>Street Name</u>	<u>Wall Length</u>	<u>Height (Max)</u>	<u>Wall Type</u>
201-016	S	4235 to 4235	River Road	100	3.6	Cantilever, Concrete
241-009	W	821 to 881	Nebraska Avenue	431	7.3	Cantilever, Concrete
244-008	S	3645 to 3645	Hillside Avenue	60	2.5	Gravity, Mortared Stone
244-019	S	0 to 0	Fithian Street	80	6	Gravity, Block
244-026	N	614 to 614	Baurichter Street	105	4.1	Gravity, Concrete
248-011A	N	986 to 996	Dehli Avenue	198	4	Toe, Concrete
248-011B	N	998 to 1004	Delhi Avenue	276	9	Toe, Concrete
249-014	E	916 to 932	Olive Avenue	94	2.6	Gravity, Concrete
250-059	N	3818 to 3820	Latham Avenue	115	9	Gravity, Dry Stone
251-028	S	2475 to 2481	Queen City Avenue	220	3	Precast Modular
251-029	W	4340 to 4344	Guerley Road	155	4.4	Precast Modular
251-034	S	1999 to 1999	Sunset Lane	15	5	Gravity, Mortared Stone
252-021	N	2726 to 2729	Ruberg Avenue	49	3.7	Gravity, Concrete
281-002	W	4929 to 4929	Kirby Avenue	132	5.5	Gravity, Dry Stone
282-016	W	4703 to 4741	Colerain Avenue	357	8.5	Pier, Cantilever
285-022	W	2035 to 2047	Baltimore Avenue	255	8.1	Gravity, Concrete
286-008	W	2431 to 2437	Saffin Avenue	165	3	Gravity, Mortared Stone
286-037	S	1823 to 1827	Esmonde Street	97	6	Cantilever, Tiedback
286-043C	N	1758 to 1760	Harrison Avenue	430	5	Gravity, Mortared Stone
286-088	S	1681 to 1681	Harrison Avenue	32	3.3	Gravity, Concrete
286-090	W	2301 to 2301	Merton Street	35	6	Gravity, Dry Stone
287-001	W	1327 to 1403	Bowman Avenue	149	10.3	Gravity, Dry Stone
288-022	E	2370 to 2398	Wilder Avenue	436	23.5	Gravity, Concrete
288-039	N	2311 to 2327	Wilder Avenue	249	9.4	Gravity, Concrete
288-080	S	2511 to 2513	Warsaw Avenue	58	4	Gravity, Concrete
288-107A	N	2630 to 2698	Maryland Avenue	378	7.3	Gravity, Dry Stone
294-052	W	0 to 0	Fargo Alley	200	9	Gravity, Mortared Stone
294-062A	E	0 to 0	Cummins Street	450	18	Cantilever, Concrete
294-062B	E	2528 to 2550	Cummins Street	440	5	Cantilever, Concrete
294-062C	E	2552 to 2622	Cummins Street	440	9	Cantilever, Concrete
294-085	S	0 to 0	Queen City Alley	25	2.3	Gravity, Concrete
295-003	W	1115 to 1115	Hopple Street	52	5.2	Gravity, Concrete
325-017	W	4543 to 4547	Mitchell Avenue, West	123	2.6	Precast Modular
325-018	N	0 to 0	Este Avenue	96	3.6	Precast Modular
329-015B	N	512 to 590	Straight Street	245	10.5	Gravity, Dry Stone
329-126A	N	700 to 730	Mcmillan Street, West	380	14.1	Gravity, Concrete
329-126B	N	680 to 700	Mcmillan Street, West	152	6	Gravity, Concrete

## DOTE Maintained Wall with Structural Rating of 3 (Poor Condition) to 4 (Critical Condition)

<u>Wall ID</u>	<u>Side</u>	<u>House Numbers</u>	<u>Street Name</u>	<u>Wall Length</u>	<u>Height (Max)</u>	<u>Wall Type</u>
329-132	W	0 to 0	Hukill Alley	30	1.5	Cantilever, Concrete
329-138	E	339 to 340	City View Place	37	3	Gravity, Mortared Stone
329-147	E	0 to 0	Freeman Avenue Steps	26	5	Gravity, Dry Stone
330-036	W	1776 to 1921	Central Parkway	492	5.3	Gravity, Concrete
330-053A	N	2122 to 2146	Central Avenue	350	13.5	Cantilever, Concrete
330-053B	N	2148 to 2172	Central Avenue	350	13.5	Cantilever, Concrete
330-057	E	0 to 0	Peete Street Steps	33	5.2	Gravity, Concrete
330-063	W	0 to 0	East Alley	198	12.5	Gravity, Mortared Stone
330-065	W	0 to 0	East Alley	102	16	Gravity, Mortared Stone
330-069	W	0 to 0	East Alley	114	11	Gravity, Mortared Stone
330-170	S	1 to 3	Clifton Avenue, East	15	6.7	Gravity, Concrete
335-110	S	0 to 0	St Gregory Place	196	6	Gravity, Concrete
335-125	N	0 to 0	Wareham Drive	187	12.5	Gravity, Concrete
335-165	N	0 to 0	Celestial Steps	41	11	Gravity, Dry Stone
335-217	S	325 to 353	Baum Street	255	20	Gravity, Dry Stone
337-192	N	0 to 0	Mcgregor Avenue	100	6	Gravity, Concrete
337-242	W	0 to 0	Presley Alley	150	4	Gravity, Mortared Stone
339-065	S	511 to 517	Forest Avenue	84	1	Toe, Concrete
339-088	S	34 to 62	Forest Avenue	397	4.4	Toe, Concrete
339-091	N	0 to 0	Rockdale Avenue	170	13	Cantilever, Concrete
367-013	N	0 to 684	Clinton Springs Avenue	330	7.4	Cantilever, Concrete
368-001	W	1015 to 1019	Dana Avenue	159	5.7	Toe, Concrete
370-125	N	1708 to 1708	William Howard Taft Rd.	32	4.3	Gravity, Mortared Stone
371-050A	E	1499 to 1525	Riverside Drive	460	11	Gravity, Mortared Stone
371-050B	S	1451 to 1497	Riverside Drive	460	9	Gravity, Mortared Stone
371-050C	S	1401 to 1449	Riverside Drive	460	7.5	Gravity, Mortared Stone
371-054	E	0 to 0	Kemper Lane	235	6.2	Gravity, Mortared Stone
371-055	E	0 to 0	Kemper Lane	321	13	Cantilever, Concrete
371-056	E	0 to 0	Kemper Lane	390	14.5	Cantilever, Concrete
371-058	S	2004 to 2005	Edgecliff Point	33	4	Gravity, Mortared Stone
371-074	S	0 to 0	Columbia Parkway	90	16	Cantilever, Concrete
372-007	N	0 to 0	Columbia Parkway	225	7.6	Gravity, Mortared Stone
409-050	N	3000 to 3026	Columbia Parkway	460	12	Toe, Concrete
409-051	N	0 to 0	Columbia Parkway	72	2.8	Toe, Concrete
422-057	W	4540 to 4598	Columbia Parkway	430	10	Toe, Concrete
452-001A	E	5776 to 5794	Kennedy Avenue	305	4.2	Gravity, Dry Stone
452-001B	E	5766 to 5774	Kennedy Avenue	318	4.7	Gravity, Dry Stone

### DOTE Maintained Wall with Structural Rating of 4 (Critical Condition)

<u>Wall ID</u>	<u>Side</u>	<u>House Numbers</u>	<u>Street Name</u>	<u>Wall Length</u>	<u>Height (Max)</u>	<u>Wall Type</u>
422-080	N	3596 to 3598	Handman Avenue	95	5.5	Mechanically Stabilized
423-104	W	647 to 647	Delta Avenue	20	2	Gravity, Concrete
244-006A	S	3645 to 3645	Hillside Avenue	55	3	Gravity, Mortared Stone
244-006B	S	3645 to 3645	Hillside Avenue	41	3	Gravity, Dry Stone
252-016	W	2907 to 2935	Hoadly Court	312	4.6	Gravity, Mortared Stone
286-086	W	2497 to 2499	Seegar Avenue	30	5	Gravity, Dry Stone
287-005	E	1300 to 1302	Lockwood Avenue	70	11.5	Gravity, Mortared Stone
288-107B	N	0 to 0	Maryland Avenue	183	7.5	Gravity, Dry Stone
294-062D	E	2624 to 2660	Cummins Street	480	15	Cantilever, Concrete
329-133A	W	0 to 0	East Alley	310	10.5	Gravity, Mortared Stone
				1596		

**City owned Walls Not Maintained by DOTE  
with Structural Rating of 3 (Poor Condition) to 4 (Critical Condition)**

<u>Wall ID</u>	<u>Side</u>	<u>House Numbers</u>	<u>Street Name</u>	<u>Wall Length</u>	<u>Height (Max)</u>	<u>Wall Type</u>
286-150	N	1710 to 1710	HARRISON AVENUE	13	4	Gravity, Concrete
289-005	W	351 to 379	Elberon Avenue	485	18.6	Gravity, Mortared Stone
297-099	N	4123 to 4125	VIRGINIA AVENUE	46	3	Gravity, Mortared Stone
327-003	N	500 to 502	Mcalpin Avenue	288	6	Gravity, Mortared Stone
327-015	N	328 to 328	Mcalpin Avenue	234	2	Gravity, Concrete
330-025	N	20 to 40	Back Street	258	2.5	Gravity, Mortared Stone
330-237	S	6 to 12	Hust Alley	90	12	Cantilever, Concrete
331-026	S	0 to 0	Clark Street	133	2	Cantilever, Concrete
335-211	W	1301 to 1301	Sycamore Street	316	3	Tee- Wall
335-283	S	0 to 0	Cannon Alley	24	3	Gravity, Mortared Stone
335-349	N	0 to 0	Celestial Street Steps	150	4	Gravity, Mortared Stone
336-162	W	0 to 0	Eleanor Place	72	6.5	Gravity, Mortared Stone
336-268	E	1799 to 1799	Art Museum Drive	648	3.5	Gravity, Concrete
336-309	E	0 to 0	Gilbert Avenue	580	3.5	Gravity, Dry Stone
336-376	E	2044 to 2056	Gilbert Avenue	164	3.5	Gravity, Dry Stone
337-055	E	2520 to 2520	Euclid Avenue	33	2.8	Gravity, Mortared Stone
337-108	S	0 to 0	Leroy Court	148	7.3	Gravity, Brick
337-311	E	2600 to 2600	Van Street Parking Lot	60	5	Toe, Concrete
339-077	S	0 to 0	Forest Avenue	187	4	Gravity, Mortared Stone
339-078	S	0 to 0	Forest Avenue	90	4	Gravity, Mortared Stone
339-079	S	0 to 0	Forest Avenue	131	3	Gravity, Mortared Stone
368-029	S	897 to 897	Clinton Springs Avenue	90	1.5	Gravity, Mortared Stone
371-052	W	619 to 619	Kemper Lane	50	5.7	Gravity, Mortared Stone
371-088	E	0 to 0	Martin Drive	233	2.2	Gravity, Mortared Stone
372-008	N	0 to 0	Columbia Parkway	120	9	Gravity, Mortared Stone
375-118	S	2425 to 2445	Riverside Drive	124	3	Gravity, Mortared Stone
375-155	N	2342 to 2352	Gladstone Av (Private)	180	9	Gravity, Dry Stone
409-068	N	2998 to 2998	Riverside Drive	8	2	Gravity, Brick
409-069	N	3000 to 3000	Riverside Drive	9	2	Gravity, Brick

**City owned Walls Not Maintained by DOTE with Structural Rating of 4 (Critical Condition)**

<u>Wall ID</u>	<u>Side</u>	<u>House Numbers</u>	<u>Street Name</u>	<u>Wall Length</u>	<u>Height (Max)</u>	<u>Wall Type</u>
330-152A	E	0 to 0	Elysian Place	36	7	Gravity, Mortared Stone
335-333	S	995 to 1001	Hill Street	100	8	Gravity, Mortared Stone
335-269	S	0 to 0	Bolivar Alley	40	5	Gravity, Mortared Stone
281-029	E	0 to 0	Kirby Avenue	11	4	Precast Modular
288-130	W	611 to 615	MARYLAND AVENUE	108	7.3	Gravity, Mortared Stone
375-115	S	333	COLUMBIA PARKWAY	50	1.8	Gravity, Mortared Stone



## SECTION 3

# Wall Repair Priority and Estimated Funding

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Priority and Estimated Funding – Landslide  
Stabilization Projects

## WALL REPAIR PRIORITY & ESTIMATED FUNDING

WALL#	STREET	T	COMMENTS	PR	LEN	AREA	FUND	COMMENTS	EST.
201-016	River Rd	C	deteriorated, cracks	HIGH	100	700	maint.	TROD, chip and patch	\$3,000.00
241-009	Nebraska Av	C	deteriorated, cracks	MED	431	2260	capital	Chip and patch	\$40,000.00
244-006A	Hillside Av	S	deteriorated	LOW	55	150	capital	monitor, replace with modular	\$22,000.00
244-006B	Hillside Av	S	deteriorated	LOW	41	120	capital	monitor	\$16,400.00
244-008	Hillside Av	S	moved and settled	LOW	60	120	capital	monitor, replace with modular	\$24,000.00
244-019	Fithian St	B	bulged	LOW	80	450	capital	monitor, replace with modular	\$32,000.00
244-026	Baurichter St	C	cracked, leaning	LOW	105	450	capital	monitor, replace with modular	\$28,000.00
248-011A	Delhi Av	C	delaminated toewalk	LOW	198	750	capital	monitor, chip and patch toe	\$10,000.00
248-011B	Delhi Av	C	delaminated toewalk	LOW	276	2500	capital	monitor, chip and patch toe	\$10,000.00
249-014	Olive Av	C	leaning	LOW	94	280	maint.	monitor, replace with concrete	\$10,000.00
250-059	Latham Av	S	stones missing	LOW	50	850	capital	replace with modular	\$15,000.00
251-028	Queen City Av	B	wrecked & salt damage	LOW	220	800	capital	monitor, replace with modular	\$30,000.00
251-029	Guerley Rd	B	loose caps & salt damage	HIGH	155	600	capital	CIP cap and repair	\$15,000.00
251-034	Sunset Ln	S	tilted wall & eroded area	LOW	15	70	capital	monitor, replace with modular	\$12,000.00
281-002	Kirby Av	M	replace deteriorated wall	LOW	132	650	maint.	TROD, rebuild areas with stone	\$5,000.00
282-016	Colerain Av	C	wrecked busstop area	HIGH	357	3000	capital	TROD, Reconstruct CIP	\$30,000.00
285-022	Baltimore Av	C	deteriorated cap	LOW	255	1050	maint.	TROD	\$4,000.00
286-008	Saffin St	S	deteriorated wall & steps	LOW	165	450	capital	moniter,rebuild existing	\$30,000.00
286-037	Esmonde St	T	rotten railroad ties	HIGH	97	500	capital	replace with modular	\$35,000.00
286-043C	Harrison Av	S	broken pilasters	MED	430	2700	maint.	repair existing	\$5,000.00
286-086	Seegar Av	S	mostly fallen	LOW	30	140	maint.	abandon	\$0.00
286-088	Harrison Av	C	delaminated wall & cap	HIGH	32	160	capital	replace CIP cap and railing	\$15,000.00
286-090	Merton St	S	moved and settled	LOW	35	100	capital	repair existing stone	\$15,000.00
287-001	Bowman Av	S	broken cap & steps	LOW	149	1500	capital	Replace cap, mortar	\$28,000.00
287-005	Lockwood Av	S	cracked corner	LOW	70	900	capital	monitor, repair stone replace cap	\$35,000.00
288-022	Wilder Av	C	deteriorated, cracks	HIGH	436	9500	capital	chip and patch	\$85,000.00
288-039	Wilder Av	C	delaminations	HIGH	249	2400	capital	chip and patch	\$3,600.00
288-080	Warsaw	C	leaning	LOW	20	350	capital	monitor, replace with CIP	\$18,000.00
288-107A	Maryland Av	S	deteriorated & bulged	LOW	378	2700	capital	rebuild stone	\$300,000.00
288-107B	Maryland Av	S	deteriorated & large gap	LOW	183	1300	capital	future Structure's project	\$150,000.00
294-052	Fargo Al	S	bulge, broken end & cap	LOW	200	1350	capital	monitor, rebuild stone	\$30,000.00
294-062A	Cummins St	C	delaminated cap & railing	HIGH	450	5500	capital	monitor, new CIP barrier	\$450,000.00
294-062B	Cummins St	C	delaminated cap & railing	HIGH	440	1600	capital	monitor, new CIP barrier	\$444,000.00
294-062C	Cummins St	C	delaminated cap & railing	HIGH	440	3000	capital	monitor, new CIP barrier	\$444,000.00
294-062D	Cummins St	C	delaminated cap & railing	HIGH	480	5000	capital	monitor, new CIP barrier	\$480,000.00
294-085	Queen City Al	C	broken end & cap	LOW	25	100	maint.	abandon	\$0.00
295-003	Hopple St	C	large crack	LOW	52	320	maint.	removed by I-75 project	\$0.00
299-002B	Hamilton Av	S	loose stones	MED	198	1050	maint.	remortar stones	\$10,000.00
325-017	Mitchell Av	PM	wrecked ends	LOW	50	100	maint.	gateway, coordinate with Architecture	\$3,000.00
329-015B	Straight St	S	bulged & tilted	LOW	245	2400	capital	monitor, replace	\$280,000.00
329-126A	McMillan St	C	broken end & railing	MED	380	2200	capital	TROD	\$76,000.00
329-126B	McMillan St	C	broken cap	MED	152	1200	capital	TROD	\$31,000.00
329-132	Hukill Al	C	broken cap	LOW	30	65	capital	abandon	\$0.00
329-133A	East Alley	S	bulge fell	LOW	310	3000	capital	Monitor, rebuild stone in sections	\$40,000.00
329-138	City View Pl	S	broken ends	HIGH	37	130	maint.	Repaired in 2015	\$0.00
329-147	Freeman Av	S	large cracks	LOW	26	225	maint.	abandon	\$0.00
330-036	Central Pkwy	C	tilted, deteriorated cap	MED	492	1700	capital	monitor, chip and patch	\$40,000.00
330-053B	Central Av	C	broken cap & spalled face	MED	350	3700	maint.	Chip and patch	\$74,000.00
330-057	Peete St	C	delaminated face	HIGH	33	250	maint.	Chip and patch	\$5,000.00
330-063	East Alley	S	bulged	LOW	198	2400	capital	Monitor, rebuild stone in sections	\$40,000.00
330-065	East Alley	S	bulged	LOW	102	1800	capital	Monitor, rebuild stone in sections	\$40,000.00
330-069	East Alley	S	bulged	LOW	114	1500	capital	Monitor, rebuild stone in sections	\$40,000.00
330-170	Clifton Av	C	delaminated face	HIGH	15	125	maint.	Chip and patch	\$3,000.00
335-110	St Gregory Pl	C	delaminated upper part	LOW	196	650	capital	repair cap	\$20,000.00
335-125	Wareham Dr	C	delaminated cap	LOW	187	2900	maint.	repair cap, gunite face, pvt. Development	\$79,000.00
335-165	Celestial St	S	cracked corner	LOW	41	550	maint.	monitor, rebuild stone	\$10,000.00
335-217	Baum St (rear)	S	3 fallen areas	LOW	255	3200	capital	monitor, supports City park, rebuild	\$25,000.00
336-307	Dorchester St	S	deteriorated cap	LOW	62	750	capital	replace with modular	\$35,000.00
337-192	McGregor Av	C	crumbled foundation	LOW	100	500	maint.	abandon, regrade if necessary	\$3,000.00
337-242	Presley Al	S	bulged and moved	LOW	150	700	capital	monitor, rebuild stone, railing	\$40,000.00
339-065	Forest Av	C	tilted panel	LOW	84	100	maint.	replace w/curb wall	\$10,000.00

339-085	Harvey Av	C	wall is too low	LOW	33	60	capital	Trans. Design Project	\$0.00
339-088	Forest Av	C	broken toewalk	LOW	397	1700	maint.	repair toe	\$5,000.00
339-091	Rockdale Av	C	deteriorated concrete	LOW	170	1600	capital	Replace wall with CIP	\$85,000.00
368-001	Dana Av	C	delaminated toewalk	HIGH	159	850	maint.	repair toe	\$5,000.00
370-125	Wm H Taft Rd	S	bulged under sidewalk	LOW	32	125	capital	monitor, replace cap	\$10,000.00
371-050A	Riverside Dr	S	deteriorated cap	MED	460	5200	capital	replace cap & mortar	\$225,000.00
371-050B	Riverside Dr	S	deteriorated cap	MED	460	4400	capital	replace cap & mortar	\$225,000.00
371-050C	Riverside Dr	S	deteriorated cap	MED	460	2500	capital	replace cap & mortar	\$225,000.00
371-054	Kemper Ln	S	cap partially missing	LOW	235	1300	capital	Replace Wall	\$235,000.00
371-055	Kemper Ln	C	top delaminated	LOW	321	3600	capital	Replace Wall	\$321,000.00
371-056	Kemper Ln	C	moved	LOW	390	3400	capital	Replace Wall	\$390,000.00
371-074	Col. Pkwy	C	delaminated face	HIGH	90	1400	capital	Chip and patch, repaint	\$18,000.00
372-007	Col. Pkwy	s	broken cap	HIGH	225	1350	maint.	Mortar and patch	\$3,000.00
409-050	Col. Pkwy	C	deteriorated end	HIGH	460	5900	maint.	Chip and patch	\$5,000.00
409-051	Col. Pkwy	C	deteriorated end	HIGH	72	250	maint.	Chip and patch	\$5,000.00
422-057	Col. Pkwy	C	toewalk broken & heaved	LOW	430	4000	maint.	Chip and patch	\$5,000.00
422-080	Handman Av	PM	large utility gap by others	HIGH	95	550	maint.	private development to repair	\$0.00
423-104	Delta Av	C	damaged wall	LOW	20	40	capital	replace with modular	\$25,000.00
452-001A	Kennedy Av	S	bulged	LOW	318	1900	capital	monitor, rebuild existing	\$15,000.00
452-001B	Kennedy Av	S	bulged & moved	LOW	318	1900	capital	monitor, rebuild existing	\$15,000.00
460-002	Salem Rd	S	half fell 1/2012	HIGH	82	450	capital	Replaced 2014	\$0.00

T = Wall Type

PR = Priority

**TOTAL Maintenance & Capital Costs** \$5,595,000.00

Maintenance Cost

HIGH \$29,000.00  
MED \$89,000.00  
LOW \$134,000.00  


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**TOTAL \$252,000.00**

Capital Cost

HIGH \$2,019,600.00  
MED \$862,000.00  
LOW \$2,461,400.00  


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**TOTAL \$5,343,000.00**

## Landslide Correction Projects & Estimated Funding

LOCATION	PRIORITY	EST.
Hillside Avenue @ Tyler Avenue	HIGH	\$625,000
Dorchester Rock Cut Stabilization	HIGH	\$100,000
Tusculum Avenue	MED	\$250,000
Riverside Drive @ Rookwood Overpass	MED	\$350,000
Art Museum Drive Retaining Wall	LOW	\$425,000
Hillside Avenue @ Henrietta Avenue	LOW	\$300,000

**TOTAL COST                    \$2,050,000**

SECTION 4

# 2015 Retaining Wall Inspection Summary

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New Walls Added to Inventory

# Retaining Wall Inspection Criteria\*

## DIVISIONS (# of items in each Division)

- Structural (12 items)
- Drainage (5 items)
- Cosmetic (4 items)
- Miscellaneous (5 items)

### Each Item Rated

0 = No Problems

1 = Minor Problems

2 = Moderate Problems

3 = Severe Problems

4 = Critical Problems

N/A = Not Applicable

Each Division – Given an Average Rating (Sum of Individual Items in Division / # of Items rated)

## OVERALL WALL RATING (General Condition)

Sum of the average of the four Divisions (Structural, Drainage, Cosmetic, Misc.) Excludes any N/A Ratings

Example:

Structural Avg. - 2.0

Drainage Avg. – 3.0

Cosmetic Avg. – 2.0

Miscellaneous Avg. N/A

Overall Wall Rating = 7 (Sum of Ratings) / 3 (Number of Subjects) = 2.3 (Rating)

**TOTAL AVERAGES OF WALLS INSPECTED IN 2015 CYCLE**

<b><u>2015 INSPECTION CYCLE</u></b>								
Maintenance	Wall Count	Total Length (Lin. Ft.)	Total Exposed Area (Sq. Ft.)	Avg. Structural	Avg. Drainage	Ave. Cosmetic	Avg. Misc.	Avg. Overall
Agreement	1	100.00	424.00	1.90	2.00	1.00	2.67	1.94
Community Development	3	311.00	900.00	0.24	0.11	0.50	0.67	0.34
Fire Department	4	453.00	4,250.00	0.29	0.54	1.00	0.75	0.54
General Services	18	3,432.00	31,720.00	0.17	0.15	0.39	0.28	0.21
Hamilton County	9	4,184.00	73,650.00	0.33	0.53	1.67	1.03	0.60
Park Board	12	3,211.00	17,180.00	0.42	0.33	0.94	0.51	0.49
Recreation Department	12	2,298.00	15,550.00	0.57	0.40	0.90	0.80	0.63
Transportation And Engineering	164	24,312.00	274,955.00	0.38	0.54	0.59	0.94	0.56
Water Department	1	14.00	50.00	0.20	0.00	0.00	0.00	0.13
<b>2015 TOTALS:</b>	<b>224</b>	<b>38,315.00</b> <b>7.12 Miles</b>	<b>418,679.00</b>	<b>0.50</b>	<b>0.51</b>	<b>0.78</b>	<b>0.85</b>	<b>0.60</b>

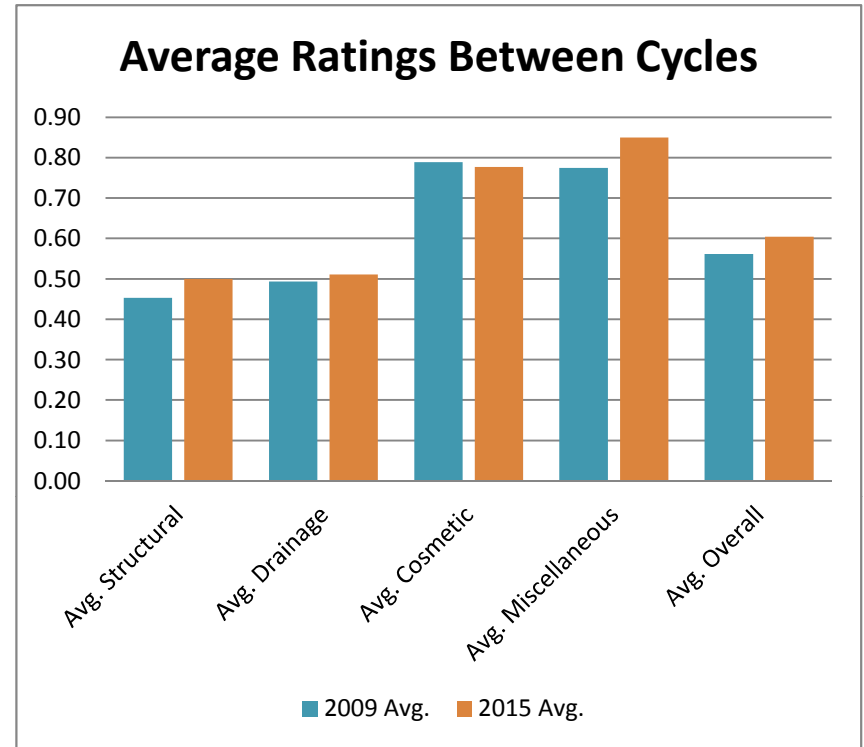
<b><u>2009 INSPECTION CYCLE</u></b>								
Maintenance	Wall Count	Total Length (Lin. Ft.)	Total Exposed Area (Sq. Ft.)	Avg. Structural	Avg. Drainage	Ave. Cosmetic	Avg. Misc.	Avg. Overall
Agreement	1	100.00	424.00	1.90	2.00	1.00	2.67	1.94
Community Development	3	311.00	900.00	0.24	0.11	0.50	0.58	0.32
Fire Department	4	363.00	2,550.00	0.17	0.50	0.92	0.42	0.40
General Services	18	3,578.00	31,720.00	0.12	0.15	0.28	0.24	0.17
Hamilton County	9	4,184.00	73,650.00	0.32	0.53	1.67	1.03	0.61
Park Board	12	3,211.00	17,180.00	0.39	0.33	0.96	0.47	0.47
Recreation Department	12	2,298.00	15,550.00	0.49	0.31	0.86	0.63	0.54
Transportation And Engineering	170	25,114.00	290,655.00	0.35	0.51	0.91	0.93	0.53
Water Department	1	14.00	50.00	0.10	0.00	0.00	0.00	0.07
<b>2009 TOTALS:</b>	<b>230</b>	<b>39,173.00</b> <b>7.42 Miles</b>	<b>432,679.00</b>	<b>0.45</b>	<b>0.49</b>	<b>0.79</b>	<b>0.77</b>	<b>0.56</b>

**TOTAL AVERAGES OF WALLS INSPECTED IN 2015 CYCLE**

**Transportation & Engineering Owned Walls**

	0-1	1-2	2-3	3-4
Avg. Structural	214	10	0	0
<i>Avg. Structural</i>	<i>222</i>	<i>9</i>	<i>0</i>	<i>0</i>
Avg. Drainage	203	20	1	0
<i>Avg. Drainage</i>	<i>211</i>	<i>19</i>	<i>1</i>	<i>0</i>
Avg. Cosmetic	172	47	5	0
<i>Avg. Cosmetic</i>	<i>177</i>	<i>46</i>	<i>8</i>	<i>0</i>
Avg. Miscellaneous	153	63	7	1
<i>Avg. Miscellaneous</i>	<i>162</i>	<i>60</i>	<i>8</i>	<i>1</i>
Avg. Overall	206	19	0	0
<i>Avg. Overall</i>	<i>212</i>	<i>19</i>	<i>0</i>	<i>0</i>

*2009 Averages are Italicized*





## Transportation and Engineering Maintained Walls - Changes from 2009 to 20015

Wall No	Com Descrip	Street	Wall Height	Wall Length	Wall Type	Avg Struct '09	Avg Struct '15
292-011	Queensgate	Mclean Street	750	142	Cantilever, Concrete	0.180	0.270
294-043	West End	Central Parkway	3400	390	Cantilever, Concrete	0.450	0.540
294-044	Over-the-Rhine	Central Parkway	8000	410	Gravity, Concrete	0.640	0.650
329-104	Over-the-Rhine	Kress Alley	300	42	Cantilever, Concrete	0.000	0.090
329-171	Over-the-Rhine	Conroy Street	550	78	Cantilever, Concrete	0.080	0.170
329-266	Over-the-Rhine	Kress Alley Steps	400	56	Gravity, Concrete	1.000	1.080
330-036	West End	Central Parkway	1700	492	Gravity, Concrete	1.100	1.200
330-053A	West End	Central Avenue	13.5	350	Cantilever, Concrete	0.640	0.820
330-053B	West End	Central Avenue	3700	350	Cantilever, Concrete	0.800	0.900
330-073	Over-the-Rhine	Mulberry Street	175	52	Cantilever, Concrete	0.300	0.500
330-075	Over-the-Rhine	Mulberry Street	450	20	Cantilever, Concrete	0.670	0.680
330-078	Over-the-Rhine	Mulberry Street	700	180	Pier, Cantilever	0.090	0.270
330-082	Over-the-Rhine	Mulberry Street	75	17	Gravity, Mortared Stone	0.400	0.500
330-144	Over-the-Rhine	Clifton Avenue, East	220	38	Precast Modular	0.000	0.090
332-021B	CBD-Riverfront	Freedom Way, E	28	260	Mechanically Stabilized	0.180	0.360
332-024	CBD-Riverfront	Elm Street	23	467	Mechanically Stabilized	0.180	0.270
332-048	CBD-Riverfront	Mehring Way	3.5	200	Gravity, Concrete	0.000	0.090
332-049	CBD-Riverfront	Mehring Way	1500	200	Gravity, Concrete	0.000	0.090
332-050	CBD-Riverfront	Mehring Way	3.5	1	Gravity, Concrete	0.000	0.090
334-027	CBD-Riverfront	Joe Nuxhall Way	5200	323	Mechanically Stabilized	0.090	0.180
335-048	CBD-Riverfront	Court Street, East	550	177	Cantilever, Concrete	0.750	0.000
335-056	Mt. Adams	Jerome Street	800	100	Gravity, Concrete	0.360	0.450
335-065	Mt. Adams	Carney Street	250	68	Cantilever, Concrete	0.730	0.910
335-066	Mt. Adams	Carney Street	330	83	Cantilever, Concrete	0.910	1.090
335-105	Mt. Adams	Oregon Street	350	44	Precast Modular	0.100	0.200
335-110	Mt. Adams	St Gregory Place	650	196	Gravity, Concrete	1.180	1.270
335-118	Mt. Adams	Baum Street	600	78	Cantilever, Concrete	0.000	0.720
335-124A	Mt. Adams	Wareham Drive	33.1	410	Gravity, Concrete	0.090	0.180
335-125	Mt. Adams	Wareham Drive	2900	187	Gravity, Concrete	0.900	1.000
335-136	Mt. Adams	Martin Drive	4200	302	Toe, Concrete	0.330	0.420
335-141	Mt. Adams	Hill Street	0	153	Pier, Cantilever	0.000	0.270
335-154A	Mt. Adams	Columbia Parkway	18	480	Cantilever, Concrete	0.250	0.330
335-154B	Mt. Adams	Columbia Parkway	11	425	Cantilever, Concrete	0.420	0.500
335-156	Mt. Adams	Columbia Parkway	20	310	Gravity, Mortared Stone	0.420	0.000
335-160	Mt. Adams	Columbia Parkway	1300	260	Toe, Concrete	0.270	0.450
335-162	Mt. Adams	Columbia Parkway	41.5	120	Toe, Concrete	0.330	0.500
335-167	Mt. Adams	Columbia Pkwy., N. Ramp	1400	65	Cantilever, Concrete	0.080	0.190

### Transportation and Engineering Maintained Walls - Changes from 2009 to 20015

Wall No	Com Desctip	Street	Wall Height	Wall Length	Wall Type	Avg Struct '09	Avg Struct '15
335-175D	Mt. Adams	Fort View Steps	4	35	Gravity, Mortared Stone	0.640	0.730
335-313	CBD-Riverfront	Lytle Place	2600	474	Cantilever, Concrete	0.270	0.240
335-314	CBD-Riverfront	Lytle Place	220	71	Cantilever, Concrete	0.270	0.240
335-317	CBD-Riverfront	Us 50 Wb	900	62	Cantilever, Concrete	0.000	0.170
336-006	Pendleton	Pendleton Street	300	64	Cantilever, Concrete	0.000	0.450

**NEW WALLS ADDED TO INVENTORY IN 2015 (CITY WIDE)**

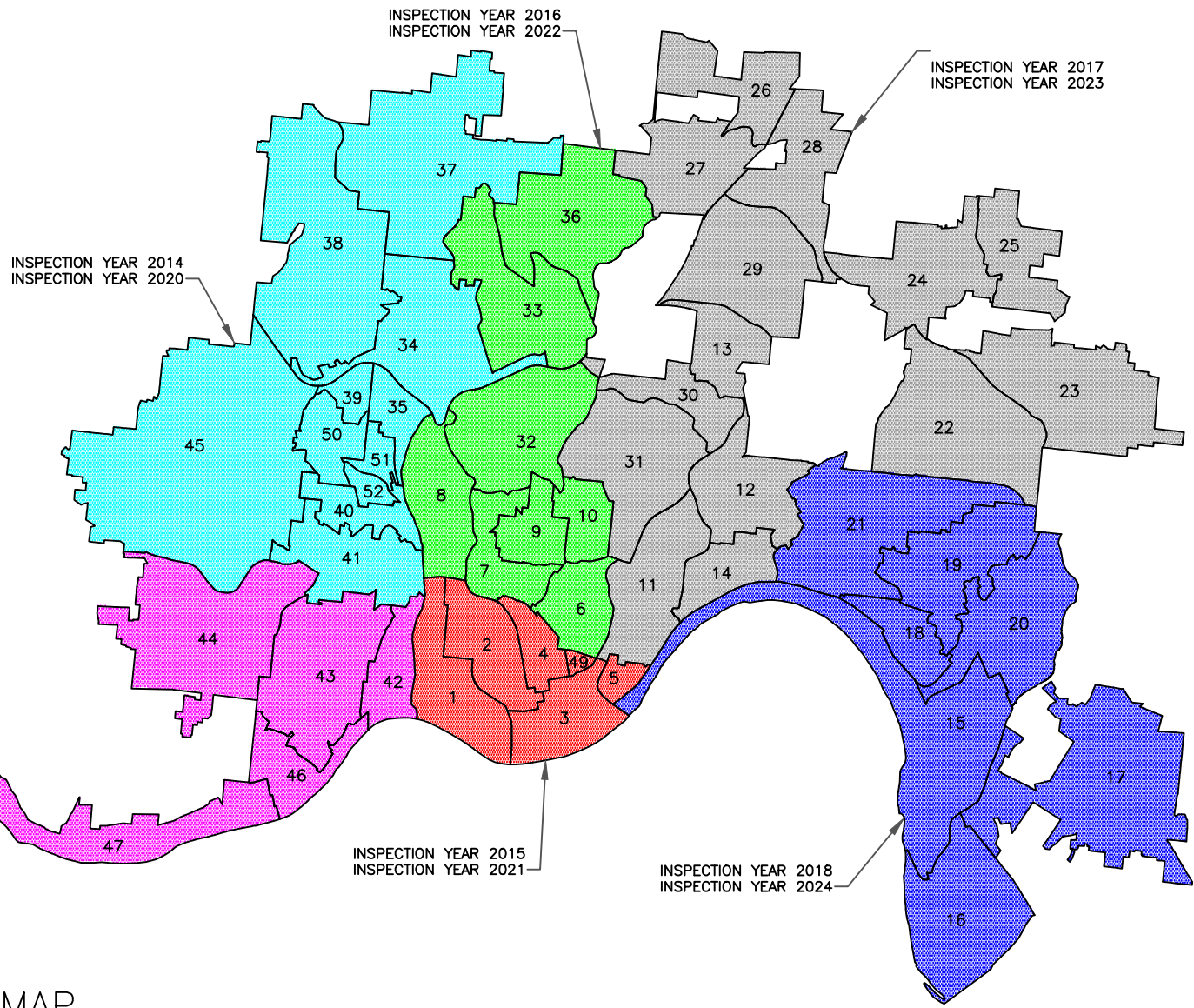
Year Build	Maintenace	Community	Wall Number	Street Name	Wall Length (Lin. Ft.)	Exposed Area (Sq. Ft.)	Wall Type	Wall Type Discription	Date Inventoried
2014	DOTE	38	283-018A	West Fork Road	120	830	PC	Pier, Cantilever	20-May-15
2014	DOTE	6	330-090A	Goethe Street	133	2630	PT	Pier, Tieback	13-May-15
2014	DOTE	6	330-090B	Goethe Street	75	280	PM	Precast Modular	13-May-15
2015	PRIVATE	44	241-029	Glenway Ave	54	95	G1	Gravity, Dry Stone	21-May-15

SECTION 5

# Inspection District Map

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COMMUNITIES			
1	Queensgate	27	Carthage
2	West End	28	Roselawn
3	CBD - Riverfront	29	Bond Hill
4	Over The Rhine	30	North Avondale
5	Mt. Adams	31	Avondale
6	Mt. Auburn	32	Clifton
7	Clifton, University Heights	33	Winton Place
8	Camp Washington	34	Northside
9	University Heights	35	South Comminsville
10	Corryville	36	Winton Hills
11	Walnut Hills	37	College Hill
12	Evanston	38	Mt. Airy
13	Paddock Hills	39	Fay Apartments
14	East Walnut Hills	40	North Fairmont
15	East End	41	South Fairmont
16	California	42	Lower Price Hill
17	Mt. Washington	43	East Price Hill
18	Columbia-Tusculum	44	West Price Hill
19	Mt. Lookout	45	Westwood
20	Linwood	46	Sedamsville
21	Hyde Park	47	Riverside
22	Oakley	48	Saylor Park
23	Madisonville	49	Pendleton
24	Pleasant Ridge	50	East Westwood
25	Kenndey Heights	51	Millvale
26	Hartwell	52	English Woods



INSPECTION CYCLE MAP