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REPORT CARD FOR D.C.'S INFRASTRUCTURE

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BRIDGES

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What You Should Know about D.C.'s Bridges

The District of Columbia has 265 bridge structures; 226 of the bridges are owned by the D.C. Department of Transportation (DDOT) and the remaining 39 are owned by the National Park Service (NPS). The average age of a bridge in D.C. is 58 years, and 80% of the bridges will need to be replaced or rehabilitated in the next 10 years. However, the District made significant strides to reduce the number of structurally deficient bridges from 8% to 3% in just three years. Despite this progress, more than 220,000 trips are taken over a structurally deficient bridge every day and a quarter of bridges have at least one major component in fair condition. Three of the eight structurally deficient bridges, including heavily travelled Arlington Memorial Bridge, are owned by NPS, which lacks a funding mechanism for large rehabilitations.

Condition, Operations and Management

Of the 265 bridge structures in D.C., 226 are owned by DDOT and 39 are owned by National Park Service (NPS). D.C.'s bridges have an average age of 58 years and with an average life span of bridge structures at 50 years, meaning more than 80% of D.C. bridges will need to be replaced or rehabilitated within the next 10 years. DDOT has been successful in steadily reducing the number of structurally deficient bridges, which are bridges that require significant maintenance, rehabilitation, or replacement. These bridges must be inspected more often since critical load-carrying elements were found to be in poor condition due to deterioration or damage.

In just three years, the percentage of structurally deficient bridges in D.C. was reduced from about 8% to 3%. However, one in four D.C. bridges has at least one major component in a fair condition, which is just one step away from being classified as structurally deficient. The list of bridges with at least one major component in a fair condition includes large bridges like H Street Bridge over Washington Terminal Yard, Theodore Roosevelt Bridge, Francis Scott Key Bridge and South Capitol Street Bridge over Anacostia River.

Francis Scott Key Bridge is scheduled to undergo a two year rehabilitation and DDOT just completed rehabilitation of several bridges including 16th Street NW over Military Road, 44th Street NE, Division Avenue and Gault Place NE over Watts Branch, and South Capitol Street Bridge over Anacostia River. South Capitol Street Bridge Phase I Project, which calls for replacement of South Capitol Street Bridge, has been funded by the committee to complete construction by 2020, using approximately $539 million of District funds and $237 million of federal funds.

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Public Safety

Though the percentage of structurally deficient bridges has decreased significantly, it is important to note that more than 220,000 trips per day are still taken across these structurally deficient bridges. With this high volume of traffic on structurally deficient bridges, funding rehabilitation or replacement of these bridges is critical. Just recently, National Park Service had to close two traffic lanes of Arlington Memorial Bridge and place a ten ton weight restriction, eliminating bus traffic.

D.C.'s percentage of structurally deficient bridges is well below national average. However, 60% of all D.C. bridges are classified functionally obsolete, meaning they no longer meet the current standards used today when designing a bridge. Functionally obsolete bridges often have substandard deck geometry, vertical and horizontal under clearances, water adequacy or approach roadway alignment. These functionally obsolete structures can lead to unsafe conditions to the travelling public and add to mounting congestion problems in the District, which costs drivers time and money.

Funding and Future Needs

D.C. bridge projects are funded by a combination of local and federal funds. D.C. has a unique challenge in that there are only two levels of funding available, rather than most major cities which benefit from state as well as city support for repairs.

Some of the major bridge rehabilitation projects necessary for D.C. to reduce the number of structurally deficient bridges have been funded, but more funding needs to be allocated to address these bridges before the total cost of the construction balloons as deterioration reaches dangerous levels.

Apart from DDOT-maintained structurally deficient bridges, D.C. also has several structurally deficient bridges that are maintained by NPS, like Arlington Memorial Bridge, and it is estimated to cost about $250 million to rehabilitate the bridge which includes replacing its bascule span. Unlike state departments of transportation, NPS does not have a funding mechanism to support major projects like rehabilitation of Arlington Memorial Bridge, which presents another unique challenge in addressing D.C.'s aging bridges.

Although DDOT has been doing a commendable job with limited resources and there is significant support from residents and elected officials to support transportation infrastructure development in the District, D.C.'s aging bridges

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continue to need additional funding for preventive maintenance, major rehabilitation or replacement. Looking to the future, the list of D.C. bridges with major components that are in fair condition and that would need major rehabilitation or replacement in the near future includes large bridges like H Street Bridge over Washington Terminal Yard and Theodore Roosevelt Bridge. Theodore Roosevelt Bridge over Potomac River is a major artery into and out of the city.

Metropolitan Washington Council of Governments (MWCOG) forecasts that D.C.'s population will grow from 661,000 in 2015 to 884,000 in 2040 and forecasts that the number of jobs in D.C. will grow from 815,000 in 2015 to 1 million in 2040. To accommodate this increase in need for transportation, it is important to fund all transportation systems well to avoid crippling congestion whether on the roads and bridges or on the transit lines. Through the process of rehabilitating or replacing existing bridges that are in fair condition or structurally deficient bridges, DDOT will need to continue looking at developing pedestrian and multi-modal transportation systems on bridges, similar to the 11th Street Bridge project where design accommodations were made for other modes of transportation. As D.C.'s bridges continue to age, having a "retirement plan" for maintaining or replacing bridges on a consistent schedule will become increasingly important.

Let's Raise the Grade

- Prioritize preventive maintenance of bridges with heavy traffic that have at least one of the major components in fair condition, like Key Bridge and Roosevelt Bridge, in order to bring them to a good condition or replace them before compromising the safety of travelling public.
- Complete rehabilitation or replacement of structurally deficient bridges.
- Avoid adding additional bridges to the structurally deficient list by focusing on preventive maintenance and rehabilitation of bridges in fair condition.
- Prioritize rehabilitation of bridges that are posted for load restriction.
- Fund rehabilitation of heavily trafficked structurally deficient bridges like Arlington Memorial Bridge. Reduce the number of functionally obsolete bridges by identifying substandard safety features that can efficiently be upgraded to meet today's traffic needs.

BRIDGES

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Find Out More

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- District Department of Transportation (DDOT), 11th Street Bridge
- U.S. Department of Transportation, Federal Highway Administration, NBI ASCII Files, 2014
- U.S Department of the Interior, National Park Service, Federal Lands Transportation Program, Arlington Memorial Bridge Repair & Reconstruction

Courtesy: Flickr/IntangibleArts

DRINKING WATER

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What You Should Know about D.C.'s Drinking Water

D.C.'s drinking water comes from the Potomac River, is treated by the Washington Aqueduct, and is then delivered by DC Water. The system supplies approximately 95.8 million gallons per day of water, equivalent to 145 Olympic swimming pools. The system entails 1,350 miles of pipes, equivalent to driving from D.C. to Chicago and back. The pipes' median age is 79 years, beyond the design lifespan of 50 years and 9% of pipes were installed during the period between the Civil War and the 1890s. Recently, DC Water started replacing 1% of pipes a year. While three times the previous year's replacement rate, it is still a 100-year replacement cycle. There are typically 400 to 550 water main breaks a year. The system also includes four pumping stations, five reservoirs, three elevated water storage tanks, and 9,300 fire hydrants.

Condition and Management of D.C.'s Drinking Water

- **Capacity** – Current capacity of drinking water infrastructure is sufficient to meet demands through 2030. The two treatment plants, Dalecarlia and McMillan Water Treatment Plants, have a combined design capacity of 284 millions of gallons per day (MGD), with maximum capacity of 444 MGD. The daily Aqueduct production average is 160 MGD. Consumption rates in the District have been decreasing over the past few years, and in 2014 consumption averaged 95.8 MGD, down from 114.6 MGD in 2008. While accounting for only 75% of the Aqueduct's production, this is well within the design capacity of the system.
- **Condition** – Distribution pipes have a median age of 79 years old, with some pipes dating back to the American Civil War. The District has 400 to 550 water main breaks per year, with 459 breaks in 2014. This averages out to 34 water main break per 100 miles of pipe annually, which is a higher rate relative to the American Water Works Association (AWWA) benchmark. The impact of water main breaks can be severely disruptive, resulting in road closures, down water service, and high cost of repair.
- **Operation and Maintenance** – Increased preventative maintenance has helped to reduce breaks and resulting disruptions. D.C. is currently replacing 1% of the water pipes each year. Preventative maintenance may also help find the 10% of water in the District that is unaccounted for, or lost due to leaky pipes. Out of nearly 9,400 public fire hydrants in the District, nearly 5,400 have been upgraded or replaced since 2004.
- **Public Safety** – Although there have been no Safe Drinking Water Act permit violations in the past decade, lead in the home owners Service Lines continues to be a risk to the system. To monitor the risk, in 2013 more than 5,600 water samples were collected from hydrants, commercial buildings and household taps throughout the District and over 41,000 tests were conducted. The results were that all tests surpassed U.S. Environmental Protection Agency (EPA) drinking water standards.

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Funding and Future Needs for D.C.'s Drinking Water

- **Funding** – D.C. has adequate funding to cover drinking water operations and planned capital investments. Their 2014-2023 Projected Capital Improvement Plan (CIP) will invest $665.7 million in the drinking water system, and the Washington Aqueduct will invest $150 million.
- **Future Need** – DC Water benefits from high credit ratings (Aa2 / AA+ / AA) allowing it cheaper rates in the bond market. As a result, in 2014 DC Water issued $450 million worth of bonds, including a $350 million green bond, allowing it to fund capital projects. In the future, drinking water rates are projected to increase 5% per year to ensure adequate revenue to support the investments needed to upgrade the system and reduce disruptions.
- **Resilience** – Due to D.C.'s high risk geography as the Nation's Capital, the need for resiliency in the system is more acute than in most states and cities. Redundancy has been built into the water system providing some resiliency. This includes two intake locations -- one at Great Falls Dam and one at Little Falls -- two treatment facilities; 110 million gallons of storage capacity via eleven storage facilities, as well as back-up gravity feed to large parts of the system in case of power outages. In addition, the control system is relatively secure and protocols at the treatment plants are in place. However, the system remains vulnerable should a catastrophic event occur.
- **Innovation:** Innovation is a continued focus of the D.C. drinking water system. The result has been some impressive wins, including the early adoption of Advanced Metering Infrastructure (AMI) as well as an innovative public, private partnership with Veolia Water to improve management practices at the Washington Aqueduct. This includes advanced water security and emergency management systems and practices. In addition, investment in fire hydrants have also been made to ensure they meet International Organization for Standardization (ISO) standards, and GIS data is available to the local fire department for just-in-time updates on the status of fire hydrants, including pressure, outages, etc.

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DRINKING WATER

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Let's Raise the Drinking Water Grade

- Continue to replace 1% percent of the drinking water mains every year to improve system reliability and reduce the impact of water main breaks.
- Given the location of sewers and pipes beneath roadways, share the cost of infrastructure upgrades by coordinating water and sewer infrastructure upgrades to coincide with District Department of Transportation roadway projects.
- Continue to invest in the Dalecarlia and McMillan Water Treatment Plants and look at opportunities for public private partnerships at the Washington Aqueduct to gain access to additional financing and private sector management practices and know-how.
- Consider opportunities for improved resiliency through a secondary water source and additional drinking water storage capacity in the system that flows via gravity to the entire city.

Find Out More

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Courtesy: Flickr/[illegible]

ENERGY

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What You Should Know about D.C.'s Energy

Like many cities, D.C. draws its energy from a variety of sources and moves it across the city using a variety of methods – from wires to substations to pipes. D.C.'s energy system is largely the distribution end of electricity generated and natural gas provided from outside its boundaries. The energy system includes 2,230 miles of primary cable and a natural gas network consisting of 2,360 miles of pipeline. Recent growth in the distributed generation capacity within the District, most notably as solar photovoltaic systems, contributes to electricity production. Efforts are underway to make significant improvements in both natural gas and electric systems by 2018, as $3 billion is planned for electricity infrastructure upgrades, and $650 million has been allocated to replace the 50-year old pipelines. The focus is on resiliency, safety, and reliability of the energy system.

Condition and Management of D.C.'s Energy

Electricity Transmission & Distribution

Pepco's service territory includes the 70 square miles of D.C. and 566 square miles in parts of Prince George's and Montgomery Counties in Maryland for over 800,000 customers. The service territory includes:

- 22 transmission substations
- 39 sub-transmission substations
- 116 distribution substations
- 14,266 miles of overhead lines
- 10,718 miles of underground cable
- 2,945 miles of underground conduit

Pepco Distribution System by Construction Type

Jurisdiction	*Type*			*Total Feeder Miles*				*System Miles*
	Number of Overhead (OH) Feeders	*Number of Underground (UG) Feeders*	*Total Feeders*	*OH (Miles)*		*UG (Miles)*		
				Length	*%*	*Length*	*%*	
DC- 4 KV	85	48	133	204.87	58%	150.22	42%	355.09
DC-13 KV	70	552	622	417.02	22%	1,462.63	78%	1,879.65

Note: This table shows the District's primary distribution system by construction type as compared to the rest of the Pepco system. This chart does not include the lower voltage secondary cables or the high voltage substation supplies. It is intended to demonstrate the number of miles of distribution lines that are running along or under the streets of D.C.

Courtesy: Flickr/[illegible]

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Source: Potomac Electric Power Company, "Comprehensive Reliability Plan For District of Columbia Including Distribution System Overview, Reliability Initiatives and Response to Public Service Commission of the District of Columbia Order No. 15568," September 2010.

While load will certainly play a role in future distribution spending as expenditures will increase by $306 million from 2012-2016, the primary concern is reliability, particularly with overhead feeders, which saw a $603 million increase in investment in that same time period. Overhead feeders serve as the primary source of reliability challenges within the District's transmission and distribution infrastructure. In 2010, Shaw Consulting conducted a feasibility study for Pepco on expanding its underground feeder infrastructure, and found that such upgrades may neither be cost effective nor productive in addressing reliability concerns. Most of the key data for reliability, electricity retail sales, etc. dates back to 2012.

In August 2012, D.C. and Pepco established a $1 billion, 10-year DC PLUG (Power Line Undergrounding) Initiative dedicated to evaluating options to reduce outages caused by significant weather events through underground feeder expansion. While D.C. has recognized the importance of addressing feeder reliability issues through additional undergrounding investment, these efforts may not be fully sufficient to address current and future reliability concerns.

Electric Power Generation

As of 2014, there were no purely electric generation assets in operation. In 2012, there were three generation plant units reported at Benning Road, Buzzard Point, and the U.S. General Services Administration's (GSA) Heating and Transmission, but the Benning Road and Buzzard Point power plants ceased operation in 2012. Both plants were scheduled for demolition in 2015. The third plant, the GSA Heating and Transmission plant, is a Combined Heat and Power (CHP) plant that uses natural gas and provides a net summer capacity of 10 MW.

Distributed Generation

D.C. has seen recent growth in the distributed generation capacity that contributes to electricity production, most notably as solar photovoltaic (PV) systems, fueled largely by generous incentive programs. Pepco records the total amount of installed PV capacity in D.C., which grew from 3.55 MW to 5.44 MW between 2011 and 2012. This capacity is spread across 638 grid-interconnected customers who have net metering agreements with Pepco. In addition to PV generating capacity, four CHP units are currently operational in D.C., and provide 14.5 MW total generating capacity.

Courtesy: Flickr: carnes

ENERGY

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Combined Heat and Power Units located in District of Columbia

State	City	Organization Name	Facility Name	Application	SIC4	NAICS	Op Year	Prime Mover	Capacity (kw)	Fuel Type
DC	Washington	General Services Administration (GSA)/ Smithsonian	GSA Smithsonian Central Plant Cogen	General Gov't.	9100	92119	2001	Combustion Turbine	10,000	NG
DC	Washington	Aegis Energy Services	National Archives Building	General Gov't.	9100	92119	2010	Reciprocating Engine	225	NG
DC	Washington	PEPCO Energy	British Embassy	Military/National Security	9721	928120	2010	Reciprocating Engine	250	NG
DC	Washington	Washington Convention Center / Pepco Energy	Washington Convention Center	General Gov't.	9100	92119	2003	Waste Heat to Power	4,000	WAST

Prime Mover Code	Description	Fuel Code	Description
B/ST	Boiler/Steam Turbine	BIOMASS	Biomass, LFG, Digester Gas, Bagasse
CC	Combined Cycle	COAL	Coal
CT	Combustion Turbine	NG	Natural Gas, Propane
FCEL	Fuel Cell	OIL	Oil, Distillate Fuel Oil, Jet Fuel, Kerosene, RFO
MT	Microturbine	WAST	Waste, Waste Heat, MSW, Black Liquor, Blast Furnace Gas, Petroleum Coke, Process Gas
ERENG	Reciprocating Engine	WOOD	Wood, Wood Waste
WHR	Waste Heat Recovery	OTR	Other
OTR	Other		

District Heating

The GSA Heating Operation and Transmission District (HOTD), within the Public Buildings Service (PBS) National Capital Region (NCR), provides steam and chilled water utility service to government and quasi-government customers. Steam is used for heating space and hot water; chilled water is utilized for cooling space and dehumidifying. In FY2005, HOTD serviced 76 customers over approximately 50M gross square feet.

There are four major assets involved in providing HOTD utility services: the Central Heating Plant, the Central Refrigeration Plant, the West Heating Plant, and the Steam Distribution Tunnels. The Central Heating Plant houses five boilers and a boiler-like heat recovery steam generator. The total plant capacity is 1.57M pounds per hour (pph) steam, with a firm capacity (capacity without one of the two largest boilers) of 1.17M pph. The Central Refrigeration Plant, located within the Central Heating Plant, includes eight chillers. Six of the chillers are electric and two chillers are driven by steam turbines. The total chiller capacity is approximately 17,000 tons, with a firm capacity less than 15,000 tons. The West Heating Plant houses five boilers with a total capacity of about 1M pph steam and a firm capacity of about 800,000 pph; however, the West Heating Plant has not been in operation since 2000. The Steam Distribution Tunnel system that moves steam throughout the HOTD service area consists of seven miles of underground tunnel and five miles of buried pipe.

Courtesy: Flickr: [illegible]

ENERGY

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Natural Gas Transmission and Distribution

PHMSA's Office of Pipeline Safety collects a variety of information from the pipeline operators under its jurisdiction, in accordance with pipeline safety regulations. PHMSA provides both data and some descriptive statistics to the public. In 2012, Washington Gas Light Co. reported ownership of about 1,200 total miles of pipeline in D.C. Of that length, 419 miles is cast iron. There is less than 100 miles of unprotected steel, and the majority of the remainder is divided between coated steel and plastic.

Recently, a team of researchers drove a car with spectrometer detection equipment across D.C. and mapped 5,893 natural gas leaks across 1,500 road miles of D.C. They further explored the methane buildup at 19 manholes, and noted that in 12 of them, methane had collected to "potentially explosive levels." Gas leakage of this type can present a safety risk, and also represents a lost product that is typically passed on to customers' bills.

Gas Pipeline Miles by System Type – 2013
District of Columbia

System Type	*System Detail*	*Miles*
Gas Distribution	Main Miles	1,999
	Service Miles	1,146
Gas Gathering	Miles	0
Gas Transmission	Miles	14
TOTAL		**2,359**

Source: USDOT Pipeline and Hazardous Materials Safety Administration Portal Data as of 1/28/15

Liquid Facilities by Commodity – 2013
District of Columbia

Commodity	*Miles*	*Tanks*
Refined PP	4	0
Grand Total	**4**	**0**

Source: USDOT Pipeline and Hazardous Materials Safety Administration Portal Data as of 1/28/15

Let's Raise the Grade

- Implement weather/storm hardening tactics, such as not exempting distribution feeders from ice and wind standards, to significantly improve overhead line performance.
- Adopt an energy policy that anticipates and adapts to future energy needs and promotes the development of sustainable energy sources, while increasing the efficiency of energy use and conservation.
- Identify and prioritize risks to energy security, and develop standards and guidelines for managing those risks.
- Create incentives to promote energy conservation and the concurrent development and installation of highly efficient coal, natural gas, nuclear, and renewable generation.

Courtesy: Flickr: [illegible]

ENERGY

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- Continue research to improve and enhance the nation's transmission and generation infrastructure as well as the deployment of technologies such as smart grid, real-time forecasting for transmission capacity, and sustainable energy generation which provide a reasonable return on investment.

Find Out More

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Photoe Courtesy: U.S. Army Corps of Engineers

LEVEES

D-

What You Should Know about D.C.'s Levees

According to the National Levee Database (NLD), the District of Columbia has two levee systems: the District of Columbia – Potomac Park (DCPP) Flood Risk Management System (FRMS) and the Anacostia (DCAN) FRMS. The DCPP FRMS is located on the left bank of the Potomac River and runs adjacent to the National Mall; providing risk reduction to the heart of the city's downtown area, also known as the capital crescent. The DCAN FRMS is located on the left bank of the Anacostia River and provides flood risk reduction to the Joint Base Anacostia Bolling facility and the adjacent vicinity. Together, the two systems are 3.26 miles in length and operated/maintained by either the National Park Service (DCPP) or the through the combined effort of the National Park Service and the Department of the Navy (DCAN).

The ability of these levee systems to reduce the risk of flooding within the District of Columbia depends heavily on both their structural integrity, as indicated by their safety (inspection) rating, and the development of the stormwater infrastructure of upstream and surrounding areas. The U.S. Army Corps of Engineers (USACE) routinely inspects the levees to evaluate the operations, maintenance, and condition of the structures. The DCPP FRMS received an overall rating of "Unacceptable" in 2007, while the DCAN FRMS has been rated "Unacceptable" even prior to 2007. Following the overall system rating of "Unacceptable" in 2007, many improvements have been in the works to improve the condition, operations, and maintenance of the DCPP FRMS in an effort to decrease the risk of flooding to the capital crescent behind the levee. These efforts have included the pursuit of Federal Emergency Management Agency (FEMA) accreditation to show the leveed area as being excluded from the 1% annual chance flood from the river (although interior flooding will remain as an issue), the assessment and remediation of deficiencies identified in the inspection and certification efforts, and the construction of a post-and-panel closure structure across 17th Street, SW. Costs associated with the accreditation of the DCPP FRMS and repairs to the levee system have been included in the FY2016 NPS budget[1]$1.248 million appropriation. The accreditation of the DCPP FRMS is scheduled for completion in 2016.

Condition, Operation and Management

System Name	Segment(s)	Sponsor(s)	Length (Miles)	Inspection Type	Inspection Date	Inspection Rating	Authorization Category
Anacostia (DCAN)	2	Department Of The Navy, National Park Service	2.41	Periodic	2012	UNACCEPTABLE	USACE Federally constructed, turned over to public sponsor operations and maintenance
Potomac Park (DCPP)	1	National Park Service	.85	Periodic	2012	UNACCEPTABLE	USACE Federally constructed, turned over to public sponsor operations and maintenance

Table 1 – Washington D.C. Levees per the National Levee Database (NLD)

Photoe Courtesy: U.S. Army Corps of Engineers

LEVEES

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- A large amount of work has been done within the DCPP levee system to remediate the Operations and Maintenance deficiencies identified by the USACE, however, a new inspection report has not yet been issued to upgrade the safety (inspection) rating.
- The DCAN levee system continues to be in poor condition, with the majority of the “Unacceptable” Operations and Maintenance deficiencies identified by the USACE remaining.
- USACE is currently evaluating the DCPP for the National Flood Insurance Program (NFIP) and anticipates that they will provide the Federal Emergency Management Agency (FEMA) with a positive evaluation report for Accreditation in 2016.
- There are no plans at this time to perform an evaluation for the NFIP for the DCAN levee system.

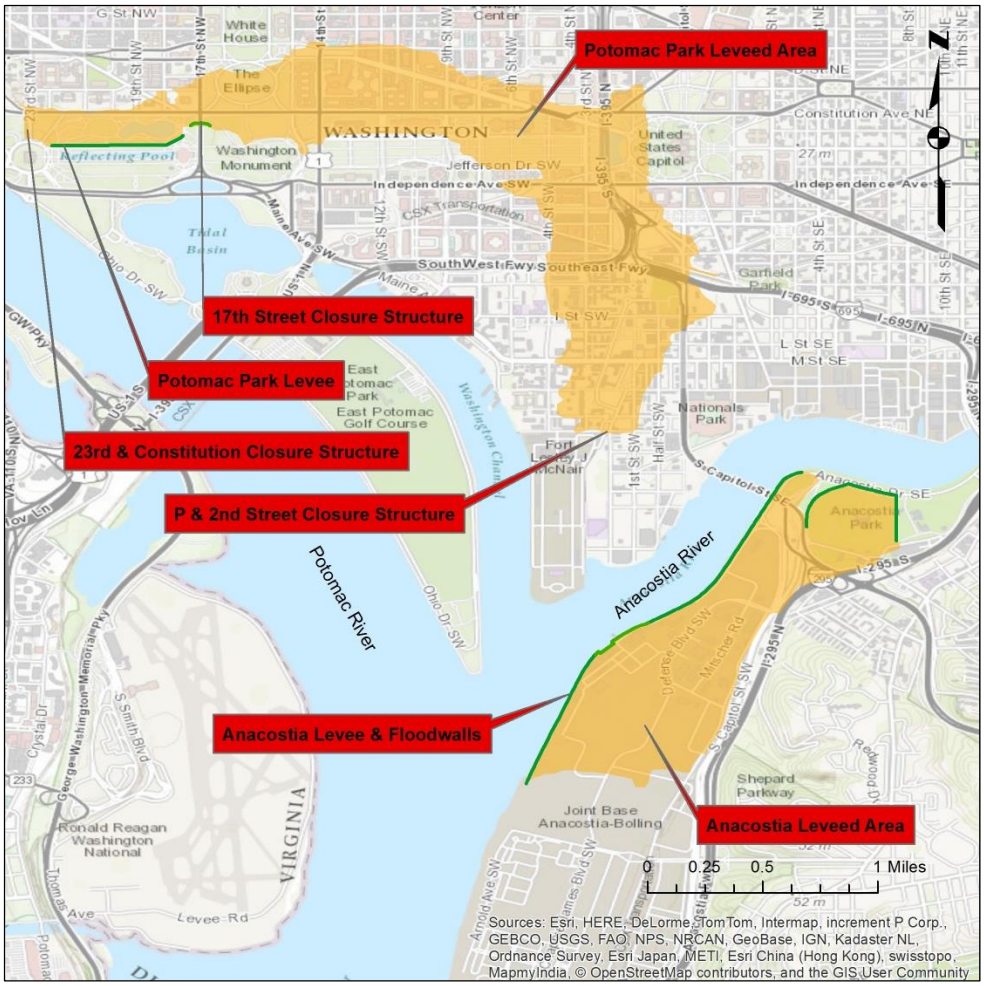

Figure 1 – Washington, DC levees with approximate leveed areas.

- Although NPS and NAVFAC request funding for the operation and maintenance of the levee systems, they do not determine how government funding is allocated and these requests may go unmet.

In 2007 USACE determined that the previous configuration of the 17th Street closure was inadequate to lessen flooding risk of downtown Washington, D.C. from the Potomac River, and in 2010 FEMA released revised Flood Insurance Rate Maps (FIRMs) showing the extent of flooding that would result from a 1% annual chance flood (1 in

Photoe Courtesy: U.S. Army Corps of Engineers

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100 chance of happening flood event). Since then the 17th Street, SW closure has been updated. Due to its location, the area is susceptible to three types of flooding: riverine flooding from the Potomac and Anacostia Rivers, interior flooding, and coastal storm surge.

The watershed that contributes to Anacostia River flooding originates in Bladensburg, MD, is highly urbanized, and quickly generates large volumes of stormwater during rain events. These characteristics put pressure on the levee system to prevent damage due to flooding.

Capacity

- Neither the DCPP nor the DCAN meets their design requirements, both have an “Unacceptable” rating per the USACE inspection which considers operations and maintenance criteria, and both are not FEMA accredited.
- The DCPP does not meet the requirements established in the 1992 General Design Memorandum. Although the DCPP is authorized to provide flood risk management from a coincidental tidal flood and river discharge of 700,000 cfs with 1.0 foot of freeboard, or a coincident tidal flood and river discharge of 575,000 cfs with 3.5 feet of freeboard, the levee system would most likely be overtopped during a storm similar to the authorized level unless extraordinary flood fighting efforts are undertaken.
- The DCAN levee system does not provide flood risk management against the authorized level: “a maximum flood discharge of 600,000 cfs from the Potomac and Anacostia rivers”. The levee system would most likely be overtopped or incur a floodwall failure during a storm similar to the authorized level unless extraordinary flood fighting efforts are undertaken.
- The current system does not provide adequate capacity to reduce the risk of flooding to Washington, D.C. from very large Potomac River events. While raising the DCPP system to its authorized 700,000 level will increase the system's capacity, our nation's capital will continue to have high residual risk to critically important government operations and infrastructure.
- The threat of increased (intensity, duration, frequency) storms and sea level rise from climate change, coupled with increased runoff and flooding due to new impervious surfaces and development will place significant stresses on these already challenged systems.

Public Safety

- Public safety is highly jeopardized by flooding of the Potomac and Anacostia Rivers because of the dense, urban environment in Washington, D.C., including Federal Triangle, home to federal office buildings, the National Mall, and Southwest D.C. neighborhoods.

Photoe Courtesy: U.S. Army Corps of Engineers

LEVEES

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- The critical closure structure across 17th Street will not only reduce the risk of flooding to the structures and landmarks in the Federal Triangle area, but will also alleviate the flooding of Constitution and Pennsylvania Avenues, removing impediments to transportation routes in the event of a flood.
- Although the levee systems are designed to reduce the flooding risk to the District of Columbia from riverine flooding. Interior flooding behind the levee systems, especially DCPP, is still an issue.
- In June 2006, six hours of intense localized rainfall caused a 200-year flood event, flooding the headquarters of federal agencies, historic landmarks, and tourist destinations within Federal Triangle. The National Archives, Internal Revenue Service, Department of Commerce, Department of Justice, Environmental Protection Agency, numerous Smithsonian Museums, National Gallery of Art, and Metrorail all suffered damage and interruptions in operations.

Funding and Future Needs

- The next phase of the DCPP system plan will eliminate the need for three temporary closures by providing a small floodwall at P and 2nd Streets and raising the existing grade along 23rd Street. This phase will also raise a portion of the levee system to a uniform elevation allowing it to meet the 700,000 cfs requirement. As this Report Card is written in fall of 2015, this work still needs Congressional funding.
- NAVFAC requested $5.1 million in funding for levee repairs in the FY18 budget cycle but were not successful in receiving funding. This funding is necessary to ensure the levees continue to lessen the risk of flooding in the District.
- The NPS FY2016 budget includes funding appropriated to the Dam and Levee Safety and Security Program in the amount of $1.248 million. Projects include Flood Emergency Planning for the National Mall levee and repairs to the Potomac Park Levee.[1]
- USACE assesses that with additional funding from Congress the project design can be completed in two to three years.
- Currently, there is no identified funding source to address interior flooding comprehensively as recommended by the 2011 Federal Triangle Stormwater Drainage Study.
- Coordination between stakeholders in the Washington, D.C. metro area is paramount reducing the flood risk around the District. One example is the D.C. Silver Jackets, formerly the Potomac River Flood Coordination Group, who formed through an interagency Memorandum of Understanding in 2014. Currently signed by 12 federal and District agencies, this MOU, established an interagency team comprised of members from federal, District of Columbia and regional agencies, as well as academia who leverage resources to identify and implement comprehensive, resilient, and sustainable solutions to reduce flood risk around the District of Columbia. The Department of Energy and Environment

Photoe Courtesy: U.S. Army Corps of Engineers

LEVEES

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(DOEE) is the District lead agency with USACE, Baltimore District and the NPS jointly leading the federal agencies. The DC Silver Jackets has established five task groups: Development of Flood Inundation Mapping/Stream Gauges; Flood Emergency Planning; Interior Drainage Flooding; Levee Certification and Accreditation; and Flood Risk Communication. Each task group has respective responsibilities that will aid in fulfilling the team's mission and goals. These efforts should be enhanced with resources that are needed.

Let's Raise the Grade

- Increased and continual collaboration between the District of Columbia and surrounding areas to mitigate the impacts of upstream and downstream construction projects and improvements is critical to lessen the possibility of flooding in the District. At the river confluence, where the District is located, the drainage area of the Potomac River is approximately 11,596 square miles which is about 79% of the entire Potomac River drainage basin. An increase in impervious area resulting from land development can increase riverine flows reaching the District. Coordination between stakeholders located in and impacting the watershed is paramount to the prevention of flooding in the District as is interagency coordination and collaboration among regional, federal, and the District of Columbia agencies in reducing flood risk.
- On 10 Sept 15, the DOEE released a new study on the likely impacts of climate change on D.C. The climate change scenarios identified by the study are being used to conduct a vulnerability assessment of infrastructure and critical resources, which in turn will inform a citywide climate adaptation plan. The study utilizes new downscaled projections of changes in precipitation and temperature extremes based on local weather station data completed by Dr. Katharine Hayhoe and provides additional data to be used to ensure the levees reduce the risk of flooding.
- Currently the system requires workers to build protective barriers: sandbag closures at Constitution Avenue and 23rd Street, and at P and 2nd Streets near Fort McNair and post-and-panel barrier that connects to earthen berms at the 17th Street closure. Automating these barriers will decrease the manpower required to utilize these levees.
- Use of storm/flood prediction technologies will be used to determine whether the barriers require construction.
- Current flood alert protocols will potentially lessen loss of life and damage due to flooding if evacuations occur in time.

Photoe Courtesy: U.S. Army Corps of Engineers

LEVEES

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- The Potomac Park Levee System provides less than 1:500 chance-per-year protection. Our Nation's capital deserves a higher level of flood protection and efforts should be made to either permanently raise the levee or have actionable plans to raise the levee before a severe flood.

Find Out More

- Levee Systems: Anacostia: http://go.usa.gov/cjmh4 DC: go.usa.gov/cjyak
- DOEE Climate Projections & Scenario Development Report and Technical Appendices: doee.dc.gov/node/1110407
- www.nab.usace.army.mil/Missions/CivilWorks/dcandvicinityfloodriskmanagement.aspx.
- nld.usace.army.mil/egis/f?p=471:32:816283732318::NO
- water.weather.gov/ahps2/hydrograph.php?wfo=lwx&gage=gtnd2&hydro_type=0
- www.fhwa.dot.gov/environment/climate_change/adaptation/adaptation_framework/resources/dc_flood_levee_system/
- Baltimore District Levee Safety Program: www.nab.usace.army.mil/Home/LeveeSafetyProgram.aspx
- 2011 Federal Triangle Stormwater Drainage Study: www.ncpc.gov/ncpc/Main%28T2%29/Planning%28Tr2%29/flooding.html
- Adaptation Initiatives (2012): www.mwcog.org/environment/climate/adaptation/Presentations/6-%20Koster_Online.pdf
- NCPC Report on Flooding and Stormwater in Washington, DC (2008): www.ncpc.gov/DocumentDepot/Publications/FloodReport2008.pdf
- Potomac Park Levee Project Environmental Assessment (Prepared by the Georgetown Climate Center under cooperative agreement with the Federal Highway Administration.): http://parkplanning.nps.gov/document.cfm?parkId=427&projectId=22260&documentID=25644
- DC Silver Jackets: silverjackets.nfrmp.us/State-Teams/Washington-DC
- silverjackets.nfrmp.us/Portals/0/doc/DC/DC_silver_jackets_fact_sheet_FINAL_30Sep_14.pdf
- http://www.nab.usace.army.mil/Media/NewsStories/tabid/10435/Article/630389/dc-silver-jackets-recognized-as-climate-change-leader-by-cities100.aspx

PUBLIC PARKS & RECREATION

C+

What You Should Know about D.C.'s Parks and Recreation Centers

The District of Columbia Department of General Services (DGS) maintains 73 recreation facilities, 379 parks, and 6 aquatic centers that are operated by the Department of Parks and Recreation. D.C. has two initiatives to improve public, locally owned parks, which are Recreation Center Projects and PlayDC Playgrounds Improvement. National Park Service owns and operates about 6,776 acres of land, which is about 17% of D.C.'s land area. This includes the National Mall, Rock Creek Park, Fort Dupont Park, Anacostia Park, monuments and memorials, street medians, traffic circles, and small pocket parks. There are an additional 1,500 acres of open space operated by other Federal agencies, which includes the National Zoo, National Arboretum, and cemeteries. As D.C. looks to implementation of green infrastructures, park land offers an opportunity to add more tree cover, natural features, and greener landscaping. PlayDC laid out a goal to increase natural features on DPR properties by 40%.

Condition and Management of D.C.'s Parks and Recreation

The Business Improvement Districts in D.C. are active partners in maintaining open spaces that qualify as parks in the Downtown area. Maintenance of local parks and recreation has been centralized under the DGS. Between Federal and locally owned open space, D.C. has 12.9 acres of park per 1,000 residents, which is one of the highest ratios of any city in the U.S. However, 19% of recreation facilities owned by DPR are considered in poor condition, and an additional 35% are in fair condition, which means more than 50% of D.C.'s open space has challenges. D.C. also faces difficulties when it comes to small parks. There are over 500 parks less than 1 acre throughout D.C., including triangle parks and pocket parks. The maintenance and management of small parks is difficult because they are too small for a dedicated staff and it is not always clear which agencies have jurisdiction. Federally, the national parks compete against other national parks, upkeep of the national monuments in D.C., and the general government budget for funding. National Parks, such as the National Mall are a victim of their success. The many festivals, freedom of speech events, and regular usage for sports and other outdoor activities create a challenge to maintain. However, other parks along the Anacostia River are underused due to lack of access from neighborhoods and poor conditions.

Funding and Future Needs for D.C.'s Parks and Recreation

Some of the challenges facing D.C. moving forward are providing amenities to existing recreation centers, regular maintenance of facilities, and providing programing to reflect the changing demographics. In recent years, NPS and DPR have collaborated to provide outdoor playground space. For example, both agencies worked together to build the $2.3 million Watkins Playground, Courts and Athletic Fields. In addition, NPS is working with the District Department of Transportation to build the $50 million Anacostia Park Trail system on NPS-owned land. In the future, dedicated funding for field maintenance and consolidation of recreation facilities can help to enhance D.C.'s


Courtesy: Flickr / Chesapeake Bay

parks. D.C. can also increase the use of existing parks by improving quality, diversity in amenities, and programming. Over the next six years, D.C. proposes spending $219 million for renovation and reconstruction of recreational facilities.

Let's Raise the Grade

- Leverage partnerships between DPR and National Park Service to better utilize facilities and compensate for usage.
- Increase appropriations for the National Park Service to address maintenance backlogs.
- Explore legislative changes to address preservation and flexibility of open space in an urban context.
- Coordinate planning and development of Federal and local open spaces to optimize recreation opportunities, operations and maintenance.
- Pursue public-private partnerships to leverage private dollars to maintain and program open space.
- Develop a systematic approach to planning, programming, and maintaining small parks.

Find Out More

- Department of General Services Website
- District of Columbia FY2015-2020 Capital Improvements Plan
- District Department of Parks and Recreation, PlayDC Master Vision Framework
- National Capital Planning Commission, Comprehensive Plan for the National Capital Region
- National Capital Planning Commission, CapitalSpace Plan: Ideas to Achieve the Full Potential of Washington's Parks and Open Space National Capital Planning Commission, CapitalSpace A Progress Report, January 2012

RAIL

B-

What You Should Know about D.C.'s Rail Infrastructure

The District of Columbia's rail infrastructure hosts 75 miles of track and bridges, four rail yards, and two stations. As a major node on Amtrak's busiest line, ticket sales to and from D.C. rank second in the nation; additionally in 2014, more than 416,000 carloads of freight moved through the network and CSX invested $25.7 million in infrastructure within the D.C. rail network. CSX and Amtrak own and are responsible for investing in and maintaining all the rails within D.C. Although commuter services are funded by Virginia and Maryland, major infrastructure improvements at D.C. stations would also require investment from federal and local governments.

Condition & Management of D.C.'s Rail Infrastructure

Freight Network: In 2014, 416,000 carloads of freight moved through the D.C. rail network, and CSX made $25.7 million in infrastructure investments in their D.C. network. CSX is also investing $200 million to rehabilitate and double track the Virginia Avenue Tunnel in D.C. to expand freight capacity. CSX's Long Bridge, which carries CSX, Amtrak and VRE trains over the Potomac River, was rebuilt in 1943 and is reaching the end of its useful life and replacement is under early stage review. Most of CSX's property is in fair to good condition and is either undergoing or planning for major rehab work, with significant investments being made to upgrade or maintain this property.

Passenger Network: Union Station and the L'Enfant Plaza Virginia Railway Express (VRE) Station face major capacity constraints with unfunded plans for expansion in the works. Union Station was last overhauled in the late 1980s, and remains in fair condition although repairs still continue after the 2011 earthquake. Amtrak is also planning for near to medium-term expansion of the existing passenger concourse at Union Station to increase the size of the waiting area. Amtrak faces perennial shortfalls in capital investment for both expansion and state of good repair, while their Northeast Corridor services operated out of Union Station are profitable.

Safety: When it comes to the safety of rail passengers and workers, NTSB reports only one fatality occurring on Amtrak or CSX property within the bounds of D.C. in the past 45 years, and this was a trespasser-caused incident. In the past 5 years, there have been 55 train derailments within D.C., 28 other types of accidents, and 4 collisions, resulting in 28 injuries but no fatalities. Other public safety concerns include hazmat trains passing through D.C.

RAIL

B-

Funding and Future Needs for D.C.'s Rail Infrastructure

Investment: CSX appears to have the investment dollars needed for improvements to its own network, but Amtrak's limited capital investment dollars make it challenging to commit large sums for large projects in D.C. such as the expansion of Union Station. There is still great uncertainty as to how the $7 billion Union Station Master Plan expansion will be paid for, and the Union Station Redevelopment Corporation (USRC), which owns the station, is working with a wide range of stakeholders to build momentum around the plan.

Future Capacity: Both CSX and Amtrak are working to resolve capacity constraints. CSX is addressing capacity constraints on its network with the Virginia Avenue Tunnel and Amtrak is working to resolve capacity constraints at Union Station through medium term investments, such as an expanded passenger concourse, and long term investments, such as a full build-out of the Union Station Master Plan. VRE and MARC will need to partner with CSX to enable through running or additional platforms at L'Enfant Plaza Station, and throughout the D.C. network.

Future Vulnerabilities: Most of today's rail infrastructure in D.C. is nearly 100 years old and will need to be hardened against more intense weather, including extreme high and low temperatures and flooding. Tunnels, bridges and rail yards are especially vulnerable to extreme weather.

Benefits and Progress: CSX's Virginia Avenue Tunnel improvements will enable double-stack intermodal traffic to pass through D.C., which is a major operational benefit. Amtrak's future plans for Union Station have been well received by the public for being an imaginative and transformative change to an already well used and historic facility. Amtrak, VRE and MARC have discussed partnering to make capacity improvements at the L'Enfant Plaza station but will need to work closely with host railroad CSX to make progress.

Let's Raise D.C.'s Rail Grade

- Collaborate to plan, fund and build key capacity improvements at D.C.'s two passenger rail stations.
- Design and upgrade new and old infrastructure to be resilient to more extreme temperatures and storms.
- Integrate rail into local and regional multimodal transportation policy that recognizes and takes advantage of efficiencies in the movement of people and goods.
- Support a regulatory and financial environment that encourages greater private investment passenger and freight rail projects in D.C.

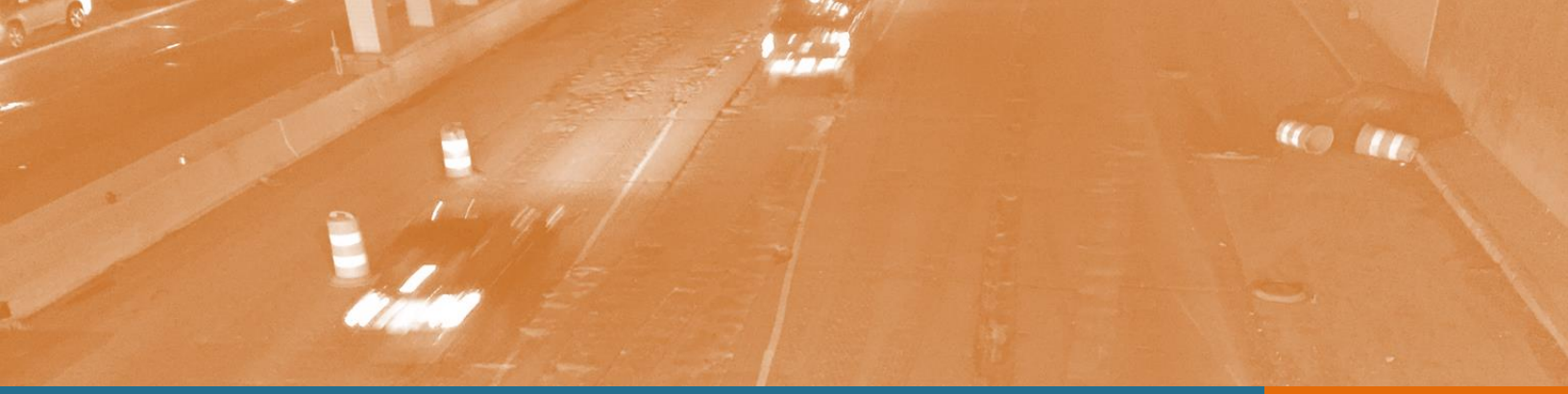
Courtesy: Flickr / Ron Cogswell

RAIL

B-

Find Out More

- CSX DC Fact Sheet: www.csx.com/index.cfm/about-csx/company-overview/state-fact-sheets/washington-dc/
- CSX DC Gateway Plans: www.greatergreaterwashington.org/post/3293/washingtons-rails-part-2-csxs-national-gateway-for-freight/
- CSX Virginia Avenue Tunnel: www.greatergreaterwashington.org/post/5482/csx-plans-for-virginia-avenue-tunnel-replacement/
- DC Freight Bypass: greatergreaterwashington.org/post/3426/washingtons-rails-part-4-the-long-way-round/
- DC Rail Network: www.greatergreaterwashington.org/post/3353/washingtons-rails-part-1-the-network/
- DC State Rail Plan: www.dcrailplan.com/
- FRA Accident Info: safetydata.fra.dot.gov/OfficeofSafety/publicsite/query/inctmap.aspx
- Long Bridge History: longbridgeproject.com/bridgehistory/
- Union Station Master Plan: www.amtrak.com/ccurl/919/171/Washington-Union-Station-Master-Plan-201207.pdf
- VRE and MARC Service Integration: www.greatergreaterwashington.org/post/22916/marylands-marc-and-virginias-vre-talk-about-integrating-commuter-rail-service/



ROADS

D+

What You Should Know about D.C.'s Roads

D.C. consistently ranks as one of America's most congested cities. In 2014, D.C.'s 3,814 lane-miles of road supported 9.7 million miles of travel causing drivers an estimated 204 million hours of delay, which is the highest in the country on a per vehicle basis and equates to 82 hours per driver in the region. With rapid growth continuing, congestion is expected to worsen by 43% by 2040. To address congestion concerns and improve overall system efficiency, D.C.'s Department of Transportation (DDOT) has put an emphasis on alternative modes of transportation, including adding dedicated bike lanes. Overall, 47% of D.C.'s roads are in good condition, and 25% of which are in poor or worse condition. However, DDOT needs four times its current maintenance budget to maintain the roads at fair condition levels.

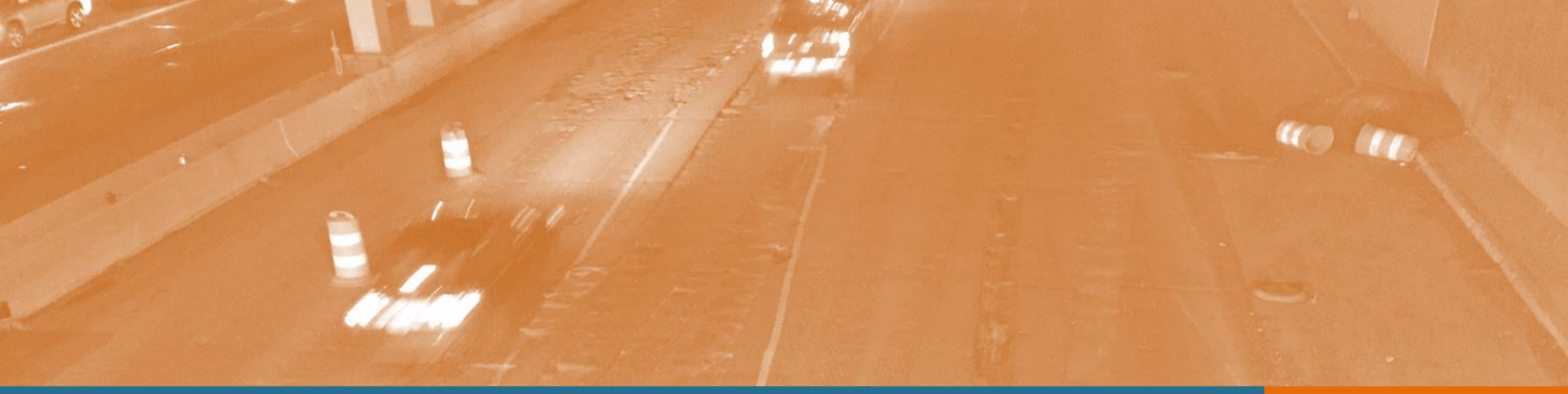
Condition, Safety and Management

The District of Columbia Department of Transportation (DDOT) manages 92% of the roads within D.C.'s boundaries, and the remainder being managed by the National Park Service and other public and private entities. In balance, the condition of these roads is mixed, which is not atypical for a city of this size, with 47% being in good or excellent condition and 25% in poor or worse condition, according to the Pavement Condition Index.

Road Network of Washington, D.C.

Areas	Miles	Lane Miles	Vehicle Miles
Interstates	11.82	77.51	1,118,510
Public Access – Other Freeways and Expressways	15.86	70.13	974,956
Public Access – Other	106.57	440.70	2,814,184
Minor Arterials	163.32	429.51	1,924,586
Major Collector	156.64	305.32	733,532
Minor Collector	0.00	0.00	1
Local	1,047.23	2,094.45	2,097,980
Total	1,501.4	3,417.6	9,663,750

Over the last 30 years, the D.C. metro area has been consistently ranked as one of the most congested cities in America. On a per-vehicle basis, D.C. has the highest congestion costs out of the largest 101 urban areas in the country, most hours of delay, most excess fuel consumed because of congestion, and the ninth highest 'commuter stress index', according to the Texas A&M Transportation Institute. The Urban Mobility Scorecard produced by INRIX estimated that an average driver in the D.C. metro region experienced the most hours of traffic delay in the



ROADS

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country. A key driving force behind this congestion has been the rapid growth that the region has experience in terms of its population and economy over the last couple of decades.

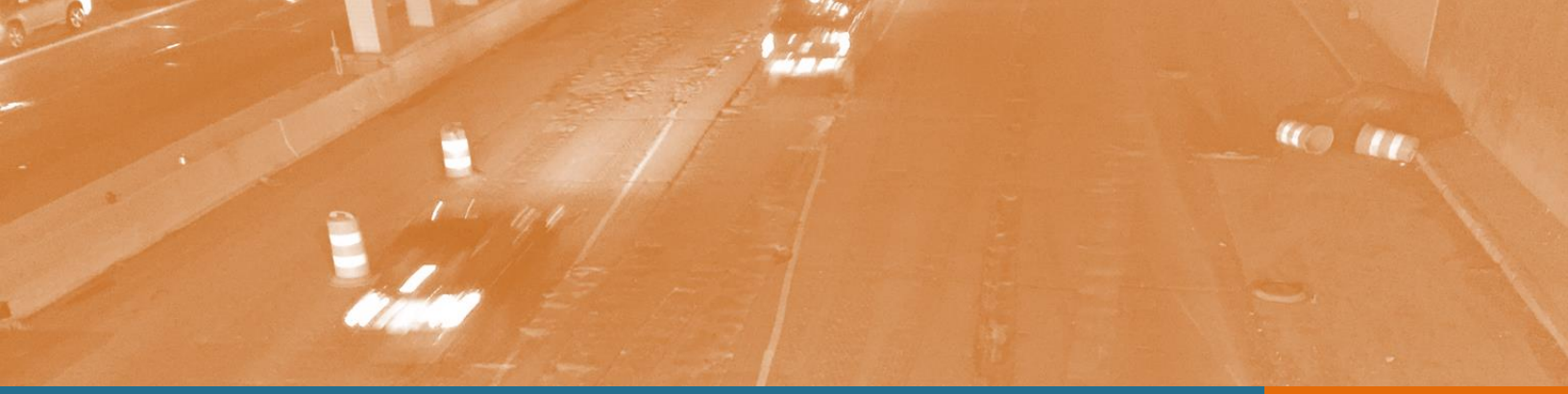
To curb roadway congestion and provide viable options for moving throughout the city, DDOT has made important investments in the city's pedestrian and bicycle infrastructure, including on-street facilities, shared-use paths, bike racks and Capital Bikeshare—the bicycle sharing system with the most stations in the country. The bike-lane network has expanded rapidly in recent years, reaching 60 street-miles in 2014. D.C.'s streets support the second-highest share of commuters that walk or bicycle to work in the U.S. DDOT has also leveraged state-of-the-art strategies in traffic monitoring, dynamic signal timing, reversible lanes, and parking management to reduce congestion and improve system efficiency. Currently there is a project underway to better optimize D.C.'s traffic signals to reduce unnecessary waiting at lights.

The District fares well in terms of safety. Traffic fatalities are on a downward trend, with 26 fatalities reported in 2014, compared to 45 a decade earlier. D.C.'s current rate of traffic fatalities is also 60% lower than the national average. However, over half of traffic fatalities in D.C. are pedestrians and bicyclists, necessitating additional safety improvements, especially as these modes play a more important role in the city's mobility. D.C. has recently introduced a safety improvement program called Vision Zero, which seeks to redesign problematic intersections, reduce the number of lanes, and greater enforcement of vehicular behavior.

Future Needs & Funding

Even though D.C. is currently one of the most congested cities in America, the situation is projected to worsen unless significant steps are taken to improve the capacity and efficiency of the system, including transit, biking and walking. While the number of miles driven in D.C. is expected to increase by a modest 14% by 2040, the total hours of delay caused by congestion are expected to increase by 43%. If this projection comes true, it will translate into significant costs for drivers and the broader society, in longer travel times, increased fuel consumption, increased greenhouse gas emissions, and worsening air quality.

The District of Columbia needs additional revenue for both maintenance and construction projects. Improving the 25% of roadways that are currently in very poor, or poor condition to fair condition should be a major priority for the District. Based on FHWA's Highway Economic Reporting System (HERS) data for Washington DC's, bringing them to fair condition is estimated to cost $1.3 billion dollars. In comparison, DDOT currently spends about $4.9 million annually on maintenance. At current spending levels, it would take DDOT 265 years to bring these roads up to fair condition. Even if DDOT could spend its entire $260 million fiscal year budget on maintenance, it would take 5 years and no funding would be available for any other type of



ROADS

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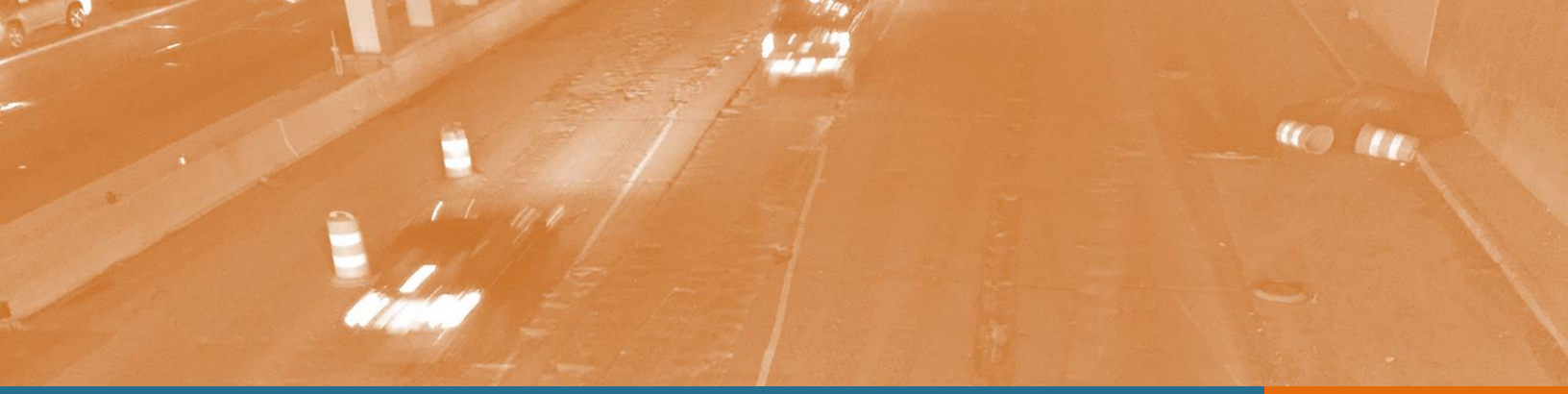
transportation infrastructure. Currently, DDOT spends approximately $16 million on transportation operations and management.

Walking and bicycling are expected to increase as people try to find alternatives to worsening vehicular congestion. By 2040, the amount of trips made by these more sustainable modes is expected to increase by 55%, leading these types of trips to almost equal vehicle trips by that date. In response, DDOT has plans to significantly expand the miles of bike-lanes and trails throughout the city. It is also looking towards innovative approaches to managing congestion, including a recently launched value pricing program for metered curbside parking in the Penn Quarter and Chinatown neighborhoods.

By many metrics, the condition of D.C.'s roads is not atypical for a city of its size. However, funding shortfalls and deferred maintenance will lead roads to deteriorate rapidly, exacerbating the costs and impact of congestion. In response, DDOT has increased the share of funding dedicated towards improving the condition of the roads, but the agency concedes that it would need a maintenance budget at least four times greater that it has now to keep the roads in DC in at least fair condition. As a temporary fix, the agency has been implementing a program since 2009 called Pothole Palooza where resident requests have led to 35,000 potholes being filled throughout the city.

Let's Raise the Grade

- Identify funding sources to address the $27.4 billion funding shortfall required to fully enact the move DC long-range transportation plan
- Increase substantially funding for road maintenance to avoid continuing deterioration and higher reconstruction costs in the future. Prioritize maintenance activities over new system development.
- Accelerate programs that support alternative forms of transportation to provide transportation options
- Continue investment in innovative approaches to manage congestion, including the recently launched value pricing for metered curbside parking in the Penn Quarter and Chinatown neighborhoods
- Identify funding sources to address the $27.4 billion funding shortfall required to fully enact the move D.C. long-range transportation plan
- Make the recent adoption of Vision Zero a priority within DDOT to include the redesign of problematic intersections, reducing the number of lanes, and greater enforcement of vehicular behavior
- Move forward with the off-hour delivery program pilot to encourage freight vehicles to make deliveries at night
- Continue the successful and popular livability program to encourage investment and opportunity in communities throughout the District. Prioritize the implementation of study recommendations.



ROADS

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Find Out More

- INRIX Urban Mobility Scorecard
- Metropolitan Police Department, 20-Year Traffic Fatality Trend
- Move DC, Vehicle Element, Multimodal Long-Range Transportation Plan
- MoveDC, The District of Columbia's Multimodal Long-Range Transportation Plan, October 2014
- State of the Region Infrastructure Report, Metropolitan Washington Council of Governments, 2015. Texas Transportation Institute Urban Mobility Report
- USDOT RITA District of Columbia Fact Sheet
- wamu.org/news/15/03/03/dc_to_embrace_goal_of_totally_eliminating_pedestrian_deaths
- Thomson, Robert. Washington Post, "D.C. plan experiment for downtown parking." Dec. 17, 2014.
- HPMS 8.0.1, Communication with DDOT
- HPMS 8.0.1, Communication with DDOT

Courtesy: Flickr/U.S. Department of Agriculture

PUBLIC SCHOOLS

C-

What You Should Know about D.C.'s School Facilities

The District of Columbia Department of General Services (DGS) operates and maintains 116 public school buildings, which include 16 vacant buildings. The total inventory is 12.6 million square feet of interior building space and an additional 22 million square feet of exterior space comprised of athletic fields, parking areas, sidewalks, and playgrounds. Since 2008, the District has spent almost $1.5 billion to modernize the physical infrastructure at 64 schools. This represents improvements in more than 50% of D.C.'s schools. The modernization projects range from renovations to construction of new schools. Despite school consolidations and closures, DCPS is still challenged with uneven enrollment across the city and across grade levels. For example, the capacity to student enrollment is as high as 137% at some schools and as low as 35% at others. In addition, there are vacant schools in the District's inventory without a future use or interim plan.

Condition & Management of D.C.'s Public Schools

The Department of General Services is required by D.C. code to conduct an annual survey that convers the condition of DCPS school facilities. The schools' building systems, structures, and facility conditions are rated on a continuum of "poor" to "good." The assessment covers categories such as:

- Foundations
- Exterior Enclosure
- Roofing
- Interior Construction
- Conveying Systems
- Plumbing
- HVAC
- Electrical Systems
- Site Civil/ Mechanical Utilities
- Site Electrical Utilities

The latest release in May of 2014, shows that 75% of the 49 D.C. schools reporting has at least one "poor" rating, and 23 had a rating of "poor" in two or more of these listed categories. The two categories most reported as "poor" were the conveying systems and interior construction.

Funding & Future Needs for D.C.'s Public Schools

Currently, there is an excess of 23,500 seats in DCPS building inventory, which includes buildings that are vacant or being used for another purpose. However, by 2022, about 2 out of every 3 neighborhood clusters, based on Office of Planning demographics and neighborhood characteristics, are facing a potential seat deficit. District Office of Planning projects the school-aged population will grow by 28.7% between 2017 and 2022. Currently, 14,651 DCPS students are attending schools that are considered in moderately high need of facility condition improvements. The school facilities with the greatest needs are in neighborhoods where the total facility expenditure has been the lowest between 1998 and 2012. The 2015-2020 Capital Improvement Plan proposes $1.6

Courtesy: Flickr/U.S. Department of Agriculture

PUBLIC SCHOOLS

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billion for the renovation and modernization of 22 schools and $9.4 million to upgrade facilities to be compliant with the Americans with Disability Act. DCPS needs to invest in modernization and renovation of schools identified as high need for facility condition improvements.

Let's Raise the Grade D.C. School Facilities

- Implement a comprehensive preventative maintenance program for each school to extend the life of school facilities, especially for schools that have been constructed recently.
- Reassess the phased approach to school modernization to ensure projects are completed. Currently DCPS renovates schools in a phased approach over several years. DCPS should examine focusing resources to modernize a school in a phased approach or whether completing the work as one project might be more productive.
- D.C. should continue to work with the community to determine creative short-term uses for vacant school buildings to ensure the building is being used and maintained.

Find Out More

- Department of General Services Website
- Department of General Services, DC Schools Facilities Condition Assessment 5-8-14
- Department of General Services, DC Schools Facilities Condition Assessment 1-27-14
- Deputy Mayor for Education, 2013 Public Education Master Facilities Plan for the District of Columbia
- District of Columbia FY2015-2020 Capital Improvements Plan

Courtesy: Flickr / copelaes

SOLID WASTE

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What You Should Know about D.C.'s Solid Waste

D.C. generates approximately 900,000 tons of municipal solid waste (MSW) annually, of which 24% is collected by the District Department of Public Works (DPW) and the remainder is collected by private haulers. MSW includes waste of all forms—paper, plastics, food waste, metals, glass, wood/yard waste, electronics, and hazardous waste. About half of MSW collected in D.C. is hauled to one of two D.C. owned and operated transfer stations – Fort Totten or Benning Road. The remainder is deposited in the two private sector transfer stations located in the District or at a Materials Recycling Facility for processing. MSW collected in D.C. is converted to energy (25%), landfilled (59%) or recycled materials (16%). However, the energy is not used in the District. In 2014, DPW had a residential recycling rate of 30%. Based on private hauler data reported to DPW, it was estimated that the overall recycling rate from city waste streams was 30.4% in 2011, which is up from an estimated 18.4% in 2006. However, the District is still not meeting the 45% recycling rate goal as stated in the D.C. Solid Waste Management and Multi-Material Act of 1988.

Condition and Management of D.C.'s Solid Waste

All of the District's municipal solid waste is disposed of outside of D.C. Of the 900,000 tons of MSW collected annually, only 24% is collected by the DPW. In 2015, DPW negotiated a five year contract with Covanta to continue disposing of MSW at the Fairfax County Energy Resource Recovery Facility in Virginia. The contract was approved by City Council approval on October 6, 2015. The DPW is expecting six new 16 cubic yard rear loading collection trucks in 2015, and 12 additional trucks in 2016 – to meet the growing demand of the increasing residential development in the city. When it comes to the quality of the DPW's collection trucks, most are in good condition, with the oldest trucks in use from 2005. There are two municipal and two private transfer stations in D.C, where solid waste collection trucks dump waste before it is hauled and disposed of outside of D.C. Both municipal transfer stations have odor control mechanisms in place at the stations. The two D.C. municipal transfer stations have enough capacity for all 900,000 tons of the MSW collected annually in D.C. However, D.C. has no flow control at the municipal stations because private haulers are able to dispose of MSW at private stations as well, resulting in the municipal stations operating below capacity.

The DPW runs the Solid Waste Education and Enforcement Program (SWEEP) which works with private haulers, to insure they are licensed and following regulations. An issue with private haulers is that they have no reporting requirements, with the exception of recycling data. This issue is currently being corrected, and private haulers will be required to report MSW collection/disposal data to the DPW. In 2014, the D.C. residential recycling rate was

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30%. Compared to other East Coast cities with similar funding like Baltimore, New York City, or Philadelphia, D.C. is doing very well. However, the 45% recycling rate goal from 1988 has not been met almost 30 years later.

Although the DPW provides a weekly drop off location for hazardous waste collection for residents, like many other cities, D.C. still has occurrences of illegal dumping. To combat this, enforcement is in place if ownership is identified, but the District focuses more on clean up. Large hazardous waste spills are the responsibility of DDOE and the fire department.

Funding, Future Needs, and Innovation for D.C.'s Solid Waste

The DPW receives funding from D.C. to meet its needs. To increase the recycling rate, D.C. needs to look at ways to further promote recycling through new regulations, enforcement and education. Additional funding could be used for more broad based public education outreach to promote source reduction and re-use.

In D.C., 25% of MSW collected is converted to energy. However, the energy is not used in the city as it is sold by Covanta from their Energy Resource Recovery Facility in Virginia. D.C. uses single-stream recycling. The city is looking at ways to bring the value of MSW (as a resource) back into the city. This could include opportunities such as building a recycling facility in the District and/or beginning a food waste collection system. These opportunities would incur larger upfront costs.

The biggest threat to solid waste collection tends to be ice on untreated surfaces. D.C. does a lot of collection in alleyways, which are generally not treated for ice. During bad snow/ice storms – collection trucks often cannot get to MSW in alleys for two weeks.

D.C. has put various programs into effect to keep MSW collection and use up to date. D.C. runs a household hazardous materials and electronic waste collection program run by contractors hired by DPW. The collection program runs every Saturday at the Fort Totten Transfer Station in Northeast from 8AM to 3PM, where people may bring household hazardous and electronic waste to be disposed. In 2014, D.C. residents brought in 154 tons of electronics, 40,000 gallons of hazardous liquids, and 62,000 pounds of hazardous solids.

D.C. passed the Anacostia River Clean Up and Protection Act of 2009, which requires that all District businesses that sell food or alcohol to charge a five-cent bag tax fee for each disposable paper or plastic carryout bag. The bag tax goes to the Anacostia River Clean Up and Protection Fund. D.C. was the first city in the US to enact a bag law, and since the law took effect in January 2010, D.C. businesses have had a drastic reduction in bag usage and

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environmental clean-up groups have witnessed fewer bags polluting D.C. waterways. Additionally, a Styrofoam ban goes into effect January 2016.

Let's Raise the Grade

- Promote composting to reduce waste streams and urban gardening to take advantage of the compost. Additionally, create incentives to promote the use of de-compostable materials similarly to what has been done with the $0.05 surcharge on plastic bags.
- Decrease the environmental impact of waste collected through use of renewable energy sources and optimize operation of waste collection vehicles. This could include operating clean fuel waste collection trucks.
- Perform outreach to schools to promote good waste practices and recycling in order to achieve the 45% recycling rate goal.
- Further explore opportunities to bring the value of MSW into the city, including developing a recycling facility in the District and starting food waste collection.

Find Out More

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TRANSIT

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What You Should Know about D.C.'s Transit

The Washington Metropolitan Area Transit Authority (WMATA or Metro) and the District Department of Transportation (DDOT) provide public transit to more than 660,000 D.C. residents as well as tourists and commuters. Ranking as the second largest rapid transit heavy rail system in the U.S., Metro currently has 118 miles of track and 91 stations, among six lines. Metro rail and bus now provide 85% of the public transportation in the D.C. region. However, in 2014, Metro had an average daily ridership of 721,804 passengers, falling for its sixth consecutive year from its highest ridership in 2008. Currently, an additional 22.7 mile long Silver Line is being added with 11 new stations that could serve 50,000 daily riders when fully opened. Metro also operates extensive bus service to 11,051 bus stops on 175 lines and has worked to improve it with new buses and service options. Finally, Metro has also provided paratransit service, MetroAccess, since 1994, providing more than 2 million trips per year. In addition to Metro, DDOT also provides transit service with its popular six DC Circulator bus lines and has built and is testing a DC Streetcar segment in the H Street NE area. In addition to the Metro rail system, D.C. also has an extensive bus system and bikeshare. To keep up with the increase in demand and meet performance measures, DDOT is expanding their routes and fleet of Circulator buses, increasing the size of their facility, and will need to replace some of the existing fleet in 2016.

Condition & Management of D.C.'s Transit

Metro formed almost 50 years ago and is in need of significant modernizations and diligent maintenance. Metro currently has 1,147 rail cars and 1,551 buses in its fleet, and many are at capacity as they move through D.C. In 2011, Metro began *MetroForward* a six year, $5 billion investment in the system to improve safety and reliability. The extensive list of overdue investments, aligned with recommendations from the National Transportation Safety Board (NTSB) after a train collision in 2009, including replacement of switches and track circuitry as well as the updating 62,723 feet of running rail, 20,745 fasteners, 11,731 cross ties, 9,829 linear feet of grout pads, and 8,849 insulators. The program also include facility improvements to 12 stations and 3 bus garages. Additionally, 100 new buses have replaced the oldest buses in the fleet and an additional 100 buses are rehabilitated to continue service. However, the condition of the system and the safety implications of a lack of consistent funding for maintenance continue to be concerns for Metro and its riders.

In October of 2015, the Federal Transit Administration was directed by the U.S. Secretary of Transportation to take over safety oversight of the Metrorail system. It was found that the Tri-State Oversight Committee (TOC) "lacks sufficient resources, technical capacity and enforcement authority to provide the level of oversight needed for the safety of Metrorail passengers and employees." Currently, the TOC and FTA are working together to verify that

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corrective safety action plans are implemented and necessary actions are taken to address safety deficiencies. D.C. will need to work with Virginia and Maryland to establish a new State Safety Oversight Agency to replace the TOC in order to be compliant with current federal law and show that it is capable of performing its identified safety responsibilities. While this temporary, the need for oversight highlights need for significant improvement in this integral part of D.C.'s commuter network.

Funding & Future Needs for D.C.'s Transit

Investment to support transit infrastructure is necessary to maintain a safe system as well as support current use and anticipated growth. Metropolitan Washington Council of Governments (MWCOG) reports an estimated $16 billion funding gap for public transit over the next 10 years in the D.C. area. No transit entity in D.C. is without funding challenges—Federal Transit Administration funding for WMATA is insufficient to keep up with current demand, DDOT is reliant on local funding sources for the Circulator, and DC Streetcar funding has been scaled back. Metro estimates that it will need $1 billion annually to maintain and replace assets that includes expansion of all trains to eight cars, 400 new buses, and overhaul of 150 buses per year and new service facilities to keep up with demand. If Metro ridership continues to fall as it has since 2008, this number may increase. DDOT does not receive any federal funding for Circulator Service; they completely rely on local funding sources even as they begin a new line. DC Streetcar recently had their funding cut in half for the proposed 37 miles of service and now only 8.2 miles is planned and will be implemented.

In the near future, funding to support public transit infrastructure will be needed to support the demand of D.C.'s nearly 660,000 residents and the 170,000 residents to come. DDOT has estimated that 500 new buses per year will be needed to meet demands of increased population and replace older vehicles. MoveDC is D.C's. long range multimodal transportation plan to innovatively address future growth through not only transit ridership but other transit options such as biking, walking, and car sharing. Approximately 4.1% of D.C. residents commute to work by bicycling, which is almost seven times the national average. Investments in bicycle infrastructure, including on-street facilities, shared-use paths, bike racks and Capital Bikeshare—the nation's largest bicycle share system by number of stations—have helped increase bicycle mode's share. Currently the Capital Bikeshare system maintains a fleet about 3,000 bicycles that provides access within a quarter mile to 80% of jobs and 40% of residents. To accommodate future demand, DDOT proposes to add 136 miles of bike lanes, 72 miles of separated bike lanes, and 135 miles of trails over the next 25 years.

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Let's Raise the Grade

- Fulfill the short and longer term goals in moveDC.
- Keep safety as priority at Metro by completing the work of *MetroForward* and determining what assets should be scheduled for replacement or repair
- Identify funding sources to address funding shortfalls for transit
- Establish a new State Safety Oversight Agency to replace the WMATA's Tri-State Oversight Committee that is compliant with current federal law and capable of performing its safety responsibilities.

Find Out More

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WASTEWATER

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What You Should Know about D.C.'s Wastewater

D.C.'s wastewater system dates back to 1810 and includes 1,800 miles of sanitary and combined sewers—a longer distance than from D.C. to Denver. The system includes16 stormwater stations, 75,000 catch basins and manholes, and nine wastewater pumping stations. The treatment system at Blue Plains is the largest advanced treatment plant in the world, in-taking on average 330 million gallons per day (MGD), which includes outlying counties, with a capacity of 384 MGD, the equivalent of 560 Olympic swimming pools. A third of the city is served by combined sewers, which can result in sewage overflows into the region's rivers during high rain events. DC Water's Clean Rivers Project, in planning since the early 2000s and in construction since 2011, is working to reduce such overflows by, among other things, burrowing 18 miles of new tunnels to store water during high rain events.

Condition & Management of D.C.'s Wastewater

- **Capacity** – Although only 158 MGD of water are allocated to the District, over 330 MGD of raw sewage flows through D.C.'s Blue Plains Advanced Wastewater Treatment Plant (Blue Plains). With an overall capacity of 384 MGD, the plant is expected to reach its treatment capacity in 2030. The D.C. wastewater collection system has 1,800 miles of sewer and storm lines, 16 storm water pumping stations, 75,000 catch basins and manholes, 22 flow-metering stations, and 9 wastewater pumping stations. Two-thirds of the city is served by separate sanitary and storm sewers, but one-third of the city is still served by combined sewers. During high rain events, this can cause capacity problems at the treatment plant, leading to combined sewer overflows (CSOs). CSOs can contain not only stormwater but also untreated human and industrial waste, toxic materials, and debris. To avoid future CSOs, D.C. is investing in the Clean Rivers Project, an infrastructure program dedicated to capturing and cleaning water during storms before it reaches and pollutes nearby rivers.
- **Condition** – The District's wastewater system dates back to 1810. The sewers have median age of 84 years. Because of the age, a 2009 study showed that 88% of sewers had some defects and 94% of manholes had some defects. Recently, there has been significant investment toward improving the wastewater collection and treatment process, resulting in a world class wastewater treatment plant.
- **Operation and Maintenance** – D.C. wastewater repair services typically respond within 45 minutes of a break. D.C. wastewater treatment system has increased preventative maintenance to further reduce breaks and resulting disruptions.
- **Public Safety** – There are very few permit violations associated with the D.C. wastewater system. The Advanced Wastewater Treatment Plant at Blue Plains has received numerous nationally recognized awards for excellence in effluent discharge quality and full compliance with EPA's National Pollutant

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Discharge Elimination System (NPDES) permit limits. And Blue Plains outfall is cleaner than the Potomac River itself. However, CSOs continue to discharge into Rock Creek, the Potomac River and the Anacostia River during high rain events. As a result, $1.5 billion is being invested in the CSO Long Term Control Plan (CSO LTCP) focused on addressing continued runoff issues and sewage overflow issues.

Funding & Future Needs for D.C.'s Wastewater

- **Funding** – D.C.'s wastewater has adequate funding to cover operations and planned capital investments. DC Water is currently planning to invest almost $3 billion over ten years to fund their Capital Improvement Plan. This includes: Wastewater Treatment: $923.9 million, Sanitary Sewer: $490.5 million, CSO LTCP: $1.5 billion, Stormwater: $35.4 million.
- **Future Need** – DC Water benefits from high credit ratings (Aa2 / AA+ / AA) allowing it cheaper rates in the bond market. As a result, in 2014 DC Water issued $450 million worth of bonds, including a $350 million green bond, allowing it to fund capital projects. In the future, water and sewer rates are projected to increase 5% per year to ensure adequate revenue to support the investments needed to upgrade the system and reduce disruptions.
- **Resilience** – Blue Plains has multiple units to provide flexibility and redundancy during times of crisis. In addition, DC Water is considering the effects of climate change into their new construction design. The treatment plants also have relatively secure systems and protocols.
- **Innovation** – D.C. recently amended its Clean Water Act Consent Decree with the Environmental Protection Agency and U.S. Department of Justice to incorporate more Green Infrastructure, including a $90 million investment for Rock Creek and the Potomac River under the CSO Control Plan. Also in the works are large investments in new technologies, including Liquid Processing, Solids Processing, and Enhanced Nitrogen Removal. Recently DC Water became the first utility in North America to use a Norwegian thermal hydrolysis system to convert the sludge left over from treated sewage into electricity. The DC Water's Clean Rivers Project is also under way, which among other things is promoting social innovation and launching a social innovation platform.

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Let's Raise the Wastewater Grade

- Complete the DC Water Clean Rivers Project to address combined sewer overflow (CSO) during high rain events, reduce the impact of flooding in neighborhoods and improve the health of the D.C. Rivers and Creeks.
- Invest in "green infrastructure" throughout D.C. as a cost effective solution for stormwater management that allows for more water to be absorbed into the ground rather than putting it through the sewer and treatment system, with secondary benefits of additional parks, gardens, green space, etc. for D.C. citizens and visitors.
- Continue to invest in the sanitary sewer system, including the collection system, sewer lines, and pumping facilities to ensure a reliable and modern system and reduce the risk of system failures.
- Given the location of sewers and pipes beneath roadways, share the cost of infrastructure upgrades by coordinating water and sewer infrastructure upgrades to coincide with District Department of Transportation roadway projects.
- Continue to invest in Blue Plains Advanced Wastewater Treatment Plant to maintain its status as a world-class treatment facility.

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