

Government of the  
District of Columbia



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# District of Columbia Long-Range Capital Financial Plan Report

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**District of Columbia: Long-Range Capital Financial Plan Report**

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## District of Columbia: Long-Range Capital Financial Plan Report

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### Executive Summary

As part of the Fiscal Year (FY) 2015 Budget Support Act, the Council of the District of Columbia included a requirement for the Office of the Chief Financial Officer (OCFO) to develop and report on a replacement schedule for capital assets in October of each year. As a result, the OCFO developed a long-range capital financial plan for the District that includes capital asset replacement needs beyond the normal six-year capital planning period. This report is intended to assist the Mayor, Council, agency directors, other policymakers and the public in understanding the size of the District's capital infrastructure funding gap, and how this funding gap might be addressed over time using new long-range financial planning tools developed for capital planning.

### *Infrastructure Financing Gaps*

The District, like every other municipal and state government, as well as the federal government, is dealing with years of deferred maintenance of its critical infrastructure. The American Society of Civil Engineers (ASCE) publishes its *Report Card for America's Infrastructure* every four years, which grades the current state of the nation's infrastructure. Since 1988, America's infrastructure has earned an exceedingly low score (a "D" average on an "A to F" scale), and has not made meaningful progress in closing the funding gap for improved capital maintenance.

Public infrastructure is a critical responsibility of governments at all levels. Whether it is new facilities to meet the needs of the residents or maintaining current assets such as roads, streets, schools, libraries and other public buildings, infrastructure is critical to the quality of life and economic prosperity. Over the six-year capital planning period, the District plans to fund \$6.3 billion in capital projects, with \$4.5 billion funded from selling municipal bonds (debt financing). However, the District's overall need for new or replacement facilities and maintenance of existing facilities exceed this funding level. Like any business or individual, the District has limits on how much it can borrow, while keeping the cost of borrowing reasonable. In addition, decisions are required about what amount of resources should be dedicated to programs and services versus capital assets.

The District is in a far better position than most cities and states due to prudent financial management practices over the last twenty years, which have resulted in fully funded pensions, strong reserves and strong credit ratings that provide low-cost financing. The strong local and regional economic growth has also provided additional financial capacity over time, as tax and fee revenues grew. Finally, a significant portion of past borrowing will be paid off in the coming years providing additional capacity to fund capital needs.

With all that said, the infrastructure needs of the District, which must serve as a city, state, county and school district, are substantial. To determine the District's total capital needs, a comprehensive review of all governmental agencies' capital and asset maintenance requirements was completed with each project scored and ranked to ensure that the highest priority projects were funded. These needs were analyzed in a new capital asset replacement scheduling system (CARSS). CARSS is an asset management planning solution that delivers a comprehensive view of the District's capital asset health, and provides information on each project or asset. This powerful tool can determine the optimal project funding within financial constraints, including

debt capacity, pay-as-you-go (paygo) or cash funding, as well as federal or other grant funding. Separate models were developed to determine the long-term funding needs of the Washington Metropolitan Area Transit Authority (Metro), which will require District support and possibly alternate funding solutions. Projects were also analyzed to determine where the private sector may assist in addressing future infrastructure challenges through public-private partnerships, or P3s.

The results of the CARSS analysis were evaluated utilizing a long-range financial forecasting model to develop solutions to fund any gaps identified. As was mentioned previously, the District is able to fund approximately \$6.3 billion in capital needs through 2022. However, approximately \$4.2 billion in projects exceeded the District’s financial capacity through 2022. Slightly less than half of this gap is related to infrastructure maintenance. This does not include funding needs for Metro of approximately \$2 billion that the District must support over the next decade, as well as an estimated \$1 billion to \$1.5 billion in P3 projects that may be addressed through private sector assistance. The funding gap for Metro will likely require a regional dedicated funding source, which is discussed in more detail in the report and in *Appendix A*. Additionally, a list of capital projects that could possibly be structured and financed as P3s, as well as a discussion of potential advantages and challenges of P3s, is outlined in *Appendix B*.

The table below illustrates the summary analysis for the primary capital needs gap, which averages approximately \$700 million per year, or 8% of the District’s General Fund.

(in \$ millions)

Fiscal Year	2017	2018	2019	2020	2021	2022	6 Year Total
Unfunded Capital Maintenance Projects	309.5	324.8	345.5	270.2	345.2	371.7	\$1,967.0
Unfunded New Capital Projects	439.3	366.2	447.5	494.3	224.4	252.6	\$2,224.2
<b>Total Unfunded Capital Needs</b>	<b>\$748.7</b>	<b>\$691.0</b>	<b>\$793.0</b>	<b>\$764.5</b>	<b>\$569.6</b>	<b>\$624.4</b>	<b>\$4,191.2</b>

Once this gap was identified, the long-range financial planning model was used to determine potential solutions to fund this gap in the least costly manner and as quickly as possible. After numerous model runs using what are termed “linear optimization” models, the least expensive and most cost-effective and practical method to address the gap identified was incremental increases in paygo funding beginning in FY 2019. This funding could come from new revenues, reallocating expenses from existing programs, or external funding such as federal grants. By increasing paygo to \$325 million per year beginning in 2019 all unfunded projects, including maintenance projects, could be funded by as early as 2026. In addition, this level of paygo provides baseline funding to ensure capital assets are well-maintained well into the future. With expected tax base growth over the next few years, and the retirement of existing debt, the balance of the gap could then be covered by new financings within the District’s debt limits.

Even if the full \$325 million is not added each year starting in FY 2019, any incremental increase will assist in funding the gap over time. The longer the period, however, the higher the risk that new unexpected capital needs may materialize, and the more likely that deferred maintenance will become prohibitively expensive. To put the funding needs in perspective, the additional \$325 million in paygo funding is approximately 3.7% of the total General Fund budget, or a little more than one year’s expected annual growth of 3% in the revenue base for the District.

This table shows the time-frame in which funding of all unmet capital needs is achievable at different levels of paygo, federal funding or other sources of revenue.

<b>Potential Funding Scenarios</b>		
<b>Scenarios</b>	<b>Additional Annual Paygo, Federal Funding or Other Sources</b>	<b>Year All Unfunded Projects are Funded</b>
1	\$0	2033
2	\$100 million	2031
3	\$200 million	2028
4	\$325 million	2026

Allocating this level of additional paygo funding is not without challenges since capital funding competes with needed program funding for priorities such as affordable housing, homelessness, and growth in day-to-day services for residents. However, properly maintained equipment and facilities will, over the long-term, result in lower life-cycle costs and increased resources for programs. Also, phasing in the additional capital funding over time, if the full amount could not be secured by FY 2019, will still lessen the long-term cost and provide needed capital infrastructure sooner than otherwise might have occurred.

This long-range capital financing plan provides information to begin policy discussions regarding long-term capital needs and strategies that can address these needs. Over time, as all assets are inventoried, the costs of repair versus replacement can be refined, but the bigger-picture policy discussions of funding will not change. Over the next few years, the District, and the region, will need to address funding for Metro to make its large infrastructure costs more manageable. Aggressive outreach for public-private partnerships needs to be pursued for prudent cost-effective projects. Finally, over the next several years, funding from federal sources, reallocation of District resources, and/or new revenue sources need to be directed to paygo funding to fully address the needed infrastructure, including maintenance of existing District assets. This would place the District in an enviable position with other cities and states in addressing long-term infrastructure needs that are a challenge throughout the country.

# District of Columbia: Long-Range Capital Financial Plan Report

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## Introduction

As part of the Fiscal Year (FY) 2015 Budget Support Act, the Council of the District of Columbia (Council) included a requirement for the Office of the Chief Financial Officer (OCFO) to develop and report on a replacement schedule for capital assets in October of each year. This report meets this requirement by reporting on the development of a long-range capital financial plan for the District of Columbia (“District”) that includes capital asset replacement needs. This report also satisfies an initiative included in the OCFO’s strategic plan, released in August 2014, which called for the development of a long-range capital financing plan for the District. Therefore, the legislative requirement introduced by the Council coincided with, and is complementary to, the necessary work in support of the OCFO’s strategic initiative that had already begun.

## Purpose of the Report

The purpose of this report is to assist the Mayor, Council, other policymakers and the public in understanding the size and scope of the challenges facing the District in identifying its capital infrastructure funding gap during the current CIP period and beyond, as well as to present potential funding solutions through the development of a long-range capital financial plan. In addition, the development of a long-range capital financial plan will also allow, for the first time, the District to have a truly data-driven and more transparent CIP process. Finally, the long-range capital financial plan will help policy makers understand the true costs of maintaining the District’s current assets, as well as the costs of deferring those decisions, so that capital budgeting decisions can be better informed and justified.

## Background

The District, along with every other municipal and state government, and indeed the federal government, is dealing with years of deferred maintenance of its critical infrastructure. The American Society of Civil Engineers (ASCE) publishes its *Report Card for America’s Infrastructure* every four years, which grades the current state of the nation’s infrastructure. Since 1988, ASCE’s *Report Card* has given America’s infrastructure an exceedingly low score (a “D” average on an “A to F” scale), reflecting the fact that state and local governments have not made significant progress in closing the needed funding gap for improved capital maintenance. In fact, with limited resources and other competing priorities such as growing pension and retiree healthcare liabilities, many state and local governments have chosen the path of least resistance and decided to defer needed infrastructure investments. Over the long term, the lack of investment in infrastructure by the federal, state and local governments threatens to harm both the local and national economies. The Bipartisan Policy Center stated in their May 2016 report, [Bridging the Gap Together: A New Model to Modernize U.S. Infrastructure](#) that,

*“Infrastructure that is efficient, resilient, and well-maintained is an essential foundation for economic growth. Upgrading our infrastructure would reduce costs for businesses through faster goods movement and increased productivity. Families would spend less on transportation costs like wasted fuel and car repairs. Thousands of jobs would be created, not only during construction, but also by increasing efficiency and productivity once the project is in use.”*

Fortunately, the District does not face the large pension and retiree health care liabilities such as those facing many other state and local governments, but the District mirrors the experience of other jurisdictions in our deferral of necessary investment in capital infrastructure in favor of other competing priorities. The District faces significant challenges in being able to balance the often competing needs to maintain and repair aging, existing infrastructure, while also making the investments needed to keep pace with the demand for new infrastructure brought on by continued population growth, as well as directing limited resources to critical programs.

## **Capital Funding Gap**

There are several challenges in accurately assessing the size and scope of the capital infrastructure funding gap of the District, including creating an inventory of the number and condition of District-owned assets; estimating their related costs of repair or replacement; assessing future capital infrastructure needed to support continued growth of the city; understanding which capital projects might be funded through the use of public-private partnerships or other non-traditional financing sources; and determining the future capital needs of the Washington Metropolitan Area Transit Authority (Metro). The OCFO estimated the total potential capital infrastructure needs of the District to be approximately \$13-\$14 billion over the next decade. For the District, the issue is less one of affordability, but more the period of time over which these capital needs will be funded.

### *Washington Metropolitan Area Transit Authority (Metro)*

As part of this capital needs assessment, it was critical to estimate Metro's potential future funding needs. Over the course of several months, the OCFO conducted a comprehensive financial analysis of the long-term capital and operating position of Metro based on publicly available financial information and consultation with Metro staff. This analysis determined that given Metro's capital needs and the size of the specific Capital Improvement Plan (CIP) program that could be realistically executed over the next decade, Metro has a potential 10-year capital shortfall of approximately \$3.3 billion. Combined with their estimated \$2.1 billion projected operating shortfall over the same period, Metro faces an estimated \$5.4 billion funding shortfall over the next decade. The District's share of this estimated shortfall would be approximately 37% or about \$2 billion over that ten year period. As part of this analysis, the OCFO identified several potential, region-wide funding solutions, including federal cost-sharing or a possible regional one-percent dedicated sales tax that is estimated to be sufficient to address Metro's funding shortfall over that period, and likely beyond. For a summary of the analysis that the OCFO prepared on Metro's funding needs, please see **Appendix A**.

### *Public Private Partnerships (P3s)*

While there is no singular definition of a public-private partnership (P3), the World Bank generally defines a P3 as, "A long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility, and remuneration is linked to performance."

In attempting to assess which capital projects might be funded through the use of P3s, or other less-traditional means of financing, the OCFO held extensive discussions with the Mayor's Office of Public Private Partnerships (OP3). During that process, certain capital projects were identified as high priorities for the District, including a replacement of the Henry J. Daly building (which houses the headquarters of the District's Metropolitan Police Department), a new correctional facility, and a number of other high-cost facilities and projects. These projects, although rated



high in importance, are unlikely to receive the full amount of funding needed to bring them to fruition in the normal CIP process. Both the Henry J. Daly building and a new correctional facility are conservatively estimated to cost between \$400 and \$500 million each to replace. These types of projects provide an excellent opportunity for public-private partnerships. Therefore, these projects (and others that were similarly identified) were removed from the long-range capital financial analysis since a P3 may bring financial resources outside the regular funding process. The capital projects that were removed from the final analysis conservatively represent approximately \$1 billion to \$1.5 billion in potential P3 projects that will be pursued by OP3 over the next several years. A list of these potential P3 projects, as well as a discussion of the advantages and challenges of P3s can be found in *Appendix B*.

#### *Direct Capital Assets of the District*

As stated earlier, more detailed information needs to be developed about District-owned assets, their condition and the cost to repair and/or replace them, as well as forecasting those additional capital assets that will be needed to support the future growth of the city. At this time, detailed data on every asset type in the District does not exist. The OCFO is in the process of developing a comprehensive asset management planning system to gather and house detailed asset data. Currently, approximately 14% of District assets have had a full and detailed inventory and needs assessment including streets, alleys, Fire and Emergency Medical Services (FEMS) vehicles, Office of the State Superintendent of Education (OSSE) buses and other vehicles, and Department of Parks and Recreation (DPR) facilities and associated amenities. Over the next few years this inventory is expected to be completed for all key assets. A more detailed discussion of the development of the asset management system can be found in *Appendix C*.

In lieu of complete detailed information on all assets, a decision was made to utilize a “top down” or project-level approach, based on scoring and ranking, to provide a reasonable estimate of all capital needs including, ongoing capital maintenance projects. The capital project needs requests of each agency presented during the FY 2017-2022 budget formulation process were used as a proxy for more detailed, asset level information. These capital requests represented all known capital needs of each agency. Those capital projects were then compared against the projects that actually received funding as part of the FY 2017-2022 CIP. The unfunded projects represent the extent of the District’s capital infrastructure funding gap.

#### *Total Capital Funding Gap*

After subtracting the District’s share of Metro’s potential future capital needs, as well as those capital projects identified by OP3 as likely to be structured and financed as P3s, the capital asset replacement scheduling system (CARSS) model determined that the total capital infrastructure needs of the District, as identified as part of the FY 2017-2022 CIP budget formulation, is approximately \$10.5 billion. The District has identified \$6.3 billion of funding for the highest-priority capital projects over the next six years, resulting in a remaining total capital infrastructure shortfall of approximately \$4.2 billion, which includes both unfunded new capital projects needed to support the growing population of the District, as well as unfunded capital maintenance projects, which represents the necessary capital maintenance of existing assets. These capital projects’ needs can be addressed over the next 10-15 years depending on the level of pay-as-you-go (paygo) funding, federal funds or other sources that the District commits to its CIP.

The following chart shows the annual estimated funding needed beyond the current six-year CIP, broken into the two categories of capital projects. The six-year funding gap for capital maintenance projects is approximately \$1.97 billion, or about \$325 million annually and the six-

year funding gap for new capital projects is about \$2.2 billion, or approximately \$370 million annually. Combined the annual funding gap is about \$700 million, which is approximately 8% of General Fund expenditures.

(in \$ millions)

Fiscal Year	2017	2018	2019	2020	2021	2022	6 Year Total
Unfunded Capital Maintenance Projects	309.5	324.8	345.5	270.2	345.2	371.7	\$1,967.0
Unfunded New Capital Projects	439.3	366.2	447.5	494.3	224.4	252.6	\$2,224.2
<b>Total Unfunded Capital Needs</b>	<b>\$748.7</b>	<b>\$691.0</b>	<b>\$793.0</b>	<b>\$764.5</b>	<b>\$569.6</b>	<b>\$624.4</b>	<b>\$4,191.2</b>

The \$325 million average annual amount of unfunded capital maintenance projects nearly matches the total amount of annual depreciation of the District's capital assets, which is generally considered a good approximation of the continued level of investment needed to adequately maintain capital assets.

As seen in the chart below, the total capital funding gap represents projects across key sectors of the District's capital infrastructure program. These amounts represent actual capital projects that cannot be delivered to residents over the next six years with current funding levels and sources. For example, the nearly \$1.8 billion in unfunded facilities capital projects includes approximately 17 elementary schools, 2 middle schools and 3 high schools, totaling about \$837 million. Similarly, approximately \$1 billion of the nearly \$1.3 billion shortfall in unfunded horizontal infrastructure relates to DDOT repair of local streets. It is important to note that the long-range capital financial analysis assumes that the costs of deferred capital projects beyond the six-year CIP period are inflated at 3% annually until those projects are funded.

Annual Capital Funding Gap by Asset Type

(in \$ millions)

Asset Classifications	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	6 Year Total
<b>IT Projects &amp; Systems</b>							
Capital Maintenance Projects	49.6	49.0	51.5	50.5	54.8	49.7	\$305.1
New Capital Projects	76.5	55.4	53.2	51.3	32.4	20.4	\$289.3
<b>Total</b>	<b>\$126.1</b>	<b>\$104.4</b>	<b>\$104.7</b>	<b>\$101.8</b>	<b>\$87.2</b>	<b>\$70.1</b>	<b>\$594.3</b>
<b>Equipment and Regulatory</b>							
Capital Maintenance Projects	49.5	40.1	42.1	38.2	44.7	35.5	\$249.9
New Capital Projects	36.9	31.4	4.0	10.5	15.2	17.5	\$115.5
<b>Total</b>	<b>\$86.3</b>	<b>\$71.5</b>	<b>\$46.1</b>	<b>\$48.7</b>	<b>\$59.9</b>	<b>\$53.0</b>	<b>\$365.5</b>
<b>Fleet</b>							
Capital Maintenance Projects	23.4	23.9	17.7	14.2	17.3	22.1	\$118.7
New Capital Projects	13.0	9.3	0.5	0.5	0.5	0.5	\$24.3
<b>Total</b>	<b>\$36.4</b>	<b>\$33.2</b>	<b>\$18.2</b>	<b>\$14.7</b>	<b>\$17.8</b>	<b>\$22.6</b>	<b>\$143.0</b>
<b>Horizontal Infrastructure</b>							
Capital Maintenance Projects	143.6	136.1	155.6	121.9	170.0	229.2	\$956.4
New Capital Projects	84.9	54.0	33.7	60.5	45.5	56.0	\$334.6
<b>Total</b>	<b>\$228.5</b>	<b>\$190.2</b>	<b>\$189.3</b>	<b>\$182.4</b>	<b>\$215.5</b>	<b>\$285.2</b>	<b>\$1,291.0</b>
<b>Facilities</b>							
Capital Maintenance Projects	43.5	75.7	78.7	45.4	58.4	35.2	\$336.9
New Capital Projects	227.9	216.0	356.0	371.5	130.8	158.2	\$1,460.5
<b>Total</b>	<b>\$271.4</b>	<b>\$291.7</b>	<b>\$434.7</b>	<b>\$416.9</b>	<b>\$189.2</b>	<b>\$193.5</b>	<b>\$1,797.4</b>
<b>Grand Total</b>	<b>\$748.7</b>	<b>\$691.0</b>	<b>\$793.0</b>	<b>\$764.5</b>	<b>\$569.6</b>	<b>\$624.4</b>	<b>\$4,191.2</b>

As is discussed later in this report, the annual funding gap can be addressed gradually over time to fully fund the capital maintenance and new capital project needs of the District within ten years at reasonable funding levels.

## Funding Sources

The District relies on a variety of sources to finance its capital infrastructure program, including paygo financing, Federal grants, local highway trust fund monies, local transportation funds, Grant Anticipation Revenue Vehicles (GARVEE bonds) from the Federal Highway Administration, sale of assets and other typical municipal sources of revenues. However, as with virtually every state and local government in the United States, the District has traditionally relied on debt financing as the primary source of funding for capital infrastructure investments. According to a 2016 issue brief Support Cities: Protect Municipal Bonds from the National League of Cities,

*“Municipal bonds are the primary way local and state governments finance infrastructure and have been for over a century. More than two thirds of U.S. public infrastructure projects are financed by municipal bonds.”*

### Outstanding Debt

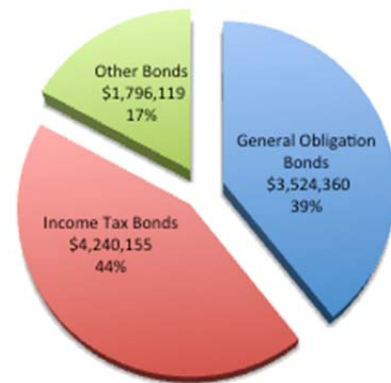
The District has utilized debt financing, primarily General Obligation (G.O.) bonds and Income Tax Secured Revenue (ITSB) bonds, as the primary sources of funds for capital infrastructure investments. As of September 30, 2016, the District has an estimated \$8.1 billion of outstanding G.O. and ITSB bonds. This represents approximately 83% of all of the District’s tax-supported debt currently outstanding.

While G.O. and ITSB bonds will remain a key source of funds for infrastructure investments into the future, the key challenges for the District will be to ensure that the total debt burden remains at a sustainable level and does not overburden the city’s budget, and that the District’s debt is structured appropriately to maintain our strong credit ratings, thereby keeping the overall cost of borrowing as low as possible. This is particularly important given the fact that the District’s current capital improvement plan anticipates adding almost fifty percent more debt (approximately \$4.5 billion) in additional G.O. or ITSB bonds over the next six years.

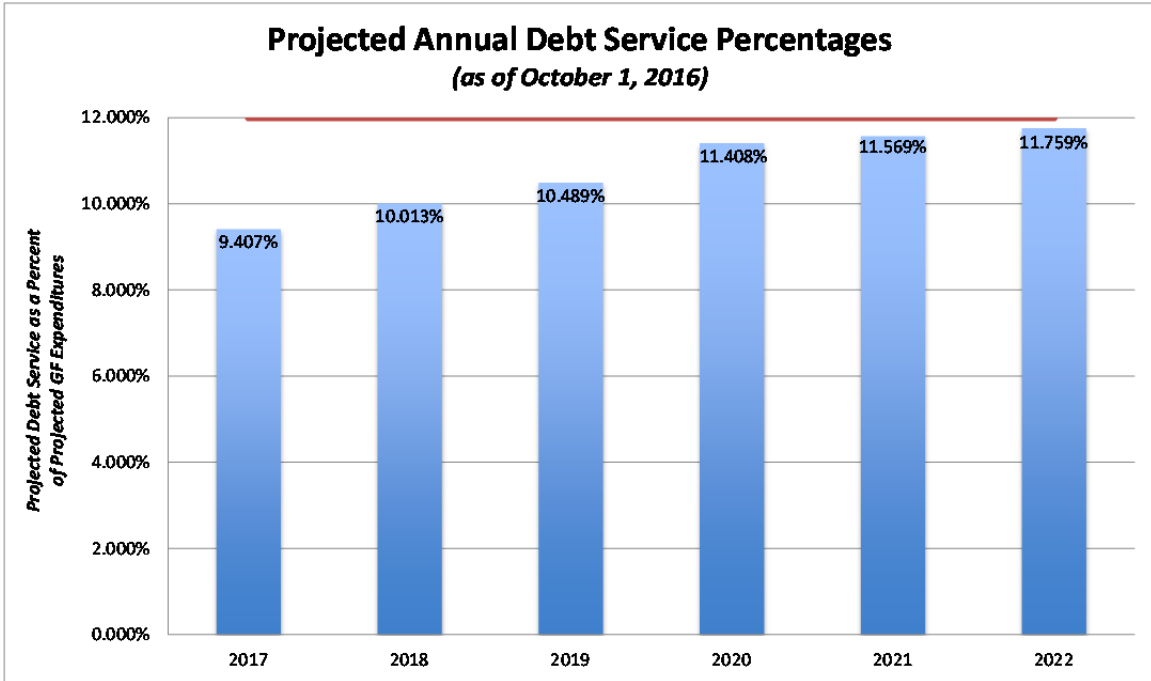
### Debt Capacity Limitations

The District must operate within both federal and local statutory debt limits. Under the federal Home Rule Act, annual debt service on the District’s General Obligation bonds must be no more than 17% of General Fund revenues. In 2009, the Council passed a more restrictive limit on the amount of debt outstanding. The local Debt Ceiling Act limits the annual debt service on all tax and fee supported debt to no more than 12% of the District’s General Fund expenditures. This locally-imposed limit is the true constraint under which the District’s borrowing must operate, and staying within this limit allows the District to maintain its strong credit ratings and low cost of borrowing.

**Total Debt Outstanding**  
Approx. \$9.7 Billion  
(Dollars in Thousands)



The OCFO measures the projected annual debt service as a percentage of anticipated General Fund expenditures during the current CIP period, in order to confirm compliance with the 12% locally-mandated debt limit. The following chart illustrates the District’s projected annual debt service percentages given the amount of debt projected to be issued in connection with the FY 2017-2022 CIP.



The 12% statutory debt limit is on the higher end of other state and local governments across the country, but reflects our unique requirement to fund state, county, city and school district infrastructure needs. This debt limit has been extensively discussed with the credit rating agencies, and coupled with our strong reserve policies, provides the maximum borrowing capacity to fund infrastructure at the lowest cost. If the debt limit was raised or reserves reduced to 2009 levels, the District’s credit ratings would likely be reduced from the high ‘AA’ category to the single ‘A’ category, resulting in approximately 15% higher borrowing costs. In order to maintain the same level of debt service payments, the District would need to reduce the bond funded capital budget by 15% (approximately \$675 million), thereby causing even fewer capital projects to be funded.

*Paygo Funding*

The other key source of funding for the District’s CIP is paygo funding, which is a transfer of funds, or cash, from the operating budget to the capital budget. Given the statutory limits on the amount of debt that can be issued, these transfers from the General Fund to the CIP program are the most flexible source of funding that can impact the amount and timing for addressing the identified, unfunded capital needs. The amount of operating budget used for paygo funding, not including grant funding, in the current CIP is relatively minor. The average amount of paygo strictly from the operating budget over the six-year period is approximately \$27.6 million per year. The General Fund paygo funding levels, over the same time period, average approximately \$120 million, which includes dedicated taxes and/or special purpose revenues that are directed to specific capital needs, such as rights-of-way fees for DDOT.

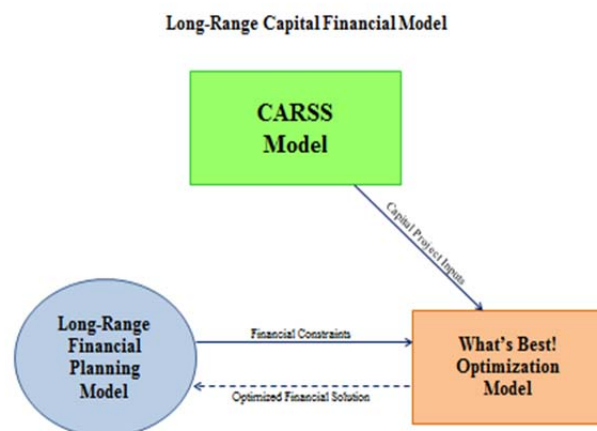
Starting in FY 2019, DC Law 18-223, as amended in Law 21-36, requires that the District dedicate 25% of any incremental increases in revenues to paygo funding of capital projects. This is projected to add approximately \$60 million in additional paygo funding over and above what is currently programmed in the CIP. This amount of paygo funding equates to approximately one percent (1%) of average annual General Fund expenditures over the current CIP period. While this increased amount of funding will be helpful, it is still below the level of paygo funding needed to address all of the unfunded capital maintenance projects. Additionally, District legislation requires that once the 60-day operating reserve level is reached for the federally and locally-mandated cash reserves, 50% of all surpluses in a given fiscal year go to paygo funding. This additional funding will further assist the District in achieving paygo funding levels that approach ongoing capital asset maintenance needs. To fully address ongoing maintenance needs, however, funding levels need to approach an additional 3.7% of annual General Fund expenditures.

Other sources of funding, including rights-of-way funds, federal grants, federal highway grant funds, GARVEE bonds, driven by specific revenue streams, are typically dedicated to specific project types (e.g. local transportation projects), and in some cases specific projects (e.g. the 11<sup>th</sup> Street Bridge project), and therefore are not available to support the wider CIP program.

### Approach to Developing Long-Term Funding Solutions

In order to properly maintain the value and functionality of existing capital assets, and to minimize life-cycle costs, the establishment of a time frame for ‘catching up’ on deferred maintenance is a best practice of any long-range capital financial plan. In order to address this complex financing challenge over the shortest period of time, while remaining within the various constraints imposed by the District’s borrowing limits, a financial planning model was developed. This model will assist the District in identifying financial strategies to fund the identified capital needs gap in the earliest year possible given various constraints.

The long-range capital financial model is actually a combination of three discreet models that work in conjunction to identify the optimal financial result. The long-range capital financial model is comprised of the CARSS, and a long-range financial planning model that utilizes a linear optimization tool to generate the optimal financial solution for a given time period. A diagram of how the long-range capital financial model works is shown to the right. A more detailed description of the model, and its various components can be found in *Appendix D*.



CARSS was used to prioritize, score and rank all of the District’s various capital projects. Then, under certain capital budget constraints and with a specific priority ranking assigned to each project, CARSS determines which projects can be funded in the CIP each year, and which projects will not receive funding (due to their lower priority ranking). The unfunded capital projects are then analyzed in the financial planning model utilizing linear optimization that funds

the highest priority projects first, along with certain debt and source assumptions, to solve for the optimal solution to finance the unfunded capital gap at the earliest possible date.

The model also allows the District to optimize and project the maximum amount of debt that can be issued in each fiscal year (under the 12% cap), while simultaneously determining the earliest possible fully-funded year of all unfunded capital projects. The District will also be able to quantify the amount of paygo, federal funding, or other revenues needed to address the entire backlog of unfunded capital needs over various time periods. This information is then used to present a complete long-term capital financing plan for the District over the forecasted 15-year period.

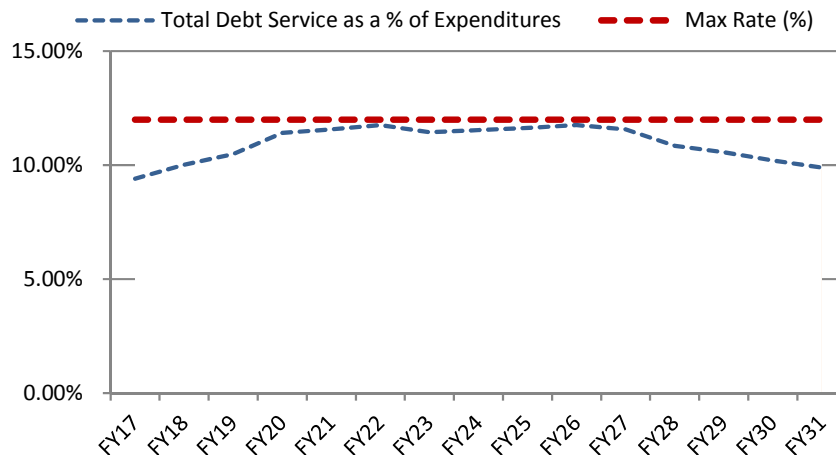
A detailed description of methodology used to classify and score the various capital projects, along with the scoring criteria used, can be found in *Appendix E*. In addition, a detailed description of how projects were prioritized in CARSS can be found in *Appendix F*.

### *Model Assumptions*

The long-range capital financial model, as with any model, makes several assumptions in analyzing funding solutions to the backlog of unfunded capital needs. These include the estimated borrowing costs for future debt issuances, the level of future funding from other non-debt sources for capital projects, and that General Fund expenditures of the District continue to grow at 3% into the future. In addition to those assumptions, there are three key assumptions in the model, which drive how the model optimizes various funding solutions. These include:

1. Maximization of debt issuances:

The model is structured to always maximize the amount of debt issued in each fiscal year outside of the current CIP period, while remaining within statutory debt limits.



2. Varying levels of paygo or additional federal funding drive the gap:

The major variable that drives the incremental increase in the amount of unfunded capital projects that can be funded, and their timing, is the amount of annual paygo, additional federal funding, or other additional revenues assumed.

3. No additional new capital projects:

As the model factors all of the many variables in solving for the best solution to fund the backlog of unfunded capital needs it assumes that no new capital projects, outside of those that were a part of the FY 2017-2022 capital needs assessment, are added to the list of capital projects in future years prior to existing unfunded needs being met, unless they are completely funded from additional paygo, federal funds, or other additional resources from private sources.

## **Funding Scenarios and Results**

In order to develop potential funding solutions to finance the approximately \$4.2 billion of projects outside the six-year CIP, it was important to first establish a baseline scenario, which would capture the current capital gap for the District. In all of the funding scenarios discussed below, the additional paygo, federal funding or other revenue sources are assumed to begin in FY 2019.

### Scenario 1: Baseline

The baseline funding scenario captures the sources of funds, including planned debt issuances and budgeted paygo amounts, and capital expenditures from the approved FY 2017-2022 CIP and projects them through the forecast period until FY 2032. The projected level of paygo funding assumes that the law requiring the 25% of incremental revenue growth goes into effect in FY 2019, but that no additional amounts above that are included. Based on these funding levels, the long-range capital financial model estimates that the District will be able to “catch up” and fund all existing unfunded capital projects, while continuing to maintain current assets, by FY 2033.

### Scenario 2: Additional \$100 Million Annually of Paygo or Additional Federal Funding

Scenario 2 assumes that, beginning in FY 2019, the District will contribute an additional \$100 million in paygo funds above and beyond what is included in the baseline scenario, or receive an equivalent amount of additional federal funding or other sources of revenue. With this additional contribution of \$100 million annually, the model estimates that the District can fund all unfunded projects by FY 2031, or two years earlier than baseline projections.

### Scenario 3: Additional \$200 Million Annually of Paygo or Additional Federal Funding

Scenario 3 assumes that, beginning in FY 2019, the District will contribute an additional \$200 million in paygo funds above and beyond what is included in the baseline scenario, or receive an equivalent amount of additional federal funding or other sources of revenue, annually. With this additional annual contribution of \$200 million, the model estimates that the District can fund all unfunded capital projects by FY 2028, a full five years earlier than baseline projections.

Scenario 4: Additional \$325 Million Annually of Paygo or Additional Federal Funding

Scenario 4 assumes that, beginning in FY 2019, the District will contribute an additional \$325 million in paygo funds above and beyond what is included in the baseline scenario, or receive an equivalent amount of additional federal funding or other sources of revenues, annually. With this level of additional funding the long-range capital financial model estimates that all unfunded capital projects can be funded by FY 2026, or seven years earlier than baseline projections, which is within a 10-year planning horizon.

While the final scenario clearly requires the greatest increase in additional annual paygo or federal funding, it still represents approximately only 3.7% of the General Fund budget. This level of funding also allows the District to address two important, and sometimes competing, goals: sustaining current assets in a good state of repair, while also delivering new capital infrastructure projects sooner in order to support the continued growth of the District. A summary of the various potential funding scenarios is shown below.

Potential Funding Scenarios		
Scenarios	Additional Annual Paygo, Federal Funding or Other Sources	Year All Unfunded Projects are Funded
1	\$0	2033
2	\$100 million	2031
3	\$200 million	2028
4	\$325 million	2026

**Summary and Conclusions**

Quality infrastructure is critical to the quality of life and growth of the District’s and the region’s economy. Continuing to defer capital maintenance or build needed facilities will ultimately result in much higher costs in the long term, as assets must be replaced rather than repaired or necessary service levels are not met. The large amount of capital required to rebuild the District’s schools is one example. Memorial Bridge, which is maintained and funded by the federal government, is another example. If this bridge had been properly maintained, its useful life would have been extended greatly, and it would be far less expensive than the significant costs to immediately replace it or close it to all but foot traffic. Metro is also a constant reminder of what deferred maintenance looks like, and how costly it can be to the economy if it does not function.

Nearly every local or state government, businesses and certainly the Federal government, has capital or infrastructure needs that exceed their short-term resources, with deferred maintenance projects the most common. As a result, needs must be prioritized and resources allocated according to a jurisdiction’s priorities. The District has taken this exercise a step further by identifying the unfunded capital projects, as well as recommended capital maintenance needs, in this long-range capital financial plan. The tool to inventory all assets, prioritize projects, and determine options to fund all needs over time provides an analysis that does not exist for many governmental entities. This analysis provides much-needed insights into options and strategies



that can be considered in the coming years to ensure our residents have a high-quality city with the best infrastructure, whether it is Metro, schools, streets, alleys, buildings, fleet vehicles for public safety, or technology and equipment.

The District is very fortunate, through the prudent financial decisions of policymakers over the past 20 years, which have resulted in fully-funded pensions and retiree health care trusts, reserves that provide flexibility to deal with uncertain future events and bond ratings that provide very low borrowing costs to finance infrastructure needs. Many U.S. cities spend all or most of their growth in revenue merely funding severely underfunded pension liabilities, leaving little for programs or infrastructure. The District has, and is forecast to continue to enjoy, economic growth that increases the tax base over time providing the capacity to fund additional needs. Cities that are stagnant or decreasing in population and economic development do not enjoy such benefits.

With all that said, this report demonstrates that not all capital projects, or recommended maintenance needs, can be funded in the District's six-year capital planning period. Although the District is able to fund \$6.3 billion through FY 2022, approximately \$4.2 billion in capital needs (slightly less than one-half related to maintenance), require funding in the future. This does not include approximately \$2 billion for the District's share of estimated Metro needs and \$1 billion to \$1.5 billion in projects that can be addressed through public-private partnerships. Although these numbers are large, the growth of the District's tax base, and the capacity that occurs as previous bonds are retired, coupled with additional funds that can be directed to paygo (cash) can address the unfunded needs over time.

By directing \$325 million per year, starting in FY 2019, to paygo capital, coupled with the increased debt capacity that becomes available each year, the entire \$4.2 billion gap can be funded by 2026, only four years beyond the normal six-year planning period. If maintained at this level, ongoing maintenance and all identified, unfunded capital projects will be funded at a high level into the future. Lower levels dedicated to paygo funding will also address the issues but require a longer period of time, while other unplanned capital needs may occur.

To put the funding needs in perspective, the additional \$325 million in paygo funding is approximately 3.7% of the total General Fund budget, or a little more than one year's expected annual growth of 3% in the revenue base of the District. Allocating this funding is not without challenges, since capital funding competes with needed program funding for priorities such as affordable housing, homelessness, and growth in day-to-day services for residents. However, properly maintained and improved equipment and facilities will, over time, result in lower life-cycle costs and more resources for programs. Even phasing in the additional capital funding will lessen the long-term cost and provide needed capital infrastructure sooner.

This report provides information to begin policy discussions regarding the District's long-term capital needs and strategies to address these needs. Gradually, as all assets are inventoried the cost of repair versus replacement can be refined, but the bigger picture policy discussions of funding will not change. Over the next few years, the issues of dedicated funding for Metro to allow it to finance its large infrastructure needs also has to be addressed. Aggressive outreach for public-private partnerships should be pursued for prudent, cost-effective capital projects that lower the cost to the District. Finally, over the next several years, funding from federal sources, reallocation of District resources, and/or new revenue sources needs to be directed to paygo funding to fully address needed infrastructure, including proper maintenance of District assets. This path would place the District in an enviable position with other cities and states in addressing its long-term capital infrastructure needs.

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# **Appendix A**

**(Summary of the Metro Funding Needs Analysis)**

*Prepared by the District of Columbia OCFO*

**Summary of Metro's Funding Needs Analysis**  
*(10 Year Analysis – FY 2017-FY2026)*

**1. Approach**

- Used Metro's FY 2017 budget data for the analysis
- Included inflation factors for projecting revenues and costs
- Added additional amounts for continued Safe Track operations
- Used Metro's six-year CIP as basis for capital needs
- Added Metro 2025 CIP in addition to the baseline six-year CIP

**2. Funding Assumptions**

- Federal funding is reauthorized in FY 2020 and remains at current levels (\$150M annually)
- Local jurisdictions continue to match federal funding at current levels
- Existing jurisdictional contributions rise 3% annually above FY 2017 levels

**3. Operating and Maintenance**

- Assume state and local operating subsidies grow at 3% annually over FY 2017 base year
- Assumed continued annual Safe Track costs inflated 3% per year (\$100M base FY 2018)
- Assumes passenger revenues decline by approximately 10% in FY2017 to reflect decrease in ridership and remain flat until FY 2022 – then grow at 3% annually
- Includes recommended OPEB contributions
- Estimated total operating gap is approximately \$2.1B – over 10 years

**4. Metro's 10-Year Capital Plan** (ranges between \$12B and \$18B)

- Under \$18B CIP – capital funding gap is approx. \$9.8 billion over 10 years
  - When combined with operating gap – average nearly \$1.2B annually
- A \$12B capital plan is a more likely target
  - Still includes railcar replacements, track system upgrades for 8-car trains and passenger system upgrades
- Under \$12B CIP – capital funding gap is approx. \$3.3 billion over 10 years
  - When combined with operating gap – average approx. \$542M annually
  - Gap increases from \$333M in FY 2022 to more than \$1.5B in FY 2026

**Pay As You Go For Funding Gap - \$18 Billion CIP Scenario**

(\$ Millions)	
CIP Funding Gap	\$ 9,846.16
Operating and Maintenance Effort Budget Gap	2,119.16
<b>Total</b>	<b>11,965.32</b>
Annual Average	\$ 1,196.53

(Dollars in Thousands)					
		FY 2017	FY 2022	FY 2026	10 Year Total
Jurisdictional Share of New Funding Needed:	% Contrib.	Base Line Year (\$287.5M)	Base-Line Plus 'Add-on's'		10 Year Total
District of Columbia	37.2%	\$106,893	\$501,279	\$680,123	\$4,448,707
<i>Maryland Subtotal</i>	<i>34.8%</i>	<i>\$99,993</i>	<i>\$468,921</i>	<i>\$636,220</i>	<i>\$4,161,540</i>
<i>Virginia Subtotal</i>	<i>28.0%</i>	<i>\$80,615</i>	<i>\$378,049</i>	<i>\$512,928</i>	<i>\$3,355,077</i>
<b>Total</b>	<b>100.0%</b>	<b>\$287,500</b>	<b>\$1,348,250</b>	<b>\$1,829,271</b>	<b>\$11,965,324</b>

**Pay As You Go For Funding Gap - \$12 Billion CIP Scenario**

(\$ Millions)	
CIP Funding Gap	\$ 3,303.39
Operating and Maintenance Effort Budget Gap	2,119.16
<b>Total</b>	<b>5,422.55</b>
Annual Average	\$ 542.26

(Dollars in Thousands)					
		FY 2017	FY 2022	FY 2026	10 Year Total
Jurisdictional Share of New Funding Needed:	% Contrib.	Base Line Year (\$158.3M)	Base Line Plus 'Add-on's'		10 Year Total
District of Columbia	37.2%	\$58,856	\$123,846	\$572,279	\$2,016,105
<i>Maryland Subtotal</i>	<i>34.8%</i>	<i>\$55,057</i>	<i>\$115,852</i>	<i>\$535,338</i>	<i>\$1,885,964</i>
<i>Virginia Subtotal</i>	<i>28.0%</i>	<i>\$44,387</i>	<i>\$93,401</i>	<i>\$431,595</i>	<i>\$1,520,484</i>
<b>Total</b>	<b>100.0%</b>	<b>\$158,300</b>	<b>\$333,100</b>	<b>\$1,539,213</b>	<b>\$5,422,553</b>

**Impact if Gap for \$12 Billion Capital Scenario is Bond Funded (Borrowed)**

- A reliable funding source, such as a dedicated tax or fee, can be leveraged to achieve a reasonable borrowing cost
- Based on an “A” category of credit or higher
- \$3.3 billion capital gap is borrowed
- Assumes estimated borrowing costs of 5% and 30 year financings
- With borrowing to cover capital shortfall, the average total funding gap (operating + capital) still exceeds \$290M annually, and is just over \$500M in FY 2026
- Maximum annual debt Service on borrowing to cover the capital shortfall would be about \$215M annually

(\$ Millions)				
	FY 2017	FY 2022	FY 2026	10 Year Total
Operating and Maintenance Effort Gap	-	247.70	298.54	2,119.16
Potential New Debt Service (to fund 100% of CIP gap)	-	68.85	214.93	803.19
<b>Total</b>	<b>\$ -</b>	<b>316.55</b>	<b>513.47</b>	<b>2,922.35</b>

**Jurisdictional impact of \$12B CIP – Assumes Debt Financing for Capital Needs**

(Dollars in Thousands)						
		FY 2017	FY 2022	FY 2026	10 Year Total	
Jurisdictional Share of New Funding Need:	% Contrib.	Base Line Year (\$7.8M)	Base Line Plus 'Add-on's'		Total	Percent of FY Total
District of Columbia	37.2%	\$2,882	\$117,693	\$190,909	\$1,086,529	37.2%
<i>Maryland Subtotal</i>	<i>34.8%</i>	<i>\$2,696</i>	<i>\$110,096</i>	<i>\$178,585</i>	<i>\$1,016,393</i>	<i>34.8%</i>
<i>Virginia Subtotal</i>	<i>28.0%</i>	<i>\$2,173</i>	<i>\$88,760</i>	<i>\$143,977</i>	<i>\$819,426</i>	<i>28.0%</i>
<b>Total</b>	<b>100.0%</b>	<b>\$7,751</b>	<b>\$316,549</b>	<b>\$513,472</b>	<b>\$2,922,349</b>	<b>100.0%</b>

### **Possible Funding Gap Solutions**

- Approx. \$500 million regional dedicated tax or fee (i.e. property, income, sales, etc.) provides the ability to debt finance the capital gap
  - *As an example, a 1% regional sales tax would generate approximately \$500 million annually*
- Annual increases in passenger revenue of approx. 13.5% (growth and/or fare increases)
- Increases of more than 8.2% annually (both operating and capital) for state and local subsidies over FY2017 base year

### **Consequences of Doing Nothing**

- Safe Track type delays will continue indefinitely
  - (Cost of trip delays are estimated between \$153M and \$235M annually)
- Passenger safety risks will continue to increase
- Traffic congestion will continue and worsen
- Approx. \$25 billion of development has occurred near metro stations over the past 8 years\*
- Economic growth in the region will likely slow
  - MWCOG economic forecast implies regional state and local government tax revenue growth of about 2.5% annually
  - Reducing the economic forecast to 2.25% per year reduces annual tax revenue to the region by approximately \$1 billion by 2025 and thereafter

# **Appendix B**

## **(List of Potential P3 Projects)**

*Per the Office of Public Private Partnerships*



## List of Potential Public Private Partnership (P3) Projects

Below is a list of potential projects, as identified by the Office of Public Private Partnerships (OP3), for which that office is actively seeking to structure and finance as P3 projects. While actual dollar values for these projects are not available at this time, the OCFO conservatively estimates that these projects represent between \$1 billion and \$1.5 billion in capital costs alone. More information on these projects can be found at <http://op3.dc.gov/pipeline>.

Project	Agency (s)
Street Light Modernization	DDOT, OCTO
Henry J. Daly Building	DGS, MPD
West Virginia Avenue Public Works Campus	DPW
Corrections Center	DOC, DGS
Lamond-Riggs Library	DCPL, DGS
Shepherd Park Library	DCPL, DGS
Police Facilities	MPD, DGS
Fire and Emergency Medical Facilities	FEMS, DGS
Parks and Recreation Facilities	DPR
Educational Facilities	DCPS
Waste Management / Recculing Center	DOEE, DPW
Solar and Microgrid Projects	DOEE, DGS

While there is no singular definition for public-private partnerships (P3s), the World Bank generally defines them as, “A long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility, and remuneration is linked to performance.” All P3s involve a basic trade-off between a transfer of risk (risk of construction, risk of management, etc.) by the private party versus control (control of day-to-day operations of the facility, control of the revenue stream from the facility, etc.) by the government entity. There are several advantages and challenges related to P3s that government entities need to address when considering their use. These include, but are not limited to, the following:

Advantages	Challenges
Accelerated project delivery compared to pay-as-you-go approach	Restricted control over day-to-day operations of the facility
Fixed-price contract where private partner is at risk for any cost overruns	Ongoing costs of monitoring the contract over a long period of time
Access to more innovative, and cost-effective methods of design and operation of the facility	More expensive cost of borrowing for private partner versus traditional public borrowing
Account for full life cycle costs of operating and maintaining a facility	Often less transparency and accountability in the contract with private partner versus traditional public sector approach
Ability to hold private partner to specific performance standards in a contract or otherwise withhold payment	A mismatch in technical expertise on the side of the private partner can lead to overpayment by the government entity

# **Appendix C**

## **Approach to Developing the Capital Asset Replacement Scheduling System (CARSS)**

## Approach to Developing CARSS

In the attempt to develop a better understanding of the costs for the District of Columbia of maintaining its critical capital infrastructure, it was determined that there was a need to develop a comprehensive asset management plan for all of the District's assets. The approach that was developed to address this need led to the creation of the District's capital asset replacement scheduling system, or CARSS. CARSS is a comprehensive asset management planning tool created by the District in conjunction with our software solutions partners at Riva Modeling, which has since been acquired by PowerPlan. PowerPlan is assisting the District with building an asset management planning solution that delivers a comprehensive view of District's capital asset health, and provides the information and control needed to align asset strategy with the overall organizational goals of the District.

In developing CARSS a critical first step is to create a centralized database, or asset register, of all District-owned assets and their respective condition, so that a calculation of the costs to maintain or replace those assets can be performed. This asset register will provide for the first time a detailed inventory of all District-owned assets on an enterprise-wide basis. The District must have an inventory of these assets, and an understanding of the maintenance and replacement costs, at not just an agency level, but also at an enterprise-wide level, in order to have a full understanding of the scope of the challenge in financing the District's capital infrastructure needs. It is also worth noting that maintaining an asset inventory and conducting condition assessments are best practices in asset management promulgated by the Government Finance Officers Association. *A system for assessing assets is prerequisite to appropriately planning and budgeting for capital maintenance and replacement needs, in turn ensuring that assets are in conditions necessary to provide expected service levels.*<sup>1</sup>

Given the inherent complexities of this task, the process of developing CARSS, while being led by the OCFO, has been a collaboration between this office and the Executive Office of the Mayor. One of the first steps that occurred in this process was the creation of a steering committee to manage the development and implementation of CARSS. The steering committee is comprised of various members from critical agencies with expertise in capital planning, information technology and finance.

### *Phase 1: Recap of Where the District was One Year Ago*

Proof of Concept (version 1.0): Development of the CARSS model initially began in June of 2015 with a Proof of Concept (POC) using three different asset types; fleet, facilities, and horizontal infrastructure. During the POC, information from three agencies that owned some of these three asset types were loaded into static Microsoft Excel files. These agencies were the Office of State Superintendent of Education (OSSE) for the special education school bus fleet; District of Columbia Public Schools (DCPS) for school facilities and their construction; and the District Department of Transportation (DDOT) for their data on streets representing horizontal infrastructure assets. The POC was successfully completed in October of 2015, having confirmed that it was possible to create an asset replacement model across multiple asset types that would successfully predict asset investment needs, and develop annual budgets for an extended period of

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<sup>1</sup> Government Finance Officers Association, *Best Practice: Asset Maintenance and Replacement*, approved by the GFOA Executive Board March, 2010. Retrieved from: <http://www.gfoa.org/asset-maintenance-and-replacement-on-9/26/15>.

time. A status report on the successful completion of the POC was submitted to the Mayor and Council in October 2015, per a legislative requirement.

*Phase 2: Recap of Where the District is Now*

Development of a comprehensive “top down” 15-year capital financial plan (version 1.5):

Development of a robust asset replacement model entails calculating the needs from the “bottom up”, individual asset by asset. This solution is neither quick nor easy to implement, therefore as an interim step, the process began with a focus on a capital projects’ needs basis. Agencies provided their complete set of capital needs, project-by-project, for FY 2017 through FY 2022 as part of budget formulation in November 2015.

For the CARSS project data, the Capital Budget Team (CBT) carefully reviewed the submissions from agencies, along with those projects receiving budget in FY 2016, and created a file set of 573 current and proposed capital projects. These capital projects were carefully categorized into one of four different asset types; horizontal infrastructure, facilities (vertical infrastructure), fleet, and information technology and equipment.

Below is a breakdown of the various asset classes and some of the project classifications that were used in this phase of the CARSS project.

Asset Class	Classification Examples
Horizontal Infrastructure	<ul style="list-style-type: none"> <li>• Streets</li> <li>• Sidewalks</li> <li>• Alleys</li> <li>• Bridges</li> </ul>
Vertical Infrastructure	<ul style="list-style-type: none"> <li>• General Support Facilities</li> <li>• School Facilities</li> <li>• Parks, Playgrounds, Athletic Fields</li> <li>• Public Libraries</li> </ul>
Fleet	<ul style="list-style-type: none"> <li>• School Buses</li> <li>• Fire &amp; EMS vehicles</li> <li>• Police Vehicles</li> <li>• Passenger Vehicles</li> </ul>
Information Technology	<ul style="list-style-type: none"> <li>• Computer Hardware</li> <li>• Software Purchase</li> <li>• IT Development</li> <li>• Communication Equipment</li> </ul>

*Phase 3: Recap of Where the District is Going*

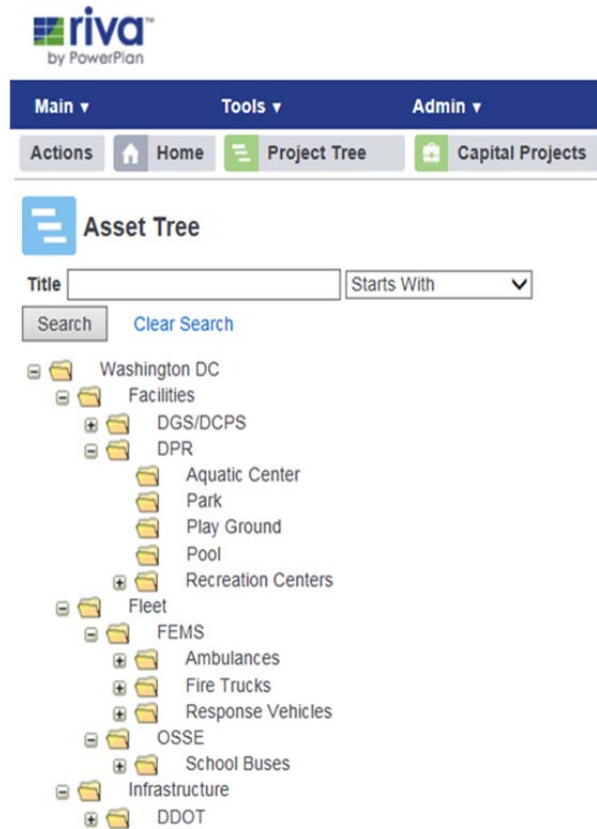
Development of a Detailed “Bottom-up” Approach to Capital Budget (version 2.0):

While the top-down, capital projects based approach is being used in the near-term, simultaneously the development of a much more granular, asset-by-asset level needs assessment approach using data from the already existing databases in OSSE, Fire and Emergency Medical Services (FEMS), Department of General Services (DGS), Department of Parks and Recreation (DPR), DDOT and the Office of the Chief Technology Officer (OCTO) was initiated. There are three distinct advantages of developing a “bottom-up” budget driven by individual assets in CARSS:

1. An alignment is created between asset and resource decisions to better meet strategic objectives,
2. It removes subjectivity, and improves transparency, by using evidence and a common framework for prioritization,
3. It enables the District to optimize constrained resources/budget with clear visibility to the impact of tradeoffs.

This asset-by-asset approach is the ultimate goal of the CARSS project, whereby each major capital asset in the District will be cataloged in an asset register, along with its current condition and cost for repair or replacement. The screen shot to the right shows the asset tree structure hierarchy that is used in CARSS to organize the asset-level data from the various agencies, for which there is sufficient detailed data at this time.

Although significant process has already been made in gathering detailed asset data from certain agencies, the quality of asset data is not consistent across all District agencies. Therefore, it will take approximately two to three years before CARSS is fully populated with “bottom-up” level data on all District assets. However, enough data exists to create an asset-driven capital budgeting needs assessment for three asset types in four different agencies for the FY 2018 – FY 2023 capital budget formulation. The District’s new effort will result in “bottom up” budgeting for both OSSE and FEMS fleet vehicle needs, DPR’s facility needs, and DDOT’s local streets and alleys infrastructure needs. These assets currently represent approximately 14% of all of the District assets.



# **Appendix D**

## **Description of Long-Range Capital Financial Plan Model**

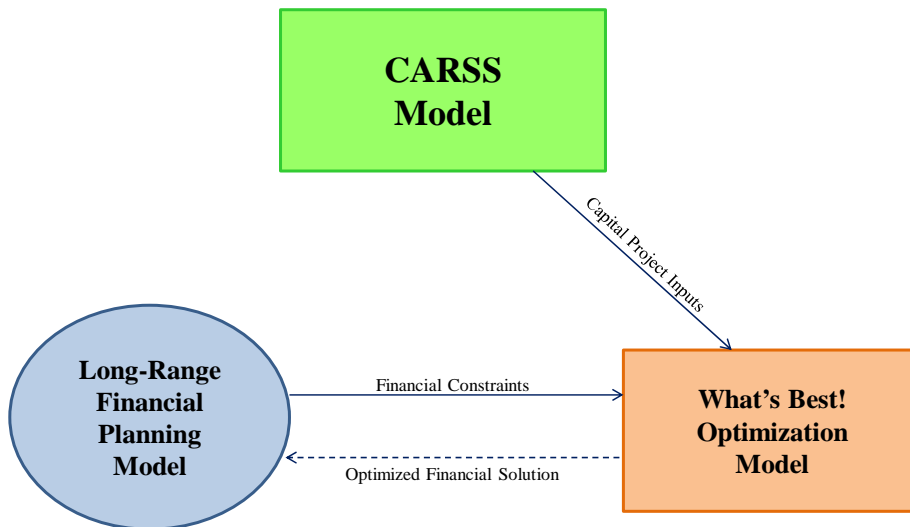
## Description of Long-Range Capital Financial Plan Model

In order to address the complex challenge of financing the unfunded capital infrastructure needs identified in the capital asset replacement scheduling system (CARSS), while remaining within the various constraints imposed by the District’s borrowing limits, the OCFO engaged the services of our external financial advisor, PFM Advisors LLC (“PFM”) to develop a long-range financial planning model. This modeling effort will assist the District in identifying financial strategies to fund the identified capital needs gap in the earliest year possible given various constraints, such as the amount of paygo or additional federal funding available over various periods.

The Long-Range Capital Financial model is actually a combination of three discreet models that work in conjunction to identify the optimal financial result. The various components are:

- CARSS – an asset management planning (“AMP”) software solution developed by PowerPlan;
- Long-Range Financial Planning Model (“LRFPM”) – which is a Microsoft Excel based model developed by PFM; and
- Lindo What’s Best! (“WB!”) – a linear optimization model, which works as an add-in to Microsoft Excel.

### Long-Range Capital Financial Model



The CARSS model extracts the capital project inputs from various District Agency files and prioritizes, scores and, based on specific District criteria, ranks them in comparison to all other projects across the District. Then, under capital budget constraints and with a specific priority ranking assigned to each project, it determines which projects can be funded in the Capital Improvement Plan (CIP) each year, and which projects will not receive funding (due to their lower priority ranking). The detailed list of unfunded capital projects are then imported into the WB! linear optimization model, along with certain debt and source assumptions from the Long-

Range Financial Planning Model, to solve for the optimal solution to finance the unfunded capital gap at the earliest possible date. The financing information from the WB! linear optimization model is then exported back into the Long-Range Financial Planning Model in order to present a complete long-term capital financing plan for the District over the forecasted 15-year period.

This modeling effort will allow the District to accomplish several capital financial planning goals. Specifically, it will allow the District to:

- Alter individual assumptions within internal and external source categories and drive source projections, with specific focus on paygo funding levels;
- House all existing debt service (by series);
- Project the District's debt service through the end of its 15-year forecast period (FY 2032) by exporting sizing results calculated in DBC Finance, a bond modeling software program;
- Utilize linear optimization software to maximize the amount, and optimize the structure, of future debt issuances to ensure that the District stays within its statutory debt limits;
- Summarize all projected debt and expenditure detail through FY 2032; and
- Calculate the projected ratio of debt to expenditures on an individual fiscal year basis throughout the entire financial planning period.

The engine of the model lies in the macros and linear WB! linear optimization software. These tools allow the model to directly interface with other internal models to ensure the District maintains the flexibility to incorporate the most current source data and CARSS assumptions into each analysis. It also allows the District to optimize and project the maximum amount of debt that can be issued in each fiscal year (under the 12% cap), while simultaneously determining the earliest possible fully-funded year of all unfunded capital projects. The District will also be able to quantify the amount of paygo needed to fund entire backlogs of unfunded capital needs over various time periods. Outputs of the Long-Range Capital Financial Model include two reports: a "*Gap Report*," which (based on the CARSS file) details and quantifies the current capital projects funding gap in each fiscal year using that year's sources of funds; and a "*Funded Report*" which lists the unfunded capital projects from the FY 2017-2022 CIP that receive funding, and in which years outside of the current CIP period, and summarizes the allocation of sources based on fiscal year projections of debt service.



# **Appendix E**

## **Methodology for Classifying and Scoring Capital Projects**

## **Methodology for Classifying and Scoring Capital Projects**

### *Project Classification*

After all agencies of the District of Columbia formally submitted their capital projects, and the Capital Budget Team (CBT) reviewed and made adjustments to them, the total number of capital projects with requested budget needs stood at 406. This set of projects went through several progressive actions to better refine and assess the total capital needs of the District.

After defining the categories and classifications of all projects within the four asset types; Horizontal infrastructure, Vertical infrastructure, Fleet, and Information Technology and Equipment, all capital project requests were then re-examined placing them into one of two groups based on their need for capital investment. The first group of projects consists of what are called “new capital projects.” This group is characterized by the fact that the project is essentially a one-time investment that either expands or establishes a new service for District constituents. For example, projects to build a new swimming pool, completely modernize a school, or to invest in an extension to the streetcar line are examples of projects in this grouping. These projects receive budget a single time, perhaps over multiple years during construction, and are then placed into service without a specific continuing capital investment need.

The second group of projects are called “capital maintenance projects,” and are comprised of those projects where a continued capital investment must be made in the asset. These projects can generally be thought of as the capital maintenance of existing assets that are already owned by the District. It is important to note that these are qualified capital expenditures, not the routine operating and maintenance costs, of capital assets. Capital projects such as public safety vehicles, sidewalks, information technology upgrades, and roof or HVAC capital repairs to buildings are examples of these types of projects. These projects require periodic investments of capital in order to maintain them in a good working condition, or otherwise replace the assets at the end of their useful lives (i.e. vehicles). Without these periodic capital investments the assets will deteriorate, costing significantly more in annual maintenance costs, and will eventually fail completely.

There are numerous examples in our region of this kind of asset failure due to lack of adequate capital maintenance over the years. High profile examples of this inadequate capital maintenance can be found at the federal level with the Arlington Memorial bridge, at the regional level with the well-chronicled troubles of the Metro system, and at the local level in the failing state of the District’s Henry J. Daly building. Actually, the most notable example of failed capital asset maintenance in the area was probably the poor state of repair of schools facilities in the District until about FY 2008, when the District began to spend billions of dollars over several years to repair and rebuild its school facilities. It can be argued that if an adequate amount of funds had been provided to maintain school facilities in the past the facilities might have lasted for several more years, and thereby decreased the amount of funding dedicated in the CIP to that purpose.

Based on project types, categories and classifications, the CBT then established the expected useful life of assets that make up the project (pending building CARSS at a more detailed asset-by-asset level in the next phase), and thus the amount of estimated budget the project will require over any number of years. For example, we know that a typical administrative vehicle must be replaced every seven years. The CBT applied adjustments needed to the agency requested project budgets to reflect any missing needed investment over the useful life of the asset, and beyond.

The budget needs are also inflated by three percent (3%) annually (compounded) to reflect a degree of cost inflation.

Capital projects were then further reviewed to identify if they should be considered as either 'pooled' projects, or potential public-private partnership (P3) opportunities. Pooled projects have typically been used where there are known capital investments of a specific type (roofs, electrical systems, HVACs, etc.) that must take place across several agency assets, but where the specific locations and/or costs are not yet identified.

The Mayor's Office of Public Private Partnerships reviewed all projects for their potential as a P3 opportunity. They scored the opportunities on a scale of "0 to 4" where zero reflects no opportunity for the project to be structured as a P3, and "4" representing a very high probability of a P3 opportunity. The data identifying the pooled projects, as well as the P3 potential scoring was entered into CARSS. This data will enable us to better identify the characteristics of certain capital projects, and will help us evaluate the potential need for funding and budget where partial funding can be obtained outside of direct District resources.

### *Project Scoring*

To properly score projects as objectively as possible a mechanism was designed to assist with process. The tool provides a set of 19 different elements against which projects are individually evaluated. Those elements were then grouped into 3 sections to evaluate the benefits, assess the potential impacts, and determine the extent to which a proposed project would meet District policy priorities.

The scoring criteria for each element was then assigned a weight to ensure that any proposed project received a fair and unbiased score when compared to other projects. In other words, the element weighting "level-sets" projects on the same scale to ensure that a well-defined, proposed new school project receives a similar score to a project to replace HVAC systems in 3 libraries, or a project to upgrade IT software. Thus a project that maximizes benefits, provides positive impacts to the District, and aligns with priorities, would receive a score of 100 points, regardless of the nature of the project or the asset being acquired.

Actual project scoring is simply a matter of assigning each element that the project impacts a score from 1-5. A score of 1 representing that the project only impacted that element minimally, while a score of 5 means the project impacts that element significantly. The weighting factors are then automatically applied to the score in the CARSS application. There is also a set of 10 additional sub-elements that are key priorities. Any project that meets one of those receives a bonus of 5 additional points. The scores in each section are then totaled to determine the overall project score. The scoring is initially performed by the Capital Budget Team members and is then reviewed several times to ensure consistency across all proposed projects and District priorities. These scores thus provide the basis for the ranking done in CARSS to determine the priority order of all projects proposed.

The detailed scoring criteria used for all capital projects can be seen on the following chart.

### Ranking Criteria for Proposed Capital Projects

Project Scoring (Score Each Numbered Element - light gray highlights) Evaluate the proposed project on a scale of 1-5 for the extent to which it meets any defined element(s)?				
Special Emphasis Projects (Mark any project that meets sub-element criteria - dark gray highlights) Define these with an "X" in the element score - and 5 bonus points will be added				
Agency	Total Cost	Element Score	Weighted Factor	Total Element Score
Project				
<b>Meets District Policy Priorities</b>				
1	Education	0	3	0
	Middle School			0
	Library			0
	Pre-K Classrooms			0
2	Community (Homelessness, Housing, Employment)	0	3	0
3	Health	0	3	0
	Recreation Center			0
	Ambulances			0
4	Public Safety	0	3	0
	Crime Fighting Technology			0
5	Transportation	0	3	0
	Local Road Rehab			0
	Pedestrian, bike or Public Transit			0
	Environmental Remediation - Trees and Green Infrastructure			0
6	Good Government	0	3	0
	Smart City - DC Net, GIS			0
<b>Priority SubTotal</b>				<b>0</b>
<b>Cost-Benefit Factors</b>				
1	Readiness (catalyst project, implements Small Area Plan, etc.)	0	5	0
2	Impact on Operating Budget*	0	5	0
3	Potential to Generate Revenue for the District	0	5	0
4	Potential for Private Economic Impact or Job Creation	0	5	0
<b>Cost Benefit SubTotal</b>				<b>0</b>
<b>Project-Specific Impacts</b>				
1	Health and Safety Improvements	0	7	0
2	Federally Required Mandate	0	5	0
3	Extends Useful Life of Existing Asset	0	5	0
4	Close Out Existing Project	0	5	0
5	Project Importance	0	7	0
6	Critical Building System Improvement	0	5	0
7	Co-location of projects/facilities	0	5	0
8	Leverages External Public or Private Investments	0	5	0
9	PIF Evaluation Score (IT projects)	0	0.25	0
<b>Impact SubTotal</b>				<b>0</b>
<b>Total Score</b>				<b>0</b>
* if the project adds costs to the operating budget, then score 1; if no impact, then score 3; if savings then score 5				

# **Appendix F**

## **Overview of How Capital Projects Were Prioritized**

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Once sufficient details outlining the nature and structure of needed projects and their budgets existed, the next task was to determine an objective approach to prioritize the 406 proposed capital projects, since there was likely no possibility that all of the capital needs could be funded in the current CIP. The CARSS model will ultimately analyze this at an asset-by-asset level by evaluating the relative risks to the District of deciding whether or not to fund certain capital projects.

One ranking mechanism that was considered was to establish District priorities by asset type, classification, or category. However, this approach does not allow for an objective comparison of different asset types against each other. For example, given scarce funding resources, how should the decision be made to objectively compare the relative importance of an emergency vehicle versus a school facility versus I.T. equipment? It was determined that a better approach would assess each project on a stand-alone basis, and its relative importance for funding versus the other 406 projects, to ensure that a project to repair an HVAC system in a school was scored on a level playing field with a new accounting system, as an example.

Using the standard system of scoring projects that was established, the Capital Budget Team (CBT) and other subject matter experts spent time over several weeks to individually score each of the capital projects. The scores of individual projects were reviewed several times to assess consistency and a genuine sense of logic, and to ensure they were as objective as possible. The criteria and the scores were then applied to the CARSS model, which created a project ranking from 1 to 406. As we complete the asset-by-asset driven model, an assignment of risk will also be created using a variety of different factors. In the interim, we are using the scoring as the proxy for risk at a project level. The logic is that the higher the score assigned (or ‘level of importance’), the greater the risk to the District for not funding that capital project.

In addition to scoring by the CBT and other subject matter experts, agencies also ranked each of their proposed capital projects in order of the agency’s priorities. This enabled the CBT to better coordinate final decisions for capital projects which were scored similarly by the CBT, in essence serving as a tie breaker based on their relative importance to the agencies.

The data load into CARSS included the proposed funding source (debt, paygo, rights-of-way fees, federal budget, etc.) of each project, for each year of the six-year CIP period. Available budget totals, based on the District’s borrowing capacity and the approved financial plan are also fed into CARSS by year and by funding source. Thus, the capital projects can be segregated by funding source and type to better ensure that the proposed budgets match the revenue and funding available.

The result, at this phase of the process, provides a priority scoring of all projects that can be funded within the budget constraints of the District, in any particular year. CARSS provides a mechanism (called a “visual leveler”) that allows users to see a graphic representation of all capital priorities and budget constraints, and determine a measure of risk to the District.

The following screen shot of the visual leveler shows all of the capital project requests from the various agencies as part of the FY 2017-2022 CIP budget formulation process, relative to the amount of funding available, represented by the red lines.



The visual leveler then enables users to maneuver individual projects by year in an attempt to determine a set of projects that can fit within the resource and budget limits for any particular year. The scenarios are captured with the results reflected in each year's set of projects, and in summary as a change to the District's risk factor. Users can propose and save different scenarios for further discussion and analysis.

In addition to allowing individual projects to be maneuvered, the visual leveler in CARSS will also automatically solve the funding problem using a combination of project scoring, risk, and budget limits to optimize the decision of which projects to fund in any particular year, and which ones will have to be excluded given budget limits. The optimization is captured both project-by-project, and year-by-year.

Below is a screen shot of the District’s capital projects budget needs after running the solver (optimization) function.



After utilizing CARSS to optimize project priorities for the CIP period, capital projects that did not have a sufficiently high priority were placed in the “excluded” column on the far right of the chart (highlighted in red). This data was then extracted and used to determine the identified gaps in budget needs year-by-year. The Capital Budget Team then conducted another detailed review and scrubbing of the remaining, unfunded or underfunded capital projects, along with identifying which of these remaining projects had a high potential to be structured as a P3. This resulted in a remaining total of 348 capital projects with verified budget needs that reflected true unfunded capital projects of the District. This set of projects defines, at this point in time, our best estimate of the total unfunded capital needs of the District, and the financing challenge that needs to be addressed.

It is important to remember that the capital projects that were removed from the set of 406 projects, because they were deemed to be highly likely to be structured as P3s, are still capital infrastructure needs of the District. Those capital needs will probably be financed through the use of an availability payment by the District, or some other payment mechanism, which at least some portion of the payment stream will likely be considered as a long-term obligation of the District, or debt otherwise subject to the District’s borrowing limitations.