



# City of Richmond

## Report to Committee

**To:** Public Works and Transportation Committee  
**From:** Milton Chan, P.Eng.  
Director, Engineering  
**Date:** June 26, 2025  
**File:** 10-6060-01/2025-Vol  
01  
**Re:** 2025 Ageing Utility and Road Infrastructure Planning – Update

### Staff Recommendation

That the staff report titled, “2025 Ageing Utility and Road Infrastructure Planning – Update”, dated June 26, 2025, from the Director, Engineering be received for information.

Milton Chan, P.Eng.  
Director, Engineering  
(604-276-4377)

Att. 5

REPORT CONCURRENCE		
<b>ROUTED TO:</b>	<b>CONCURRENCE</b>	<b>CONCURRENCE OF GENERAL MANAGER</b>
Finance Department	<input checked="" type="checkbox"/>	
Public Works	<input checked="" type="checkbox"/>	
Transportation	<input checked="" type="checkbox"/>	
Climate and Environment	<input checked="" type="checkbox"/>	
Policy Planning	<input checked="" type="checkbox"/>	
<b>SENIOR STAFF REPORT REVIEW</b>	<b>INITIALS:</b> 	<b>APPROVED BY CAO</b> 

## **Staff Report**

### **Origin**

The purpose of this report is to update Council on the estimated long-term capital funding requirements for age-related infrastructure renewal. The previous update report was brought forward in 2022. This report reflects on the City's current infrastructure inventory, new inspection data, and updated infrastructure replacement costs.

This report supports Council's Strategic Plan 2022-2026 Focus Area #3 A Safe and Prepared Community:

*Community safety and preparedness through effective planning, strategic partnerships and proactive programs.*

*3.1 Advance proactive, sustainable, and accelerated flood protection in collaboration with other governments and agencies.*

*3.3 Ensure the community is collectively prepared for emergencies and potential disasters.*

*3.4 Ensure civic infrastructure, assets and resources are effectively maintained and continue to meet the needs of the community as it grows.*

This report supports Council's Strategic Plan 2022-2026 Focus Area #4 Responsible Financial Management and Governance:

*Responsible financial management and efficient use of public resources to meet the needs of the community.*

*4.1 Ensure effective financial planning to support a sustainable future for the City.*

### **Background**

This report outlines the long-term funding requirements for maintaining and replacing the City's ageing infrastructure. The objective of the analysis is to ensure that the City has the capacity to meet the funding challenges of the present as well as the future, while maintaining current service levels.

The ageing utilities and roads infrastructure analysis is based on standard and observed service life of specific types of infrastructure. There are several local factors that can impact the actual useful life of infrastructure, such as soil type and quality of original installation. The long-term analysis is essential for long-term budget projections but has limited use for identifying exact replacement dates for specific pieces of infrastructure. Short-term infrastructure needs are addressed through the 5 Year Capital Plan, which is developed based on field observations, repair history, and condition assessments.

The graphs that are attached to this report provide long-term infrastructure funding projections and should be used as a general overview for anticipated long-term infrastructure costs, while the 5 Year Capital Plan more accurately identifies short-term budget requirements.

### Existing Infrastructure

In managing the City's extensive network of infrastructure services, staff have developed: water, sanitary sewer, flood protection, and pavement management computer models to predict infrastructure performance, upgrade requirements, replacement year, and replacement costs. Coupled with field-verified condition assessments and repair history, predictive modelling plays a key role in determining the City's infrastructure replacement and upgrade programs.

Table 1 provides a summary of the City's inventory of water, sanitary sewer, flood protection, non-Major Road Network (MRN) roads and road infrastructure. The replacement value assumes that infrastructure will be replaced or upgraded to meet the City's current requirements.

**Table 1: Infrastructure Inventory**

<b>Infrastructure</b>	<b>Components</b>	<b>Main Funding Source</b>	<b>Replacement Value (2025 Dollars)</b>
Water	636 km Pipes 13 PRV Chambers 60 Valve Chambers 32,433 Water Meters	Water Utility	\$1,216M
Sanitary Sewer	569 km Pipes 154 Pump Stations	Sewer Utility	\$1,122M
Flood Protection	599 km Pipes 39 Pump Stations 61 km Culverts 151 km Watercourses 49 km Dikes	Flood Protection Utility	\$3,691M
Roads (Non-MRN) and Road Assets	1,338 lane km Asphalt <sup>1 2</sup> 12,025 Street Lights <sup>3</sup>	General Revenue	\$1,087M
<b>Total</b>			<b>\$7,116M</b>

<sup>1</sup> Includes asphalt layer only and not supporting sub-base structure.

<sup>2</sup> Excludes MRN roads.

<sup>3</sup> Excludes BC Hydro lease lights not maintained by the City.

The infrastructure programs for Water, Sanitary Sewer, and Flood Protection are funded by the Water Supply Reserve, Sanitary Sewer Reserve, and Flood Protection Reserve, respectively. Each reserve receives an annual contribution from the corresponding utility budget. Road and road assets (asphalt and street lights) are not part of a utility and are mainly funded from the City's General Revenue.

Table 2 summarizes the current annual funding levels included in the 2025 Utility Budget and General Revenue funding sources, along with the uncommitted reserve balance as of May 31, 2025.

**Table 2: 2025 Annual Funding Levels and Reserves**

<b>Infrastructure Type</b>	<b>2025 Approved Annual Funding Level</b>	<b>Main Funding Source</b>	<b>Uncommitted Reserve Balance (May 31, 2025)</b>
Water	\$8.5M	Water Utility	\$29.7M
Sanitary Sewer	\$7.3M	Sewer Utility	\$25.9M
Flood Protection	\$17.6M	Flood Protection Utility	\$26.6M
Road and Street light Assets	\$4.7M <sup>1 2</sup>	General Revenue	N/A
<b>Total</b>	<b>\$38.1M</b>		<b>\$82.2M</b>

<sup>1</sup> Includes \$100k from the Citywide Sidewalk and Street Light Replacement Program.

<sup>2</sup> Excludes supplementary asphalt paving program.

As part of this report, the expected long-term average annual capital funding requirements have been updated to reflect changes in infrastructure replacement costs, inventory changes resulting from growth or capacity improvements, and new inspection data. There is an increasing funding gap that will need to be addressed through future utility budgets. Staff will continue to present annual budget options to close existing funding gaps and, ultimately, maintain utility funding within the required target range.

## **Analysis**

### Total Replacement Value and Schedule

Infrastructure replacement costs for the City's water, sanitary sewer, flood protection, and road infrastructure over the next 100 years are presented in Attachments 1 to 5. The attachments also present the current annual capital funding levels, and the expected long-term average annual capital funding levels required to replace assets (in 2025 dollars). Given the volatility of construction costs, infrastructure projects do not always follow general inflation trends.

The current analysis indicates that construction cost increases have been significant in recent years, with cost inflation being well above the Consumer Price Index. Replacement values have been updated to account for this continuing trend.

The attachments provide a funding range (low to high) to reflect a level of uncertainty in long-term replacement programs, which is due to a number of variables, such as:

- Coordination with development driven upgrades or other capital projects;
- Variability in the potential service life of the infrastructure; and
- Variability in the cost of infrastructure replacement.

### Water

Staff estimate a long-term average annual capital funding requirement of \$13.2 million, with a funding range of \$10.8 to \$17.5 million, for the City's water infrastructure (Attachment 1). Since 2001, Council has endorsed increases in the annual Water Utility capital funding to its current level of \$8.5 million. The City's proactive replacement programs have mitigated ageing infrastructure issues and watermain breaks, which has minimized service disruptions and property damage from broken watermain.

The primary focus of the City's watermain replacement program is the replacement of ageing asbestos cement (AC) water pipes with new polyvinyl chloride (PVC) or high-density polyethylene (HDPE) pipes. PVC and HDPE pipes offer longer service lives, better seismic resilience, and higher chemical resistance in Richmond's corrosive soil conditions. Approximately 35% of the City's watermain are AC pipes. Since the last ageing infrastructure planning update in 2022, approximately 14 kilometres of AC water pipes have been replaced through the watermain replacement program. Replacement of ageing AC pipes will remain the primary focus of the City's watermain replacement programs for approximately the next 30 years.

The City's water meter program is funded through the Water Utility and has been successfully implemented. To date, 100% of single-family, approximately 60% of multi-family, and 100% of industrial, commercial and institutional properties have been metered. One of the benefits of water metering is the ability to identify property-side water leakage and provide incentives for leak repair. Since 2015, the City has received 2031 applications for leak rebates, totalling 3.3 million cubic metres in annual leak reduction. This represents approximately \$2.5 million in annual cost savings on Metro Vancouver water purchases.

### Sanitary Sewer

Staff estimate a long-term average annual capital funding requirement of \$14.7 million, with a funding range of \$12.8 to \$18.5 million, for the City's sanitary sewer infrastructure (Attachment 2). Since 2001, Council has endorsed increases in the annual Sewer Utility capital funding to its current level of \$7.3 million.

Inflow and infiltration (I&I) of rainwater and groundwater into the sanitary system reduces available system capacity for domestic sewage and municipal growth. I&I management is an important strategy for deferring or avoiding capacity-based system upgrades. The City maintains one of the lowest rates of I&I in Metro Vancouver, which is a result of proactive sanitary sewer assessment and rehabilitation programs. The City completed a condition assessment of all sewers indicating that the City's gravity sewers are generally in excellent condition.

The City operates and maintains 154 sanitary pump stations. Since the early 2000s, the City has constructed nine new sanitary pump stations, rebuilt five sanitary pump stations, performed upgrades on 27 sanitary pump stations, and installed new pumps at 92 pump stations. The City completed a condition assessment of the sanitary pump station inventory in 2024. The assessment results indicate that the City's sanitary pump stations are generally in good condition, with minor rehabilitation work recommended over the next 5 to 10 years.

### Flood Protection

Staff estimate a long-term average annual capital funding requirement of \$38.7 million, with a funding range of \$36.8 to \$42.6 million for the City's flood protection infrastructure (Attachment 3). Council has endorsed increases in the annual Flood Protection capital funding to its current level of \$17.6 million.

### *Drainage Infrastructure*

The expected long-term average annual capital funding level for drainage infrastructure has increased mainly due to inflation and emerging box culvert issues.

The City has approximately 58 kilometres of box culverts, the majority of which are 50 to 60 years in age. Concrete box culverts have a design life of 100 years; however, some box culvert joints are failing prematurely leading to the development of sinkholes, often under highly travelled roadways. To extend the useful service life of box culverts and minimize long-term replacement costs, inspections are completed on a 7-year cycle. In addition, Council has supported a number of capital projects related to box culvert repairs. Since 2015, a total of \$16.4 million has been allocated to repairs of failed box culverts.

Condition assessments for the City's 39 drainage pump stations is on-going. The estimated replacement costs have increased due to increased seismic mitigation and regulatory requirements, along with significant increases in construction costs.

Since the early 2000s, the City has rebuilt or performed significant upgrades on 19 of 39 drainage pump stations. The City's capital program includes two additional proposed pump station replacements. The remaining Lulu Island drainage pump stations are identified to be rebuilt or receive significant upgrades over the next 20 years.

### *Dike Infrastructure*

The City is an average of one metre above mean sea level and protected by 49 kilometres of dike. Current climate change science estimates that sea levels will rise by 1.0 metre by the year 2100 and 0.2 metres of land subsidence will occur over the same time period. The Flood Protection Management Strategy identifies upgrading the City's perimeter dike to an elevation of 4.7 metres geodetic as the priority response to address sea level rise. All new dikes are designed to accommodate a further height increase to 5.5 metres to address sea level rise beyond 2100. The City's Dike Master Plan addresses this need by recommending dike upgrade options for each section of dike throughout the City. All five phases of the Dike Master Plan have been endorsed by Council.

Since 2019, the City has raised 2.1 kilometres of the south dike between Gilbert Road to 400 m west of No. 4 Road, and near No. 9 Road. Upcoming upgrades include 450 metres of the north dike between Lynas Road to No. 2 Road and 1.2 kilometres of the south dike between No. 4 Road and No. 5 Road. Staff will continue to upgrade the perimeter dike in accordance with the Dike Master Plan and bring forward projects for Council's consideration as a part of the annual capital budget.

### *Flood Protection Funding and Accelerated Flood Protection Program*

In the early 2000s, Council endorsed the Flood Protection Utility and the annual capital funding levels have been progressively increased to its current level of \$17.6 million. Through the Flood Protection Utility and leveraging grant funding, the City has dedicated over \$206 million over the last 10 years to complete flood protection projects, including pump station and dike upgrades.

In 2021, Council adopted a 50-year implementation period for an accelerated flood protection program with the objective of upgrading the City's dikes within 50 years. The program was developed based on an estimated dike upgrade cost of \$1 billion (2021 dollars), with a projected annual capital funding level of \$30 million within the Flood Protection Utility by 2032.

Due to factors including construction cost escalation, environmental enhancement and rising land acquisition values, the estimated cost to complete the dike upgrades has increased to \$1.3 billion (2025 dollars). Staff will present updated funding options for Council consideration later this year as part of the utility rate and budget process.

The estimated dike upgrade costs should be used as an order of magnitude reference, considering highly variable factors, such as construction costs, superdikes, land acquisition values, and regulatory requirements. Staff will further refine cost estimates as the program progresses through the annual budget process.

### Road and Street Light Assets

Staff estimate a long-term average annual capital funding requirement for the City's roads and street light assets to be \$13.6 million. The City's road and street light asset inventory include road pavement and street lights.

These assets are not part of a utility and are mainly funded from the City's General Revenue. Since 2006, Council has endorsed increases in annual roadway capital funding levels to its current value of \$4.7 million.

#### *Road Pavement (Non-MRN)*

Staff estimate a long-term average annual capital funding requirement for the City's road pavement to be \$10.3 million with a funding range of \$8.8 to \$11.9 million (Attachment 4), excluding full structural road rebuilding. Current funding levels allow an average of approximately 20 lane-km of roads to be repaved each year. Locations are identified using the City's computerized pavement management system and coordinated with other capital projects and development. Paving prices are also heavily influenced by oil prices, which have significantly varied over the past few years. The fluctuating price of paving has a significant impact on the long-term capital funding requirements for the City's road network.

Unlike typical utility infrastructure, road pavement has a much shorter lifespan of 15 to 35 years. The shorter asset lifecycle increases opportunities to benefit from development-driven replacement, paving completed through development activities will have notable impacts on ageing infrastructure plans.

Based on typical roadway design life information, significant road paving will be required over the next five years. Area-specific verification will be reviewed as part of the annual budget process. The results from the City-wide asphalt surface condition assessment inform the City's existing and future capital paving programs. Staff will continue to bring forward paving program funding recommendations that will include on-going capital program requests and supplementary capital requests to meet the needs of the roadway paving program.

#### *Street Lighting (Non-MRN)*

The City's street lighting system consists of 12,025 street lights and continues to grow with new development. Through the LED replacement program, approximately 7,100 end-of-life high pressure sodium light fixtures have been replaced with LEDs to reduce energy consumption and improve efficiency. Multiple phases of this program have been completed, and staff will continue to upgrade the remaining luminaires to LED through future capital submissions.

The long-term average annual capital funding requirement for the replacement of street lighting systems is approximately \$3.3 million with a funding range of \$3.05 to \$3.77 million (Attachment 5). However, there may be significant variability in the useful service life of street lighting infrastructure based on the level of deterioration, and because the service life used to inform the current analysis may be conservative. Additionally, decorative street lighting replacement is significantly more expensive than standard street lighting replacement and adding decorative street lights to the City's inventory will increase the cost associated with the replacement program.

The City's street lighting assets have recently required increased capital funding due to shown signs of deterioration. Through the capital budget, the City has invested \$4.1 million for the multi-phase LED street light replacement program.



The asset deterioration model indicates that additional funding will be required to proactively upgrade and replace street lighting assets. Given that there is no dedicated utility for street light LED upgrades, robust asset management plans are critical to help assess the funding requirements through the annual budget process.

#### Expected Long-Term Average Annual Funding Requirements

Table 3 below summarizes the current and expected long-term average annual funding requirements in 2025 dollars, as well as the current ageing infrastructure funding gaps. The City has made considerable infrastructure funding gains since initiating its strategy to close the funding gap in 2006.

**Table 3: Annual Capital Funding Levels**

Infrastructure Type	2025 Approved Annual Funding Level	Expected Long-Term Average Annual Funding Requirement	Estimated Additional Capital Funding Required	Target Funding Range	Main Funding Source
Water	\$8.5M	\$13.2M	\$4.7M	\$10.8M - \$17.5M	Water Utility
Sanitary	\$7.3M	\$14.7M	\$7.4M	\$12.8M - \$18.5M	Sewer Utility
Flood Protection	\$17.6M	\$38.7M	\$21.1M	\$36.8M - \$42.6M	Flood Protection Utility
Road Assets (Non-MRN)	\$4.1M <sup>1</sup>	\$10.3M	\$6.2M	\$8.8M - \$11.9M	General Revenue
Street light Assets (Non-MRN)	\$0.6M <sup>2</sup>	\$3.3M	\$2.7M	\$3.05M - \$3.77M	General Revenue
<b>Totals</b>	<b>\$38.1M</b>	<b>\$80.2M</b>	<b>\$42.1M</b>		

<sup>1</sup> Excludes supplementary asphalt paving program.

<sup>2</sup> Includes \$100k from the Citywide Sidewalk and Street Light Replacement Program.

#### Funding Strategies

The expected long-term average annual capital funding levels will allow the City to implement proactive and sustainable infrastructure replacement programs. This enables the City to sequence utility replacement and use competitive bidding to ensure the optimal utilization of funding. Replacing failed infrastructure has proven to be considerably more expensive and disruptive to residents and City services than proactive replacement.

In recent years, the City has successfully applied for federal and provincial grants from programs, such as the Community Emergency Preparedness Fund, National Disaster Mitigation Program, Disaster Mitigation and Adaptation Fund, and Emergency Management BC Flood

Protection Program. Staff will continue to seek such opportunities in the future to support infrastructure upgrades. Although the City has been successful with obtaining grant funding over the last few years, the availability of grant funding is highly variable.

Development facilitates significant infrastructure replacement that has a positive impact on the City's overall ageing infrastructure. However, development is subject to economic variability and does not always coincide with infrastructure that is beyond its useful life. Therefore, development is not considered a sustainable resource for ageing utility infrastructure replacement.

Staff will present funding options and make recommendations to Council as part of the annual utility rate review and budget process.

#### Provincial Housing Legislation Updates

In response to Provincial Bill 44 (2023 Housing Statutes (Residential Development) Amendment Act), at the June 24, 2024 Regular Council Meeting, Council adopted zoning bylaw amendments (Bylaw 10573) included in the staff report titled, "Response to Provincial Housing Bills: Small-Scale Multi-Unit Housing (SSMUH) Zoning District Bylaw and Associated Zoning Bylaw Amendments," dated June 12, 2024, from the Director of Policy Planning.

The higher population density will place additional demands on the water, sanitary, and flood protection systems. Staff are currently updating the utility models to identify any additional utility infrastructure upgrades and/or maintenance requirements. The modelling results will be used to inform the ongoing road and infrastructure planning processes. Funding for these items will be reviewed and incorporated into future development cost charge or utility rate and operating budget processes.

#### **Financial Impact**

None at this time. The information presented in this report will be used to develop the options that will be brought forward for Council consideration as part of the utility rate and operating budget processes.

## Conclusion

Staff will continue to refine and update infrastructure replacement requirements and explore new technologies and best practices to positively impact lifecycle infrastructure costs. In addition, staff will continue to identify utility funding gaps through the annual budget process. The rate of increase and timeframe to close the funding gaps will be impacted by Metro Vancouver's regional charges for water and sewer, which are non-discretionary costs imposed on the City and currently represent approximately 65% of the City's budget for these two cost centres.

The capital funding shortfalls outlined in this report should be considered in conjunction with the City's Long-Term Financial Management Strategy.

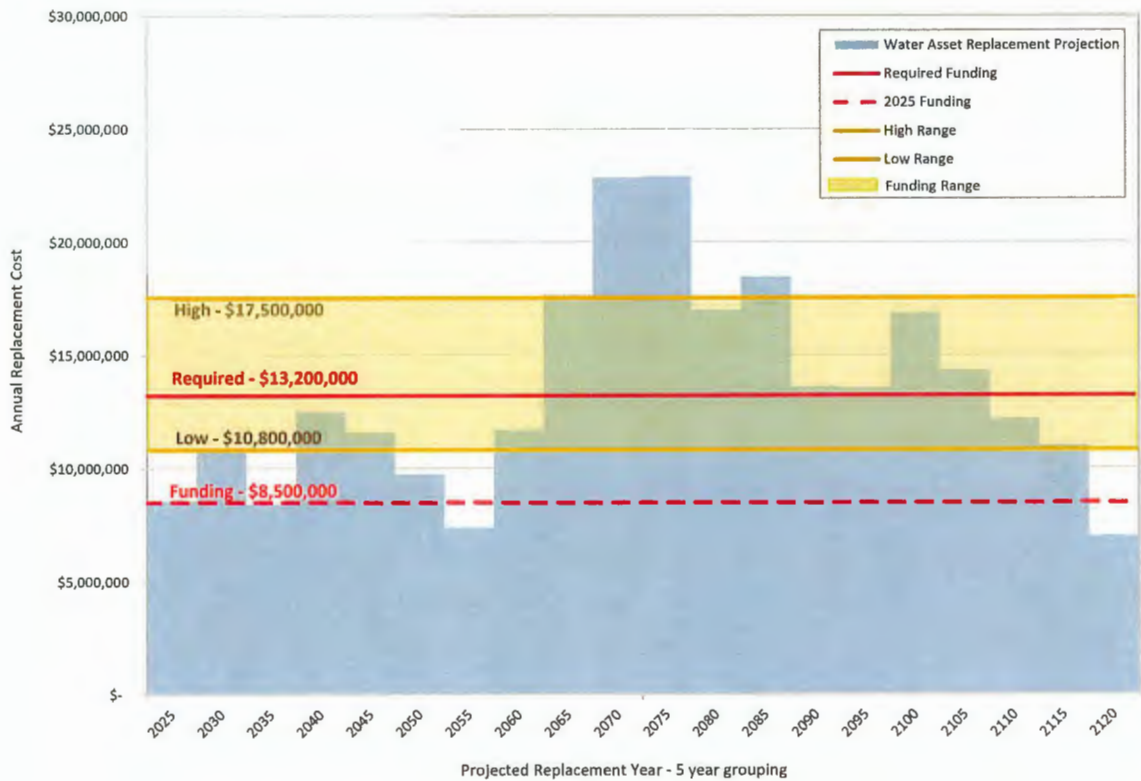


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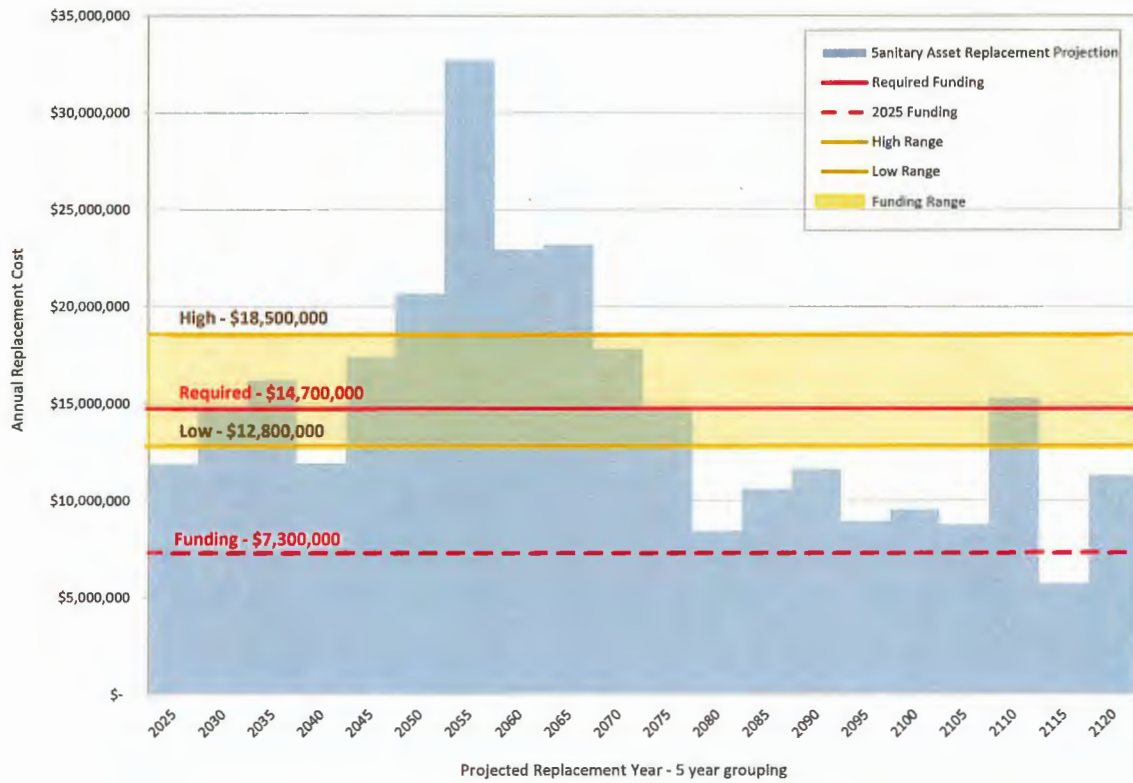
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- Att. 1: 2025 Ageing Infrastructure Report – Water Assets
- Att. 2: 2025 Ageing Infrastructure Report – Sanitary Sewer Assets
- Att. 3: 2025 Ageing Infrastructure Report – Flood Protection Assets
- Att. 4: 2025 Ageing Infrastructure Report – Road Paving Assets (non-MRN)
- Att. 5: 2025 Ageing Infrastructure Report – Street Light Assets (non-MRN)

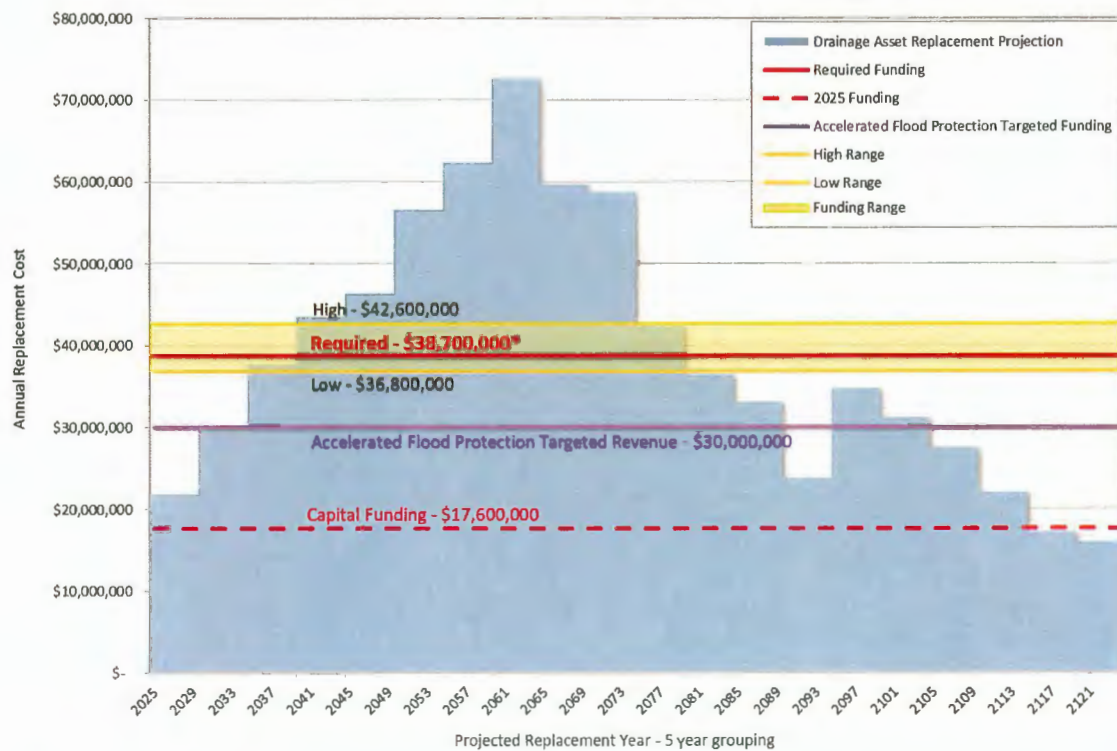
2025 Ageing Infrastructure Report – Water Assets



## 2025 Ageing Infrastructure Report – Sanitary Assets

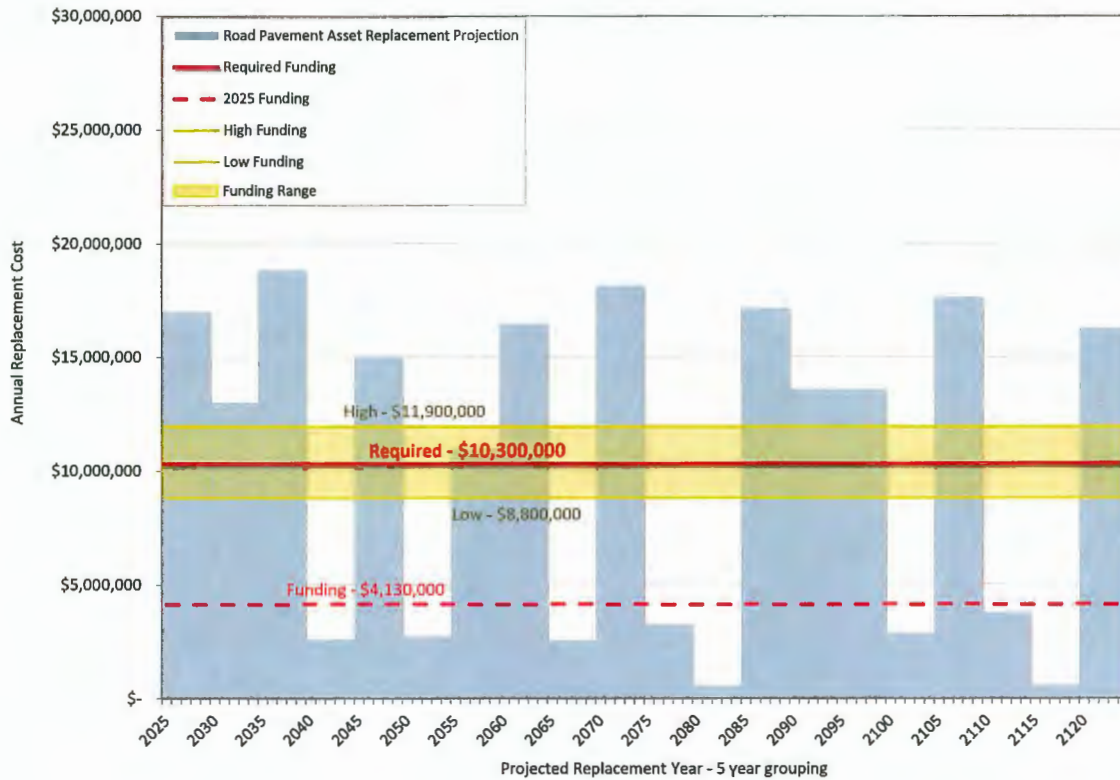


## 2025 Ageing Infrastructure Report – Flood Protection Assets



\*Required Funding Level may decrease upon award of senior government grant funding

## 2025 Ageing Infrastructure Report – Road Paving Assets (non-MRN)



## 2025 Ageing Infrastructure Report – Street light Assets (non-MRN)

