

Appendix F

Unit Cost Summary



Unit Cost Summary



Document History

Version	Summary of Changes	Document Status	Date
1	First-generation document for AM Strategy	Final	June 2023

General Assumptions

1. Unit costs assume like-for-like replacement.
2. Unit costs were inflated to \$2022 based on the Statistics Canada Consumer Price Index (annual average, not seasonally adjusted, all items).
3. Unit costs include engineering and contingency as noted.

Asset Type/Group	Unit Cost (\$2022)	Units	Sources	Assumptions
Drainage				
Box Culverts	\$6,800	m	Saanich Engineering Department, Water Resources (\$2022)	Based on competitive tender pricing; Includes 15% engineering and 25% contingency
Culverts	\$1,300 to \$2,500	m	Drainage Asset Management - Preliminary Asset Replacement Forecast Results (Final), Urban Systems (December 7, 2021)	Based on competitive tender pricing; Includes 15% engineering and 25% contingency; Inflated from \$2020 to \$2022.
Laterals	\$1,300 to \$2,500	m	Drainage Asset Management - Preliminary Asset Replacement Forecast Results (Final), Urban Systems (December 7, 2021)	Based on competitive tender pricing; Includes 15% engineering and 25% contingency; Inflated from \$2020 to \$2022.
Mains	\$1,300 to \$2,500	m	Drainage Asset Management - Preliminary Asset Replacement Forecast Results (Final), Urban Systems (December 7, 2021)	Unit Costs for Mains include manholes, catchbasins and catchbasin leads. Based on competitive tender pricing; Includes 15% engineering and 25% contingency; Inflated from \$2020 to \$2022.
Pump Stations	\$870,000	pump station	Lift Station Condition Assessment Report, Urban Systems (December 2, 2020)	Class D cost estimate for pump station less than 5 HP; Based on competitive tender pricing; Includes 15% engineering and 30% contingency; Inflated from \$2020 to \$2022.
Facilities				
Municipal Facilities	Based on insurance valuation	facility	Appraisal Report of Specified Property of the Corporation of the District of Saanich, Suncorp Valuations, (June 10, 2020)	"Cost of Reproduction New (CRN)" represents the cost of replacement at current market prices; Includes architect or engineering fees; Does not include contingency; Inflated from \$2020 to \$2022.
Park Buildings	\$1,000 to \$5,000	m2	District of Saanich Park & Trail Structures - Hampton Park Buildings, Advicas Group Consultants Inc., (January 27, 2023)	Class D cost estimates in \$2022; Based on Advicas' historical cost data and/or R.S. Means Company publications; Includes 0% engineering and 10% contingency.



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Information Technology				
IT assets (hardware and software)	\$10,000 to \$5 million	various	Finance, District of Saanich	Based on TCA 2021 spreadsheet; Inflated from \$2021 to \$2022.
Park & Trail Structures				
Courts	\$200 to \$500	m2	District of Saanich Park & Trail Structures - Unit Cost Categories, Advicas Group Consultants Inc., (January 27, 2023)	Class D cost estimates in \$2022; Based on Advicas' historical cost data and/or R.S. Means Company publications; Includes 0% engineering and 10% contingency.
Foot Bridges	\$1,300 to \$13,700	m2	District of Saanich Park & Trail Structures - Cuthbert Park Footbridges, Advicas Group Consultants Inc., (January 27, 2023)	Class D cost estimates in \$2022; Based on Advicas' historical cost data and/or R.S. Means Company publications; Includes 0% engineering and 10% contingency.
Irrigation Systems	\$2,300 to \$4,000	zone	Parks, District of Saanich	Based on recent project costs in \$2022; Includes 0% engineering and 0% contingency.
Parking Lots	\$90 to \$100	m2	District of Saanich Park & Trail Structures - Unit Cost Categories, Advicas Group Consultants Inc., (January 27, 2023)	Class D cost estimates in \$2022; Based on Advicas' historical cost data and/or R.S. Means Company publications; Includes 0% engineering and 10% contingency.
Playgrounds	\$50,000 to \$300,000	playground	Finance, District of Saanich	Based on recent project costs; Includes 0% engineering and 0% contingency; Inflated from year of construction to \$2022.
Roads	\$240	m2	Transportation, District of Saanich	Unit cost includes road surface and base. Based on recent project costs in \$2022; Includes 15% engineering/contingency.
Sports Fields	\$60 to \$210	m2	District of Saanich Park & Trail Structures - Unit Cost Categories, Advicas Group Consultants Inc., (January 27, 2023)	Class D cost estimates in \$2022; Based on Advicas' historical cost data and/or R.S. Means Company publications; Includes 0% engineering and 10% contingency.
Trails	\$40 to \$700	m	District of Saanich Park & Trail Structures - Unit Cost Categories, Advicas Group Consultants Inc., (January 27, 2023)	Class D cost estimates in \$2022; Based on Advicas' historical cost data and/or R.S. Means Company publications; Includes 0% engineering and 10% contingency.



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Transportation				
Bridges	\$6,000 to \$13,000	m2	Replacement Cost & Design Life Estimates (Bridges), McElhanney Ltd., (April 29, 2022)	Based on recent construction costs for 5 types of bridges of varying complexity; Includes 15-25% engineering and 40-50% contingency.
Bus Stops	\$3,300 to \$35,000	bus shelter	Transportation, District of Saanich	Based on recent project costs; Includes 15% engineering/contingency; Inflated to \$2022.
Controlled Crosswalks	\$10,000 to \$40,000	controlled crosswalk	Transportation, District of Saanich	Based on recent project costs in \$2022; Includes 15% engineering/contingency.
Pedestrian Signals	\$40,000	pedestrian signal	Transportation, District of Saanich	Based on recent project costs in \$2022; Includes 15% engineering/contingency.
Roads - Surface	\$90 to \$100	m2	Transportation, District of Saanich	Based on recent project costs in \$2022; Includes 15% engineering/contingency.
Roads - Base	\$150	m2	Transportation, District of Saanich	Based on recent project costs in \$2022; Includes 15% engineering/contingency.
Sidewalks	\$400 to \$1000	m	Transportation, District of Saanich	Based on recent project costs in \$2022; Includes 15% engineering/contingency.
Street Lights	\$4,000	streetlight	Transportation, District of Saanich	Based on recent project costs in \$2022; Includes 15% engineering/contingency.
Street Signs	\$700	street sign	Transportation, District of Saanich	Based on recent project costs in \$2022; Includes 15% engineering/contingency.
Traffic Signals	\$146,000	intersection	Transportation, District of Saanich	Based on recent project costs in \$2022; Includes 15% engineering/contingency.



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Vehicles & Equipment				
Vehicles and Equipment - Fire	\$15,000 to \$2,100,000	vehicles and equipment	Finance, District of Saanich	Based TCA 2021 spreadsheet; Inflated from year of purchase to \$2022.
Vehicles and Equipment - Fleet	\$10,000 to \$1,800,000	vehicles and equipment	Public Works, District of Saanich	Based on recent purchases; Inflated from year of purchase to \$2022.
Vehicles - Police	\$12,000 to \$100,000	vehicles and equipment	Finance, District of Saanich	Based on TCA 2021 spreadsheet; Inflated from year of purchase to \$2022.
Equipment - Cedar Hill Golf Course	\$400 to \$120,000	equipment	Finance, District of Saanich	Based on TCA 2021 spreadsheet; Inflated from year of purchase to \$2022.
Equipment - E-bikes	\$4,040	E-bike	Sustainability, District of Saanich	Based on recent purchases; Inflated from year of purchase to \$2022.
Equipment - EV Charging Stations	\$5,030	EV charging station	Sustainability, District of Saanich	Based on recent purchases; Inflated from year of purchase to \$2022.
Equipment - Fitness	\$2,000 to \$17,000	equipment	Finance, District of Saanich	Based on TCA 2021 spreadsheet; Inflated from year of purchase to \$2022.
Wastewater				
Force Mains	\$720 to \$2,200	m	Sewer Master Plan 2022, Sanitary Project Unit Cost Estimating, Urban Systems (April 28, 2021)	Class D cost estimate based on competitive tender pricing; Includes mains and appurtenances; Includes 10% engineering and 40% contingency; Inflated from \$2020 to \$2022.
Gravity Mains	\$1,200 to \$5,000	m	Sewer Master Plan 2022, Sanitary Project Unit Cost Estimating, Urban Systems (April 28, 2021)	Class D cost estimate based on competitive tender pricing; Includes mains, manholes, tie-ins, laterals (does not include clean-outs); Includes 10% engineering and 40% contingency; Inflated from \$2020 to \$2022.
Pump Stations	\$100,000 to \$2,800,000	pump station	Sewer Master Plan 2022, Sanitary Project Unit Cost Estimating, Urban Systems (April 28, 2021)	Class D cost estimate based on competitive tender pricing; Includes 15% engineering and 40% contingency; Inflated from \$2020 to \$2022.



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Asset Type/Group	Unit Cost (\$2022)	Units	Sources	Assumptions
Water				
Mains	\$920 to \$3,800	m	Water Master Plan 2022, Water Project Unit Cost Estimating, Urban Systems, (April 28, 2021)	Class D cost estimate based on competitive tender pricing; Includes mains, appurtenances, tie-ins, service connections, hydrants; Includes 10% engineering and 40% contingency; Inflated from \$2020 to \$2022.
Pump Stations	\$9,000 to \$28,000	HP	Water Master Plan 2022, Water Project Unit Cost Estimating, Urban Systems, (April 28, 2021)	Class D cost estimate based on competitive tender pricing; Includes 10% engineering and 40% contingency; Inflated from \$2020 to \$2022.
Pressure Reducing Valve Chambers	\$270,000 to \$890,000	PRV chamber	Water Master Plan 2022, Water Project Unit Cost Estimating, Urban Systems, (April 28, 2021)	Class D cost estimate based on competitive tender pricing; Includes 10% engineering and 40% contingency; Inflated from \$2020 to \$2022.
Reservoirs	\$1,000 to \$2,600	m3 of storage capacity	Water Master Plan 2022, Water Project Unit Cost Estimating, Urban Systems, (April 28, 2021)	Class D cost estimate based on competitive tender pricing; Includes 10% engineering and 40% contingency; Inflated from \$2020 to \$2022.
Water Meters	\$400 to \$25,000	meter	Water Metering Strategy - Final, Urban Systems (August 13, 2020)	Meter replacement unit costs include supply and installation (installation cost of 30% of meter for <=50 mm and 15% for >50 mm); District of Saanich actual costs for sizes 19 mm to 150 mm; City of Surry tender cost for 200 mm; Urban Systems estimate for 250 mm.

DATE: May 31, 2023
TO: Jaqueline Weston
CC: Brittney Dawney
FROM: Laura Bernier
FILE: 1862.0090.01
SUBJECT: Saanich Replacement Value Memo

PURPOSE

Over the past year, the District of Saanich developed the 2023 Asset Management (AM) Strategy, which identifies the District's total infrastructure replacement value and the annual average replacement funding target (in 2022 dollars). In 2007, the District completed an Infrastructure Replacement Strategy (IRFS); an update has been identified in the fall of 2023.

During the period between 2007 and 2022, the estimated total replacement value of infrastructure in Saanich has significantly increased from \$2.1 billion (in 2007 dollars) to \$4.7 billion (in 2022 dollars).

The District engaged Urban Systems to conduct a third-party review of the District's replacement values, with the aim of helping to ensure that the values are suitable for their intended use. This memorandum summarizes the scope and outcomes of the review.

The review addresses the following questions:

1. What are some of the drivers for the increase in estimated replacement value observed by the District?
2. To what extent is the District's increase in total replacement value experienced by other communities?
3. How do the District's replacement values compare to other communities?
4. Is the District's methodology for estimating replacement values appropriate for the intended use of the information?

1. WHAT ARE SOME OF THE DRIVERS FOR THE INCREASE IN ESTIMATED REPLACEMENT VALUE OBSERVED BY THE DISTRICT?

Since the District's last IRFS in 2007, the costs of the District's infrastructure have increased due to factors such as inflation, the addition of new assets, and improved asset management practices, such as improvements to data and information. In recent years, inflation and market disruptions have had a particularly significant impact, leading to higher costs for construction materials, labor, and equipment.

2. TO WHAT EXTENT IS THE DISTRICT'S INCREASE IN TOTAL REPLACEMENT VALUE EXPERIENCED IN OTHER COMMUNITIES?

The change in the District's total estimated replacement value was compared to recent total replacement value estimates by the City of Kelowna, the District of Oak Bay, and the District of Squamish. These communities were selected based on their proximity, similar provincial context, and because they have estimated two cycles of total replacement value within a comparable time frame as the District of Saanich. The comparison relied on replacement values reported in infrastructure plans/asset management plans developed by each community, or in the absence of this, values reported by each community per the Local Government Data Entry (LGDE) forms.

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These communities reported on replacement costs in different years, and so the average annual increase (expressed as a percent of Year A replacement value) is used as the primary comparison metric.

It is important to note that there is no standardized methodology for estimating municipal asset replacement values. Each municipality uses different approaches, reflecting their varying degrees of maturity in asset management practices. Therefore, replacement values across communities should not be directly compared without fully considering the assumptions, methodology, and scope of asset inventory on which the total replacement value is based. Such a detailed review was beyond the scope of this analysis. The findings in Table 1 aim to provide a *high-level* indication of how replacement values have changed for other communities over time and how they compare to the District.

Table 1. Comparison of Change in Replacement Values Over Time.

	Year A Replacement Value (\$)	Year B Replacement Value (\$)	Average Annual Increase from Year A to Year B (%)	Notes
Kelowna	\$2,520,000,000 (\$2016) ¹	\$4,583,586,487 (\$2021) ²	16%	No updated Infrastructure Plan was available to provide context on the difference in replacement costs. Therefore, LGDE replacement costs (2021 dollars) were used for comparison.
Squamish	\$420,000,000 (\$2011) ³	\$883,000,000 (\$2021) ³	11%	Difference can be attributed to more assets being included in the 2021 estimates and due to asset acquisition, that has occurred over the past 10 years.
Oak Bay	\$204,855,268 (\$2016) ⁴	\$653,000,000 (\$2021) ⁵	44%	Difference can be attributed to more assets being included in the 2021 estimates.
Saanich	\$2,100,000,000 (\$2007) ⁶	\$4,673,000,000 (\$2022) ⁶	8%	Difference can be attributed to inflationary construction cost increases, new assets, and assets that existed but were not included in the 2007 estimate.

¹ City of Kelowna, 2030 Infrastructure Plan (2016)

² 2023 LGDE Statement of Tangible Capital Assets for 2021

³ District of Squamish, 2022 Asset Management Plan

⁴ District of Oak Bay, 2016 Asset Management Report

⁵ District of Oak Bay, Sustainable Infrastructure Replacement Plan (2021)

⁶ District of Saanich, Asset Management Strategy (2023)

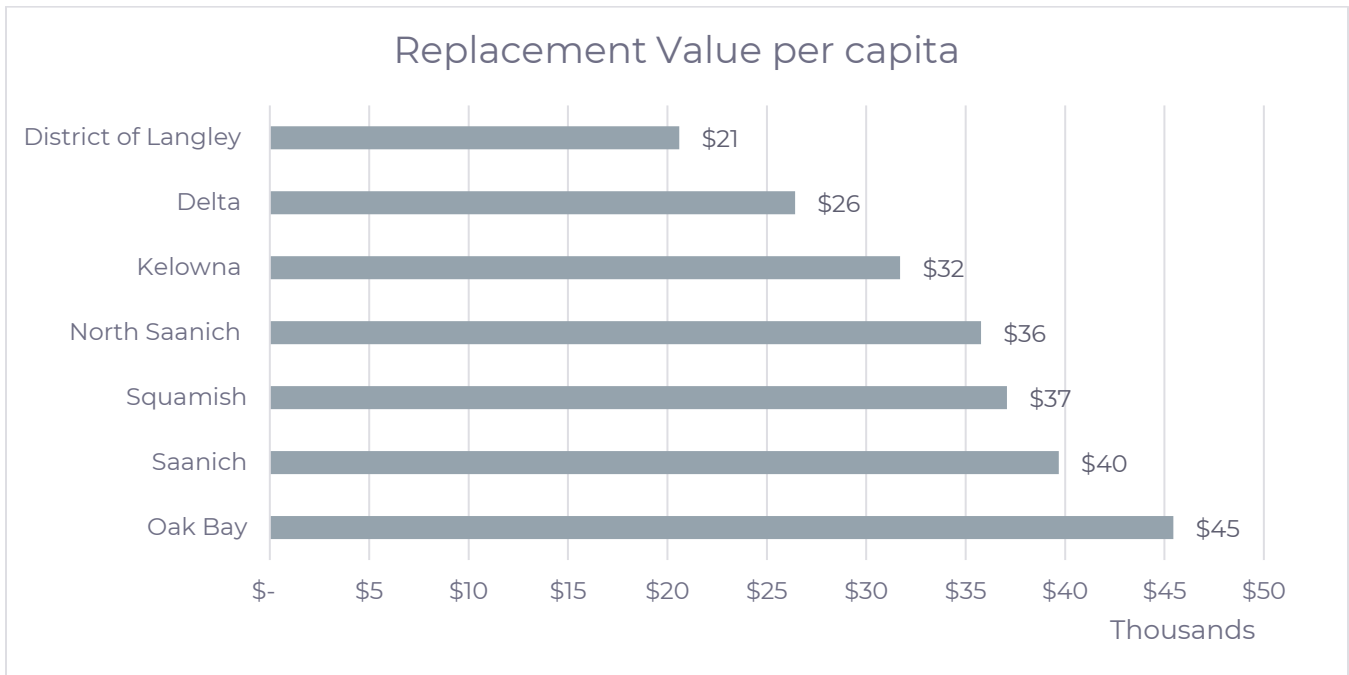
Key observations:

- Significant increases in estimated total replacement value have been experienced by the other communities included in the review.
- Although the timing of updates varies among the communities, the average annual increase observed between Year A and Year B for all communities was greater than that observed by the District.

3. HOW DO THE DISTRICT'S TOTAL REPLACEMENT VALUES COMPARE TO OTHER COMMUNITIES?

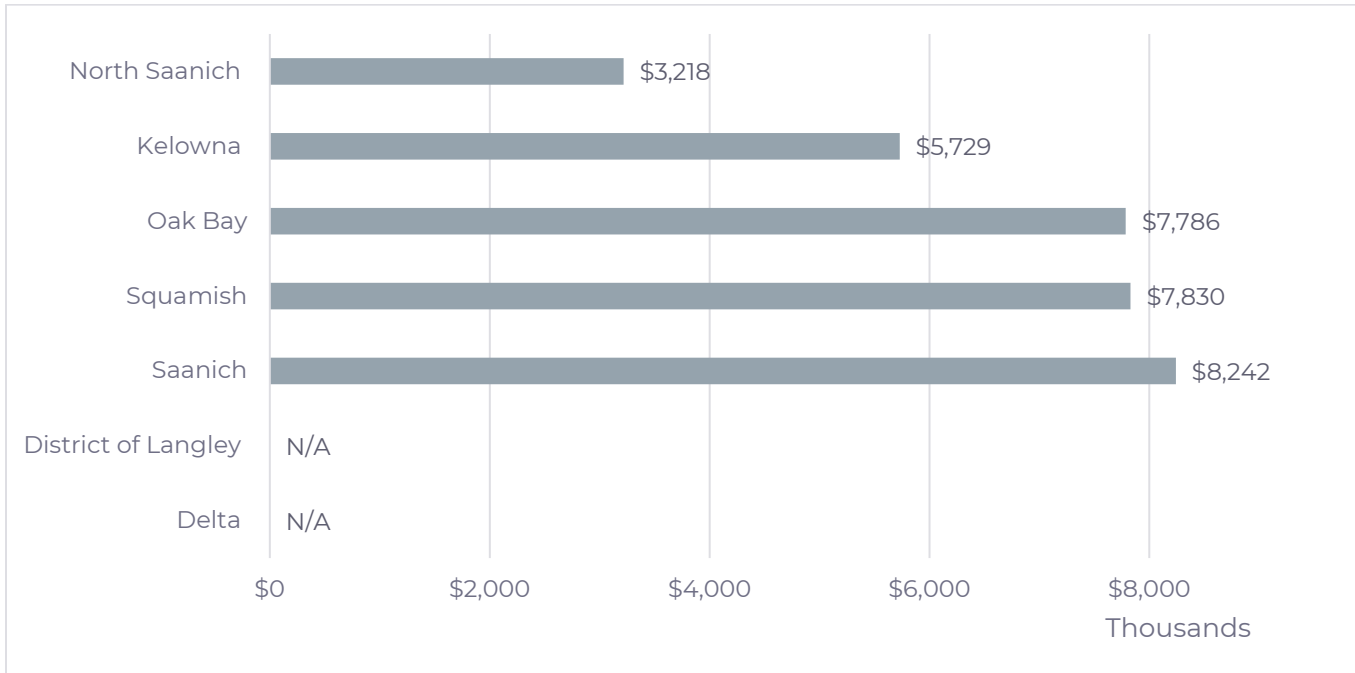
As previously noted, the methodology for estimating municipal asset replacement values is not standardized, and a detailed review of the methodology and assumptions on which other municipalities' estimates are based was beyond the scope of this assignment. Therefore, this question was explored by conducting a high-level comparison of the District's replacement values to nine other communities, selected due to similar population size, geographic proximity, and/or recently estimated total replacement values. Total replacement value for each community normalized by (a) population (\$/capita) and (b) length of road in kilometers (\$/km) were the primary comparison metrics.

Figure 1. Total Replacement Value (per capita)



Note: See section 4.0 Sources for data sources

Figure 2. Total Replacement Value (per road km)



Note: See section 4.0 Sources for data sources

Key takeaways:

- The District's per capita replacement values (\$39,691 per capita) are higher than in many of the other communities (range from \$20,600 to \$37,071 per capita), except for Oak Bay (\$45,443 per capita), where they are approximately the same. Similarly, the replacement values per road kilometer in Saanich (\$8,242 per km) are higher compared to other communities (range from \$3,218 to \$7,830 per km).
- The extent to which these cost differences are due to differences in asset sizes and materials, level of service, other aspects of the asset inventory, or due to differences in unit costs, is not clear.

4. IS THE DISTRICT'S METHODOLOGY FOR ESTIMATING REPLACEMENT VALUES APPROPRIATE FOR THE INTENDED USE OF THE INFORMATION?

The methodology and assumptions on which the District's replacement costs are based, and any existing gaps in asset attribute data that could impact costs, are very well documented in the appendix of the District's AM Strategy, including:

- Sources of cost data and information (such as tender, project costs, historical costs, and appraisals)
- The application of inflation
- Engineering and contingency allowances (ranging from 0% to 75%)
- The level of cost estimation (e.g., Class D)
- The year of cost estimation (specified)
- The units and unit costs (identified)

This level of documentation is a good practice and one the District should engage in moving forward, as it will allow for continuous improvement over time. Opportunities for improvement to methodology are provided in Section 5.

Key takeaways:

Based on a review of the documented methodology, assumptions, and gaps, it is Urban Systems' assessment that the costs are suitable for the purpose of the information, which is to raise awareness among staff, Council and the community about the scope of the assets the District manages, and to inform decisions about long-term infrastructure funding (and not for estimating project costs).

5. OPPORTUNITIES FOR IMPROVEMENT

Asset management is a continuous improvement process; opportunities for improvement are summarized below. These opportunities are outlined to guide investments the District makes in refining its replacement value estimates over time; the replacement values currently reported are suitable for the intended purpose.

1. Variability exists in the application of engineering and contingency values across different asset classes. While variability is common, and the assumptions have been thoroughly documented, increasing consistency is a potential objective as the District continues to refine its AM program.
2. A number of assets are earmarked for inclusion in future cost updates. The inclusion of new unit costs will impact the reported total replacement value. Understanding the extent to which the future unit costs will impact replacement value and filling these gaps is an important next step to ensure funding levels are appropriate.
3. Unit costs per lineal meter of water, sanitary, and drainage assets included embedded costs of appurtenances. This is an acceptable practice for the purpose of this information, as previously discussed. To inform more detailed operations budgeting, maintenance management, or project-level costing, the District should develop more detailed cost estimates by asset component.

By addressing these areas of improvement, the District can enhance its asset management practices and facilitate greater consistency in the estimation of replacement values for informed decision-making.

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SOURCES

The intended purpose of estimating replacement value is to update the AARF target as an input to updating the Infrastructure Replacement Funding Strategy.

	Year A Replacement Value (\$) (Table 1)	Year B Replacement Value (\$) (Table 1)	Population (Figure 1)	Road Network (no. of km) (Figure 2)
Kelowna	City of Kelowna, 2030 Infrastructure Plan (2016) Year for dollars RV: \$2016	2023 LGDE Statement of Tangible Capital Assets for 2021 (see source and notes below) Year for dollars RV: \$2021	Statistics Canada 2021 Census data	https://www.kelowna.ca/our-community/planning-projects/2040-transportation-master-plan
Squamish	District of Squamish, 2022 Asset Management Plan Year for dollars RV: \$2011	District of Squamish, 2022 Asset Management Plan Year for dollars RV: \$2021	Statistics Canada 2021 Census data	District of Squamish, 2022 Asset Management Plan
Oak Bay	District of Oak Bay, 2016 Asset Management Report Year for dollars RV: \$2016	District of Oak Bay, Sustainable Infrastructure Replacement Plan (2021) Year for dollars RV: \$2021	Statistics Canada 2021 Census data	District of Oak Bay, Sustainable Infrastructure Replacement Plan (2021)
Saanich	District of Saanich, Asset Management Strategy (2023) Year for dollars RV: \$2007	District of Saanich, Asset Management Strategy (2023) Year for dollars RV: \$2022	Statistics Canada 2021 Census data	District of Saanich, Asset Management Strategy (2023)
North Saanich	N/A	2023 LGDE Statement of Tangible Capital Assets for 2021 Year for dollars RV: N/A	Statistics Canada 2021 Census data	https://northsaanich.ca/your-community/transportation/
District of Langley	N/A	2023 LGDE Statement of Tangible Capital Assets for 2021 Year for dollars RV: N/A	Statistics Canada 2021 Census data	N/A
Delta	N/A	2023 LGDE Statement of Tangible Capital Assets for 2021 Year for dollars RV: N/A	Statistics Canada 2021 Census data	N/A
<p>Source: Local government financial reporting - Province of British Columbia; “Estimated Current Replacement Value” statistics are found in Schedule 503 – Statement of Tangible Capital Assets</p> <p>Note: Local governments are required to submit an annual Local Government Data Entry (LGDE) form, which presents a standardized account of assets, liabilities, revenue, expenditures, and other financial indicators to the Ministry of Municipal Affairs and Housing. Note that Replacement Value is a non-mandatory field provided by some municipalities in 2021, in addition to the mandatory TCA statistics.</p>				

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Sincerely,

URBAN SYSTEMS LTD.



Laura Bernier, MUP
Community Consultant

cc: Brittney Dawney, P.Eng., Strategic Consultant

/lb
Enclosure