



ENGINEERING & PUBLIC WORKS

Public Works

2022 Business Plan



DEPARTMENT OVERVIEW

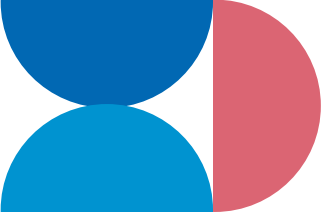
The Public Works Department provides operation, maintenance and construction of critical City owned infrastructure. These areas include water supply, treatment and distribution, sanitary sewer and storm drainage collection, sanitation, recycling, cemeteries & administration, roads and traffic and fleet services. Public Works works closely with Engineering to plan, design, construct and maintain while continually performing condition assessments and feed back to continue the asset management cycle.

Public Works continued to provide established levels of service with all staff reporting to work. Staff continued to work closely with Occupational Health and Safety (OH&S) to implement protocol to reduce risk to the public and staff while carrying out construction, scheduled maintenance and repairs.

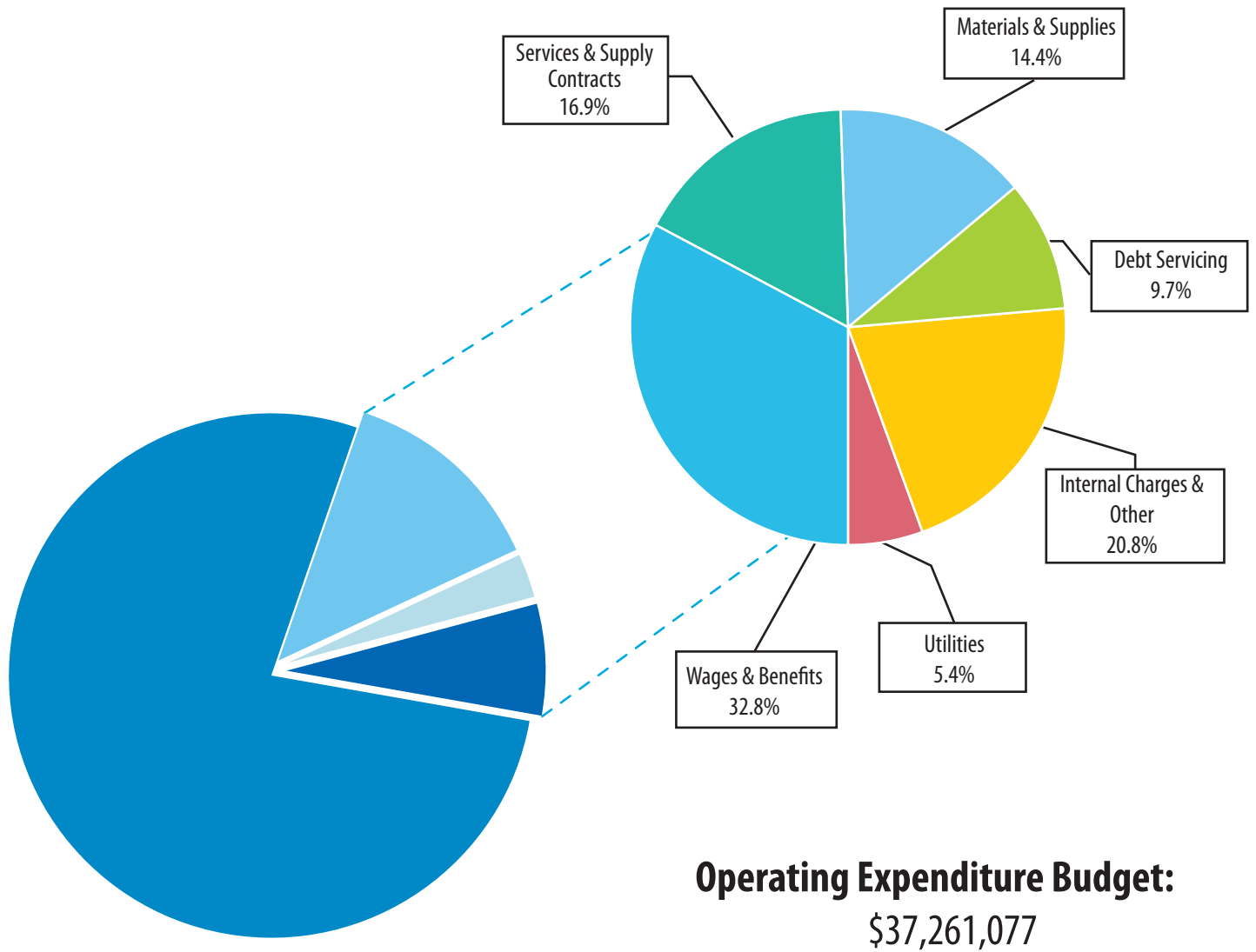
Staffing levels at Public Works were business as usual with few reductions to levels of service and annual maintenance programs.

Some activities included:

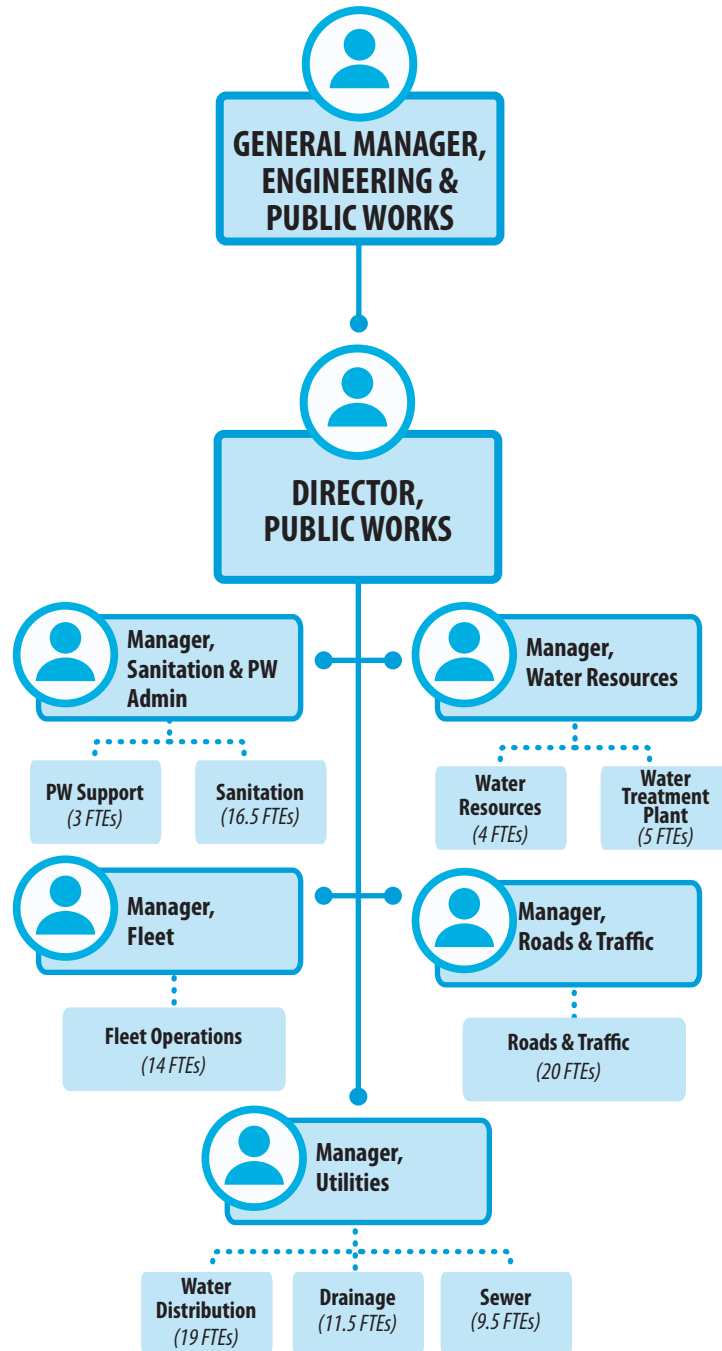
- Implement and update current Business Continuity Plan.
- Maintaining Established Essential Services Mutual Aid Agreement with neighboring municipalities and regional districts as per provincial directive.
- Develop and implement additional Safe Work procedures and physical distancing measures.
- Maintain additional cleaning sanitizing of Public Works facilities, equipment and vehicles to ensure a safe work environment for staff



DEPARTMENT'S SHARE OF THE BUDGET



- PUBLIC WORKS 13.0%**
- SANITARY SEWER 2.7%**
- WATERWORKS 6.8%**
- REMAINING CITY BUDGET 77.5%**



Two Water Meter Readers funded from Water and report to Revenue Services in Finance



ADMINISTRATION

The Administration of Public Works provides essential support. These are front line staff that interact with the public, provide financial and clerical support, records management, organize, and ensure that other staff have the day-to-day resources they need.

Administrative services for the Public Works Department is provided by three staff located at the Public Works yard. Seasonal and temporary staff provide additional support as required.

The strong and diverse knowledge base, high level of service and public interaction provided by Administration, deflects calls from supervisors and managers resulting in excellent efficiency.

Level of Service

- A front counter is available at Public Works for the public to access and reach staff in Public Works during normal working hours. Public Works is the primary point of contact for the public for many operational questions or concerns.
- We provide information and generate work orders in a range of areas including: solid waste, street cleaning, roads, utilities, and cemeteries
- Permit processing and approvals including water use, third party utility construction, etc.
- 24/7 remote alarm monitoring of infrastructure throughout the City.
- Records management for the department is maintained.
- Assistance for financial transactions and processing of invoices.

Public Works administration provides both an interface for residents and a dispatch centre for operations. The Fleet Services also has internal administrative functions.

2021 Accomplishments

Administration staff create, dispatch and close work orders for each area of Public Works. It is estimated that more than 50% of the calls are resolved by

the admin staff person providing the information. The rest result in the creation of a work order, for assignment to field personnel.

Administration staff received and responded to:

- 42,401 calls in 2017
- 83,171 calls in 2018
- 65,239 calls in 2019
- 46,231 calls in 2020
- 25,591 calls by the end of July 2021

Majority of the calls are resolved by the admin staff person providing the information. The rest result in the creation of a work order, for assignment to field personnel.

Administration staff created, dispatched and closed:

- 7,667 work orders in 2019,
- 7,418 work orders in 2020, and
- 4,400 by the end of July 2021.
- Also, City Works Calls for Service commencing Feb 2021 by end of July 2021: 169

2022 Considerations and Opportunities

- The public-facing level of service in this area is high. Each resident who calls is able to speak with a member of the admin team. Residents are accustomed to this service. It is increasingly rare in cities of this size. Many cities have opted to move to an automated answering service. While staff do not feel this is necessary at this time, there are events that make this high level of service hard to maintain. In 2022 staff will continue to use the voicemail box to provide information during periods of high call volumes.
- The 24/7 operations of the Public Works yard has become increasingly difficult in 2021 as a result of additional security concerns. Due to frequent break-ins and thefts from the yard, nightly foot patrols have been implemented and continue. These are performed by a contractor who reports to the Commissionaire on duty.

ROADS AND TRAFFIC

Apart from Provincial Highway 19 and Trans-Canada Highway 1, the City owns and maintains its road network, including pavement management, winter clearing, signage, and pedestrian and cycling facilities.

In 2021, there were:

- 644 km of roads, 453 km of sidewalks, 103 km of bicycle lanes.
- 53 signalized intersections, four roundabouts, 26,107 traffic signs.
- 18 bridges, 28 railroad crossings.
- 4,504 City owned streetlights, and 4,258 lights leased from BC Hydro.
- 1,318 marked crosswalks, and 53 pedestrian activated crosswalk-warning beacons.

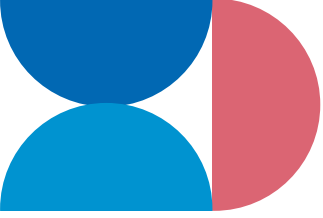
Level of Service:

- Snow and Ice Control (SNIC) is provided to reduce risk and maintain functionality of the transportation network during adverse weather. Routes are prioritized with the goal of clearing major routes first, particularly emergency and transit routes. Local streets are the lowest priority and are cleared once higher priority routes have been completed. No service is provided to laneways.
- Potholes – roads crews respond to complaints from the public and reports from staff, and repair as identified.
- Traffic Signals – 50% of the system is inspected once per year, and conflict monitors are tested every year.
- Street Sweeping – Major roads are swept once per month, other streets once per year.
- Sidewalk Sweeping – downtown sidewalks are swept twice per week.
- Sidewalk Cleaning – downtown pressure washing completed every second year.

- Street garbage receptacles are provided and maintained. Currently there are over 100 streetside receptacles in the City that are emptied at least weekly.
- Sidewalk settlements greater than 25mm vertical displacement are repaired.
- Boulevard and roadside vegetation control is completed once per year during the summer.
- Centreline road markings are repainted every year. Stop signs and yield signs are inspected annually; other signs are replaced as needed.
- Crosswalks are inspected annually (including pedestrian flashers).
- A model of the transportation network assists in making land use and capital infrastructure planning decisions. The model is updated every five years to reflect changes in population growth and land development.
- Traffic Safety – respond to traffic concerns and provide technical data collection and analysis.
- Provide and maintain transit amenities including bus shelters, benches, garbage cans and signs.
- Crack Sealing – roughly 60,000 lineal metres of roadway is crack sealed every year.
- Asphalt Rehabilitation and Patching – There are programs in place to patch and renew asphalt with the aim to maintain the travel and driving surfaces.

2021 Accomplishments

- Renewed asphalt road surface, including patching on Dunster Rd., McRobb Avenue, Labieux Rd., 107th, College Drive and Dufferin Cres..
- Completed upgrade of rail crossing at Dorman Rd. and Wentworth St., in partnership with Southern Railway.



ROADS AND TRAFFIC

- Installed over 100 new bus stop signs for RDN Transit
- Promptly and effectively responded to pothole and sidewalk repair requests
- Provided a high level of service in supporting other City Utility operations with sidewalk reinstatement and paving repairs following underground utility work.
- Supported Culture and Events Section in completing the street banner program and Hub City Walls mural event
- Filled the new Traffic Signal Technician position, reducing the City's reliance on contractors to maintain critical infrastructure
- RFP for Asphalt Condition Level of Service issued
- Supported Transportation Engineering with the installation of new traffic calming programs, including Lost Lake Rd., Departure Bay Rd. and Georgia Ave.

2022 Considerations and Opportunities

- There is a steady rise in expectation for levels of service. This ranges from concerns with congestion or lack of sidewalk connectivity, to feelings of inadequate parking. Balancing resources to meet these expectations is a major challenge for staff.
- With implementation of new Complete Street Standards, operation and maintenance requirements will be developed.
- Road Rehabilitation Asset Management – The asphalt in the City's roads is deteriorating faster than it is being rehabilitated. The City typically has funding for several million dollars per year of asphalt renewal, unchanged significantly for years. A detailed evaluation of the City's asphalt asset, indicate an annual investment of about \$5 million per year is needed to keep the current pavement quality. Funding pressures are likely to continue to limit the ability to maintain the existing level of asphalt quality.

- Rail Crossings and Cost – There are 28 rail crossings in the City for either roads or trails. There are annual costs attributed to maintaining these crossings and considerable costs anytime road or trail improvements are undertaken near the crossing. Significant changes to rail standards mean these crossings have created a financial and regulatory barrier to undertaking road and trail improvements along the entire length of the tracks in the City.
- Traffic Medians and Boulevard Maintenance – increase in assets continues to cause challenges for operations and maintenance. The level of service demanded by the public is higher than what the City is currently able to provide (financially and personnel).
- The growth in population and corresponding increase in infrastructure requires additional staff resources and operational funding to sustain the existing level of service. More roads require sweeping, snow clearing, parking management, line and sign maintenance. Over the past 10 years, the City has seen population growth of about 15% with no meaningful increase in staffing. Over this 10 year time period, an additional \$26 million in transportation infrastructure has been added to the City through transfer from development.
- Until recently, there has been a single contractor for asphalt paving operations in Nanaimo; this has caused significant delays in the Road Rehab Program delivery due to the contractor over committing to projects. Highway paving projects throughout Nanaimo in the last couple years have caused a significant amount of road rehabilitation work to be carried forward. The presence of a second operation provides an opportunity to catch up on deferred work, and provides competitive pressure for pricing.



WATER SUPPLY, TREATMENT & DISTRIBUTION

The City operates and manages a water supply and distribution system for the residents and businesses of Nanaimo, South West Extension, Snuneymuxw First Nation and the District of Lantzville. This infrastructure includes dams, reservoirs, pump stations, pressure reducing stations, supply mains, distribution mains, services and water meters. The City's drinking water supply is from a protected community watershed, consisting of over 230 square kilometers of privately managed forest land. The City owns and operates two dams within the watershed, to impound enough water to ensure a sustainable supply for drinking, firefighting and environmental needs in the river. From the watershed, two major supply pipelines convey water to the South Fork Water Treatment Plant. The Water Treatment Plant filters and conditions the water to quality exceeding Canadian Drinking Water Guidelines. Drinking water is distributed to City residents through over 600 km of piping.

Characteristics of the system include:

- 2 Water Supply Dams, 8 Recreational Dams.
- 647 km of distribution watermain.
- 93 km of transmission watermain.
- 9 reservoirs (storage tanks).
- 3283 Fire Hydrants.
- 12 000 valves.
- Jump Lake Dam / Reservoir and South Forks Intake Dam.
- Water Treatment Plant.
- 8 pump stations.
- 26,550+ service connections.
- Energy Recovery Facility.
- 13.9 billion litres of treated water supplied per year.
- 2 Water Filling Stations

Level of Service:

- Operate and maintain water storage and distribution infrastructure including main flushing, water testing, air valve & valve maintenance and inspection in compliance with the Drinking Water Protection Regulation.
- Complete dam inspections and reporting for 9 dams, 2 for potable water, 7 for recreation, in accordance with the British Columbia Dam Safety Regulations and Canadian Dam Association Guidelines.
- Operate telemetry system to monitor water system 24/7 in real time.
- Operation of a membrane water filtration plant to supply the entire City and neighbouring communities, max capacity 116 ML/d.
- Rigorous raw and treated water sampling and testing program. 49 raw water tests in the watershed, 1379 treated water tests at WTP, 99 treated water tests at in town reservoirs and 1200 treated water tests throughout the water distribution system, including in-town reservoirs as of 3 Aug 2021.
- Provide water for fire suppression.
- Maintain a City-wide water system model to assist with decisions for City owned capital projects and private developments.
- Watermain Breaks – Provide 24/7 response by certified water operators. Watermain Breaks in 2021 – 10 to date.
- Current Water Audit revealed a very low level of real losses of 1,139 million litres, corresponding to an Infrastructure Leakage Index (ILI) of 1.13, the lowest level of losses that can be achieved.
- 120 New Fire Hydrants added to distribution system, 6 Hydrant repairs due to MVA's.
- 500 Hydrants flushed during annual flushing program.



WATER SUPPLY, TREATMENT & DISTRIBUTION

2021 Accomplishments

- Decrease of 20% on daily consumption in the past decade, with a population increase of 17%. The average daily consumption of water for all users in Nanaimo during 2019, was approximately 390 liters per person per day. The average daily consumption of water for residential users in 2019, was approximately 215 liters per person per day.
- Our water conservation initiatives to date include; staged watering restrictions, public education, tiered billing rates, toilet and appliance rebates. These efforts have resulted in historical low water demands well below Provincial and Federal levels. Reducing consumption helps the environment and delays costly upgrades to infrastructure. Based on this, we are well below our 10% reduction per decade targets outlined in the City of Nanaimo 2014 Water Conservation Strategy and exceed the 2035 target average water production of 426 liters per capita per day.
- Continued implementation of the Cross Connection Control (CCC) Bylaw and launch of program which improves the level of protection to the water supply system and reduces the risk of contamination. Over 790 registered accounts currently active and administered through the Cross Connection Control Program.
- Provided 24/7 emergency response for watermain breaks and all water supply and distribution emergencies by certified water operators.
- Updated Emergency Plans and Wildfire Protection – water supply facilities.
- Updated Business Continuity Plans for pandemic for the South Fork Water Treatment Plant.
- Updated Water Rates Bylaw together with Finance.
- Revenue from the sale of electricity to BC Hydro from the Reservoir No. 1 Energy Recovery Facility is projected to be \$86,000 this year.
- Started four year membrane age study with UBC for the South Fork Water Treatment Plant.
- Started the Water Supply Strategic Plan update.

- Started the Water Supply Cathodic Protection review.
- Started coatings assessment of 3 steel reservoirs.
- Completed North End Water Supply Study.
- Formal Annual Dam Safety inspections in progress.
- Maintained essential operations during early phase of COVID-19 crisis, with reduced staffing.
- Completed 100% of PRV maintenance.
- Completed 100% air valve maintenance on supply and distribution systems.
- Ongoing regular valve maintenance and exercising.
- Completed 2021 flushing program, maintaining high quality of potable water.

2022 Considerations and Opportunities

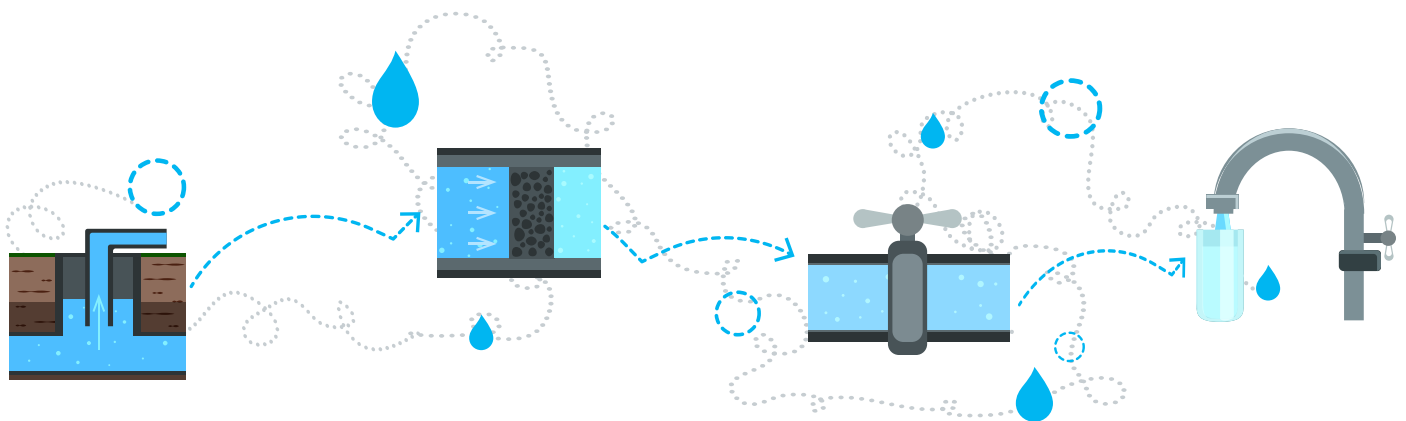
- As an outcome of the Bowen Road Water Supply Main break on April 3, 2020, the Water Supply Capital Plan has been re-prioritised to expedite the replacement of this main in the next 2-3 years. This critical infrastructure supplies the mid-town hospital region plus North Nanaimo. This will be a phased approach requiring the replacement of the Boundary Avenue / Northfield Road water supply connector to be upgraded first, allowing the Bowen Road water supply main to be replaced off-line at a later date. Routing studies are near completion and early consultant / contractor engagement will commence in the fall of 2021, with construction to commence Spring of 2022. Following the Project Management Framework, this project is considered a major project and will require considerable stakeholder outreach including a reporting committee.
- Aging Watermain Infrastructure – The City has a mixture of pipes and other components ranging from very new, to very old, that form the Water Distribution System. Infrastructure such as pipes, have a limited lifespan and eventually require renewal to remain reliable. Approximately 6% of the infrastructure, with a value of about \$60 million, is near the end of the typical useful life and requires heightened monitoring and ultimately replacement.



WATER SUPPLY, TREATMENT & DISTRIBUTION



- Watermain Breaks – The most breaks are on pipes made from Asbestos Cement that were installed in the 1960's and 1970's. Typically, the City experiences several breaks a year on this type of pipe. Currently replacing AC watermain that is older than 40 years and has a pressure of 80 psi or higher, whenever repaving, and if adjacent to a capital project.
 - Individual service connection piping to each property has reached the end of its lifespan and causing water leaks throughout the City; while not major, these create nuisance and expense for property owners and the City.
 - The updated Water Supply Strategic Plan as part of the Official Community Plan will develop further understanding of climate change impacts to drinking water supply.
 - WorkSafeBC regulation changes such as asbestos pipe and confined spaces enhance the safety of workers; however, they often have an impact on efficiency and increase costs.
 - The growth in population and corresponding increase in infrastructure, such as more pipes, valves, pump stations, reservoirs, etc., requires additional staff resources and operational funding. Over the past 10 years, the City has seen population growth of about 15% without a corresponding increase in staffing. Over this 10 year time period, an additional \$6 million in water distribution infrastructure has been added to the City through transfer from development.
- Undertake City Wide master plan with rebuilt City Wide Water Model
 - Resilience to climate change is being strengthened with huge strides in conservation. In the next 10-15 years, a larger dam will need to be constructed to meet the needs of population growth, climate change, and instream environmental flow needs.
 - Update to Water Supply Strategic Plan will continue in concert with **REIMAGINE NANAIMO**.
 - Completion of the Nanaimo River Flood Inundation Plan.
 - Worksafe BC inspected the WTP in 2021 and has mandated the City to install automatic shut off valves in the Chlorine injection room, this initiative will be budgeted for and completed in 2022.





SANITARY SEWER

The City provides and maintains a safe and healthy sanitary sewer collection system for residential, multi-family, commercial and industrial properties. The City works closely with the RDN who operate the Greater Nanaimo Regional District Sewer Treatment Facility.

Characteristics of the system include:

- 593 km of gravity sewer mains and 31 km of forcemains (pressure pipes from pump stations).
- 16 lift stations.
- 262 km of lateral sewer service lines to individual properties.
- 8,802 manholes and 15 pump stations.
- 4 step low-pressure sewer systems in specific neighborhoods.
- 13 flow monitor stations.
- 3 chemical injection sites to control fat buildup or odours.

Level of Service:

- Maintain a citywide sanitary sewer system model to assist with decisions for city-owned capital projects and private developments.
- Ongoing maintenance and upgrades of sewer services to properties in the city.
- Conduct routine sewer main flushing of certain pipes. There are pipes on 3, 6 and 12 month flushing programs to ensure they remain operational.
- Ongoing maintenance and cleaning of sewer pump stations.
- Provide 24/7 emergency response for all sewer related emergencies by certified wastewater operators.
- Maintain annual Pipe Condition Assessment program.
- Conduct inflow and infiltration monitoring and remediation program.

2021 Accomplishments

- Maintain yearly sewer flow and rainfall monitoring program for city wide sewer model calibration.
- Video inspection and condition assessment of 13.3 km of sewer pipe completed by City forces and contractor.
- Manhole inspections for public safety and infiltration and inflow issues.
- Infiltration and inflow maintenance in easements and rights-of-ways.
- Responded to 358 Work orders to date. (Aug 3, 2021)
- 129 service repairs/ upgrades, 13 services replaced.
- 67 kms flushed(Aug 3, 2021).
- Cleared 9 plugged SS services, 2 plugged SS main.(as of Aug 3, 2021)
- Upgrade of remote data acquisition and recording of pump station maintenance information.
- Conducted condition assessment of Sanitary pump stations in conjunction with Urban systems to prioritize upgrades of stations.
- Fielding Road Step system partial upgrade.
- New CCTV vehicle ordered for Utilities section, arrival expected late 2021.
- Maintained essential operations during early phase of COVID-19 crisis, with reduced staffing.

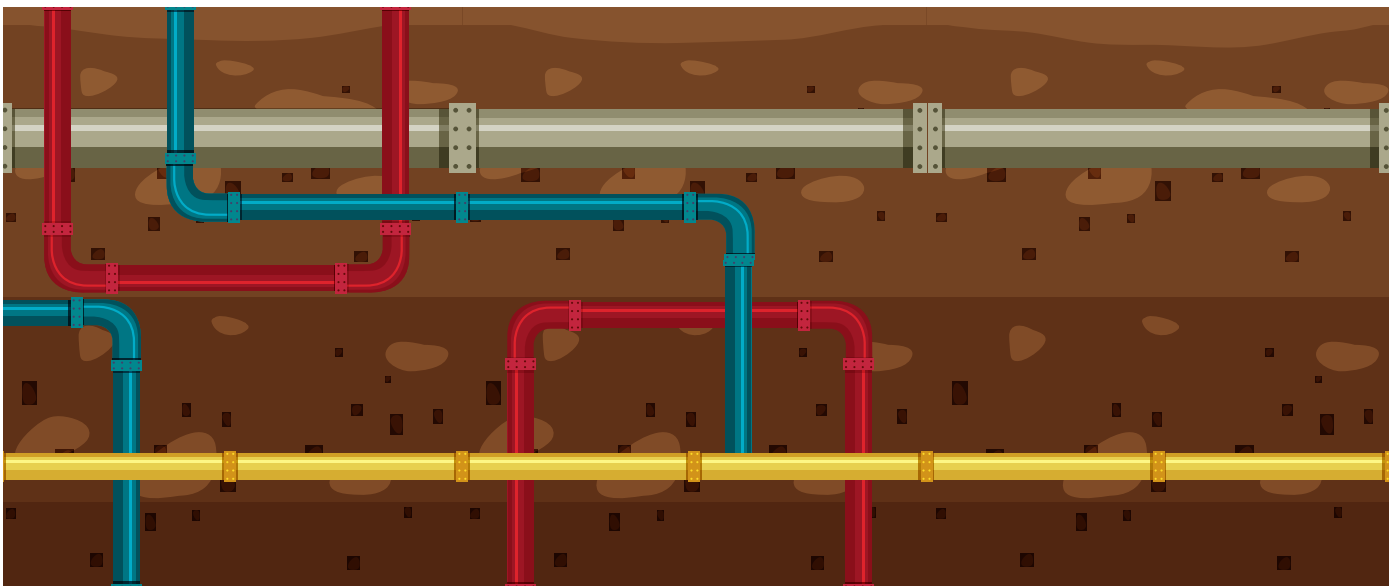
2022 Considerations and Opportunities

- The City has a mixture of pipes, manholes and other components ranging from very new to very old that form the sewer system. Infrastructure, such as pipes, have a limited lifespan and eventually require renewal to remain reliable. Approximately 4% of the sewer infrastructure, with a value of about \$25 million, is near the end of the typical useful life and requires heightened monitoring and near term replacement.

SANITARY SEWER



- Continued reduction of infiltration and inflows into sanitary sewer system, reducing the costs of treatment.
- Pipes in poor condition introduce unnecessary flow from rainfall and groundwater infiltration in the system causing system capacity reduction and treatment issues.
- Population growth and corresponding increase in infrastructure will need staff resources and operational funding. Over the past 10 years, the City has seen population growth of about 15% without a corresponding increase in staffing. Additional pipes require flushing, inspection and maintenance. As growth continues, without additional funding and staff, the condition and reliability of the sanitary sewer system infrastructure will decline. Population growth has outpaced staff resources and funding to operate and sustain the utility. Over this 10 year time period, an additional \$5.5 million in sanitary sewer infrastructure has been added to the City through transfer from development.
- Some of the major trunk sewers have greater volume than the Provincial requirements allow and monitoring stations have been installed to better understand the risks. Revenue from user fees and development cost charges are not keeping up with the need to expand sewers, creating financial pinch points.
- Climate change impacts capacity and inflow and infiltration. With increasing storm intensity and rainfall events, the peak flows the system is required to handle increase.
- Integration of new CCTV van allowing next generation analysis of underground assets.
- Continue to work closely with RDN on source control issues and monitoring.
- Update CCTV Management Software – Software system needed to allow Engineering and Public Works to manage and do analysis from the extensive library of pipe inspection videos.





DRAINAGE (RAINWATER)

Drainage infrastructure, such as pipes, ditches, culverts, catchbasins, and detention ponds conveys rainwater to natural water bodies. The overall goals are to convey water away from roads, properties and buildings in a safe and sustainable way, while mitigating adverse impacts on natural watercourses, and contribute to the health of natural areas.

Characteristics of the system include:

- 596 km of storm drainage mains.
- 560 km of ditches.
- 142 km of storm lateral services.
- 7018 manholes.
- 13 077 catchbasins.
- 35 detention or pond facilities.
- 30 active beaver dams.

Level of Service:

- Catchbasins (Road and Boulevard) are cleaned annually to prevent harmful sediments entering waterways and ensure environmental sustainability.
- Inlets and outlets inspected regularly and during major rainfall events to ensure storm drainage model working correctly.
- Monitoring and maintenance of natural watercourse to ensure flow of water and to prevent flooding.
- Ongoing monitoring of the North Slope erosion area during King tides and major rainfall.
- Flushing and video inspection of storm pipe and culvert infrastructure.
- Inspections of storm water infrastructure in new subdivisions.
- Water Quality Control program collaborating with Nanaimo Port Authority. Conducts all primary water sampling for City of Nanaimo Parks and Recreation swimming beach areas to ensure safe recreational

swimming. Water quality results published on City of Nanaimo website to ensure public access.

- Annual vegetation control maintenance around storm infrastructure such as inlets, outlets, and detention ponds to ensure free flow and access.

2021 Accomplishments

- Video inspection and condition assessment of 10.1 km of drainage pipe to date.
- Maintain yearly rainfall monitoring program with 5 rain gauges across the City reporting through SCADA.
- 10, 500 catchbasins cleaned to prevent sediment and heavy metal contaminants from entering storm system.
- Installed 13 new CB's, upgraded 9 to date.
- Interdivisional coordination of Road Rehab and Traffic Calming programs to improve drainage and safety.
- Cleaned and rehabilitated portion of Departure Creek in conjunction with DFO, Friends of the Stream and Departure Bay Neighbourhood Association.
- Completed City wide storm drain infrastructure inventory for SD model.
- Replaced & upgraded 196 m of failed corrugated steel pipe and responded to 465 work orders to date (2021-Aug 03).
- Installed 10 new SD services, upgraded 16 existing services to date.
- Replaced and installed new storm drain outfall from Shoreline Drive to beach, this was destroyed due to slope failure in winter months.
- Replaced corroded CMP storm outfall at Stewart Ave below Chestnut St.
- Conducted seasonal water sampling program for faecal coliform on local area beaches.
- Maintained essential operations during early phase of COVID-19 crisis, with reduced staffing.

DRAINAGE (RAINWATER)



2022 Considerations and Opportunities

- Climate change has increased the intensity and strength of storm events. Drainage infrastructure may not be able to handle events especially the short duration, high intensity events. Increased flooding of low lying areas and properties may result due to more frequent storm events.
- Sea level rise is expected to restrict the amount of storm water runoff and increase erosion on shorelines.
- Staff turnover due to retirement, decreases historic knowledge, increasing the importance of training and asset management systems.
- Managing growth of storm infrastructure with competing priorities for General Revenue funding and staffing needs.
- The City will need to upgrade funding model to budget for an aging drainage infrastructure, and consider the benefits of a storm water utility.
- There are increasing amounts of private drainage infrastructure that play an important environmental role in both quantity and quality of storm water. These systems require maintenance to prevent contamination and continued operation. Education and messaging to property owners will be important as these systems age and need attention.



The Fleet Section provides support, oversight and maintenance of the City's transportation and mobile equipment inventory. The group includes 13 permanent staff and a manager.

Characteristics of the service are:

- Maintains over 160 light and heavy-duty vehicles including 4 electric ice machines, 1 propane ice machine, 10 electric cars, and 13 tractor/backhoe/loaders.
- Maintains over 300 pieces of smaller equipment including generators, mowers, compressors, trailers, attachments, etc.
- Generates over 3,000 work orders per year for vehicle maintenance and repair.
- Maintenance facility includes 6 service bays, 1 welding bay, and 1 small equipment shop.

Level of Service:

- Operates 3 fleet maintenance shifts from 6:00 am – 5:30 pm to ensure adequate coverage and avoid equipment downtime.
- Maintains a government certified Designated Inspection Facility Licence. Preventative maintenance work and commercial vehicle inspections are completed to government standards and timelines. Annual audits from Commercial Vehicle Safety and Enforcement are conducted for compliance.
- Provides monthly fuel consumption statistics for all departments.
- Provides oversight and advisory services for purchases or new additions to the fleet.
- Procures and deploys 10 – 20 new vehicles per year.

2021 Accomplishments

- Procurement and deployment of the following:
 - 2 - Electric Cars
 - 2 - High-Roof Vans
 - 6 - Light-Duty Trucks
 - 4 - Medium-Duty Trucks
 - 1 - Compressed Natural Gas (CNG) Refuse Truck
 - 2 - Utility Vehicles
 - 1 - Forklift
 - 2 - Loader/Backhoes
 - 1 - Valve Turner Trailer
- Completed approximately 40 commercial vehicle inspections.
- Collaborated with architects and project management team to complete a design plan for future fleet facility.
- Continued active participation in province-wide fleet management group.

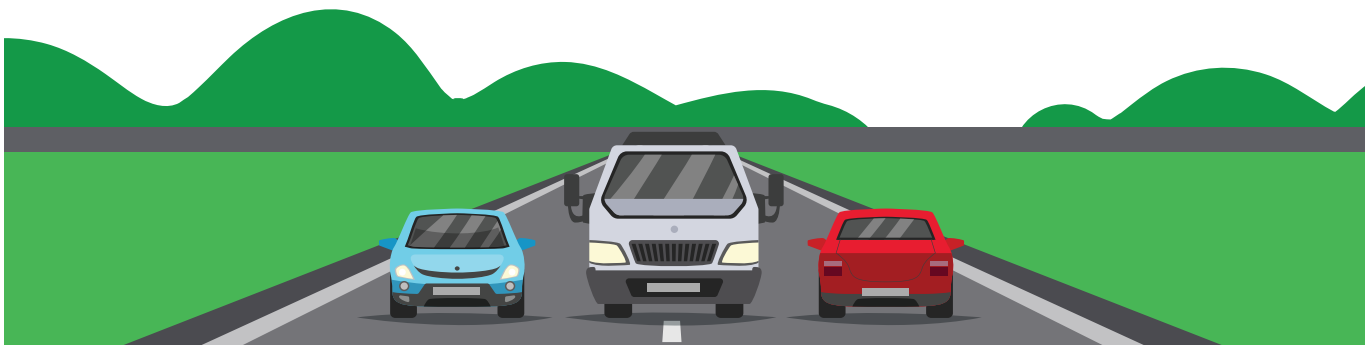
2022 Considerations and Opportunities

- The City continues to grow, therefore the size and complexity of the City's fleet is also increasing. Staffing levels and operational funding will need to increase to accommodate this growth.
- As advancement in green technologies continue, fleet services will continue to pursue the corporate Green Fleet Strategy by exploring alternative fuel solutions in order to reduce Green House Gas (GHG) emissions and decrease fuel consumption. Alternate-fuel vehicles are becoming more prevalent in the marketplace and are starting to meet the departmental needs of the City.

FLEET



- Fleet technology is rapidly changing which can be challenging for technician training, recruitment, and development.
- Vehicle accidents and incidents continue to affect insurance premiums and vehicle downtime. A permanent driver trainer position would be beneficial in reducing these expenditures.
- Continue to upgrade existing infrastructure and facilities to meet the requirements of electrifying fleet vehicles.
- Continue to build strong relationships with other municipalities and local governments. The sharing of technical specifications and procurement solutions is highly beneficial amongst agencies.
- The Fleet Services facility is not adequately meeting the needs of the diverse fleet that the City maintains. A number of units within the City's fleet are unable to be serviced inside the facility due to the length of the units being greater than the building. The facility is in need of a suitable CNG bay equipped with a gas detection system in order to effectively work on the refuse truck fleet. Additionally, the Fleet Services facility has undergone a seismic review that has revealed concerns. In order to meet the growing needs of the community, and overall maintenance of the City's fleet and small equipment, further advancement of a new fleet facility is required.



SOLID WASTE MANAGEMENT

The City provides weekly curbside collection of garbage, recycling and comingled kitchen/yard waste organic materials. The service uses standardized carts and automated collection vehicles to 29,500 residential addresses. This service is provided for single family and multi-family, up to and including four-plexes. Larger multi-family, strata, commercial and industrial solid waste collection is completed by the private sector.

Characteristics of the program are:

- Provide residential solid waste collection including weekly collection of food waste, bi-weekly collection of residential garbage and recyclables.
- Provide public education and promotion for the 3 R's – Reduce, Reuse, Recycle.

User fees fully cover the costs of solid waste collection. The delivery of curbside collection services is a daily activity that requires a level of management and effort to match the high degree of complexity. Any failure in delivery results in a high level of public interest.

Level of Service:

- Biweekly servicing of litter receptacles.
- Collection of illegally dumped items from public property.
- Collection of dumped hazardous items including needles.
- Clean up of littering and other unsightly areas of public property.
- Perform daily homelessness cleaning around downtown area.

In addition to Solid Waste Collection Services, the Sanitation Section also facilitates other initiatives including:

- The Partners in a Cleaner Community Program - Working with local community groups to litter pick city roadsides. These groups are paid \$50 per kilometre for their efforts.
- Reuse Rendezvous - The citywide swap meet.
- The Nanaimo Recycle Trunk Sale- a free event for residents to give used items a new life.

2021 Accomplishments

- Nanaimo has one of the few services that pick up three different types of waste with a single vehicle – many others use multiple vehicles.
- Injuries in the sanitation section have decreased by over 90% since the implementation of the program. in summer 2018.
- Implemented Optimized Collection program, dividing collection into two categories of Recycling/Organics and Garbage/Organics.
- New Optimization Collection program resulted in reduction of an average of 22 service delays per month in 2020 to less than 2 per month as of July 2021.
- Work orders relating to missed collections and other operational issues have reduced 15%.
- No significant changes in collection of materials from residential curbside collection services:

Kilograms per Household	2020 (Jan-June)	2021 (Jan-June)	2021/2020
Landfill	111	113	102%
Recycling	65	64	99%
Organics	146	140	96%
Total	321	317	99%

SOLID WASTE MANAGEMENT



- Estimated 2021 total collection material forecasted for:
 - 6,800 tonne of garbage,
 - 8,400 tonne of organic materials, and
 - 3,500, 3,700 tonne of recyclable materials.
- Diversion rate increased 1% in year 2018 and another 1% in 2019. Due to the pandemic, household waste disposal has increased, resulting in 1% decrease in diversion rate since the beginning of the pandemic.

Year	Landfill (Kilogram per Household)	Recycling (Kilogram per Household)	Organics (Kilogram per Household)	Total (Kilogram per Household)	Diversion Rate
2016	133	140	118	391	64%
2017	133	140	118	391	64%
2018	182	169	126	477	65%
2019	247	193	125	566	66%
2020	293	227	129	648	65%
2021 (Jan-June)	140	113	64	317	64%

2022 Considerations and Opportunities

In the first 6 months (Jan-Jun) 2021, over 200 new accounts were added to existing refuse collection routes.

The Sanitation fleet consists of ten full time units and two spares.

- Landfill tipping fees continue to increase with fees for 2020 at \$130 per tonne increased to \$135 in Jan 2022 and to \$140 in Apr 2022.
- To ensure that residential curbside collection program remains efficient and sustainable in the face of ongoing urban growth and other pressures like pandemic, the City is conducting an optimization of the fleet equipment lifecycle and spare equipment ratio.
- Illegally dumped waste, needles and littering problems in the downtown core continue to swamp the Sanitation City Patrol and the Bylaw

Departments. A permanent community clean team will significantly increase sanitation capacity in the public spaces (business case has developed and submitted).

- Recycling contamination increased to 8% by the end of 2021. Recycle BC has formally requested from the city to develop and implement a “Contamination Remediation Plan”. Staff have started to develop the plan aimed to reduce the contamination to the acceptable level by mid 2022
- Staff will continue to observe and review the potential implementation of Public Space Zero Waste and street scene initiatives including street side waste source separation and cigarette butt recycling.

CEMETERIES

The City owns, operates, and maintains three cemeteries:

Location	Status	Total Interments
Townsite/ Chinese Cemetery	Open for sales of new plots.	950
Bowen Cemetery	Closed for sales of new plots. Open to burials in existing plots.	14,719
Wellington Cemetery	Closed for sales of new plots. Open to burials in existing plots (very uncommon).	125

Public Works operates these sites under the Cremation, Interment and Funeral Services Act and City of Nanaimo "Cemetery Bylaw 2009 No. 7084". A contractor maintains the cemetery grounds. As a public service, the cemeteries are operated as an alternative to private burial services. The Revenue Services Section (Finance Department) receives and administers requests for plot purchase, burials, and genealogy research requests. The trend appears to be an increasing preference for cremation burials.

2021 Accomplishments

In 2018, 56 interments were conducted, including 15 full burials and 41 cremation burials. In 2019, 75 interments were conducted, including 13 full burials and 62 cremation burials. In 2020, 65 interments were conducted, including 17 full burials and 48 cremation burials.

Year to date (July 31) in 2021, there have been 47 interments conducted, including 10 full burials and 37 cremation burials.

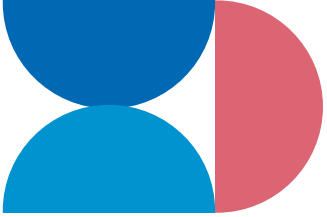
2022 Considerations and Opportunities

- There are currently no dedicated cemetery staff. This means that opportunities may be missed to develop and expand service offerings, revenue potential, and cultural significance of the sites. Burial work is carried out by the sanitation section which can put undue pressure on the department who is primarily focused on delivering daily waste collection services.
- The public interest in these sites can be tied to emotional reactions, so a high level of empathy and emotional intelligence is required for employees who come into contact with interested members of the public or family members of those interred.
- Townsite/Chinese Cemetery is the only site with remaining capacity for new plots. To continue offering burial services, alternative memorials could be explored, including columbarium, ash gardens, etc.
- In the 1960's changes were made to Bowen Road Cemetery to reduce the maintenance efforts, which included laying down headstones and removing perimeter stones. A cache of these stones was recently recovered which generated interest in reusing these stones in a way which honours their heritage.
- Future proofing- In order to continue offering burial services, alternatives to standard burial services could be explored including niche columbaria and ash gardens.
- Considering the limited space available for expansion, and in order to provide a long term business model and service plan, staff have scheduled a business model review for 2022.

PROPOSED OPERATING BUDGET



	2021	2022	2023	2024	2025	2026
	Approved Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget
Revenues						
Cemetery Operations	\$ 74,500	\$ 76,000	\$ 76,760	\$ 77,528	\$ 78,303	\$ 79,086
Drainage	41,205	41,205	41,629	42,058	42,491	42,928
Fleet Operations	-	-	-	-	-	-
Public Works Support Services	445,600	469,500	478,805	488,295	497,975	507,846
Solid Waste Management	6,663,346	6,983,087	7,187,335	7,395,411	7,576,685	7,698,573
Transportation	73,384	73,384	74,118	74,860	75,608	76,364
Annual Operating Revenues	\$ 7,298,035	\$ 7,643,176	\$ 7,858,647	\$ 8,078,152	\$ 8,271,062	\$ 8,404,797
Expenditures						
Cemetery Operations	\$ 267,475	\$ 273,601	\$ 279,074	\$ 284,650	\$ 290,345	\$ 296,155
Drainage	2,230,999	2,276,210	2,321,736	2,368,159	2,415,532	2,463,837
Fleet Operations	2,758,769	2,768,638	2,824,004	2,880,474	2,938,075	2,996,830
Public Works Support Services	1,804,694	1,901,307	1,939,062	1,977,562	2,016,839	2,056,905
Solid Waste Management	7,437,879	7,655,294	7,249,583	7,120,537	7,221,175	7,321,567
Transportation	6,491,457	6,646,434	6,779,362	6,914,929	7,058,496	7,285,072
Annual Operating Expenditures	\$ 20,991,273	\$ 21,521,484	\$ 21,392,821	\$ 21,546,311	\$ 21,940,462	\$ 22,420,366
Net Annual Operating Expenditures	\$ 13,693,238	\$ 13,878,308	\$ 13,534,174	\$ 13,468,159	\$ 13,669,400	\$ 14,015,569
Staffing (FTEs) - Budgeted	71.3	69.2	69.2	69.2	69.2	69.2



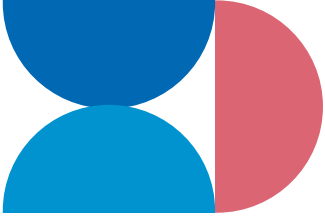
PROPOSED OPERATING BUDGET

	2021	2022	2023	2024	2025	2026
	Approved Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget
Expenditure Summary						
Wages & Benefits	\$ 7,586,824	\$ 7,447,026	\$ 7,595,969	\$ 7,747,885	\$ 7,902,841	\$ 8,060,899
Services & Supply Contracts	5,032,918	5,146,407	5,253,621	5,358,683	5,465,859	5,575,173
Materials & Supplies	2,822,676	2,914,544	2,975,816	3,037,996	3,100,191	3,161,116
Utilities	1,703,670	1,725,980	1,760,500	1,795,709	1,831,622	1,868,257
Internal Charges & Other	2,554,423	2,993,092	3,160,428	3,423,526	3,478,974	3,565,967
Debt Servicing	1,288,562	1,291,935	643,937	179,911	158,322	186,248
Grants & Subsidies	2,200	2,500	2,550	2,601	2,653	2,706
Annual Operating Expenditures	\$ 20,991,273	\$ 21,521,484	\$ 21,392,821	\$ 21,546,311	\$ 21,940,462	\$ 22,420,366

PROPOSED OPERATING BUDGET - SANITARY SEWER



	2021	2022	2023	2024	2025	2026
	Approved Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget
Revenues						
Sanitary Sewer	\$ 8,344,863	\$ 8,719,144	\$ 8,765,936	\$ 8,853,595	\$ 8,942,286	\$ 9,032,025
Annual Operating Revenues	\$ 8,344,863	\$ 8,719,144	\$ 8,765,936	\$ 8,853,595	\$ 8,942,286	\$ 9,032,025
Expenditures						
Sanitary Sewer	4,270,797	4,435,576	4,480,405	4,620,391	4,719,531	4,916,042
Annual Operating Expenditures	\$ 4,270,797	\$ 4,435,576	\$ 4,480,405	\$ 4,620,391	\$ 4,719,531	\$ 4,916,042
Net Annual Operating Revenues	\$ 4,074,066	\$ 4,283,568	\$ 4,285,531	\$ 4,233,204	\$ 4,222,755	\$ 4,115,983
Staffing (FTEs) - Budgeted	9.8	9.8	9.8	9.8	9.8	9.8



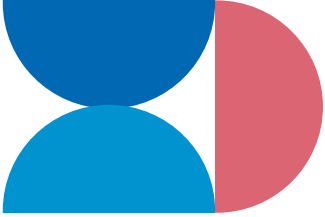
PROPOSED OPERATING BUDGET - SANITARY SEWER

	2021	2022	2023	2024	2025	2026
	Approved Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget
Expenditure Summary						
Wages & Benefits	\$ 1,104,844	\$ 1,095,391	\$ 1,087,911	\$ 1,109,667	\$ 1,131,861	\$ 1,154,498
Services & Supply Contracts	295,691	285,881	259,214	264,392	269,685	275,074
Materials & Supplies	549,995	585,566	577,503	585,564	593,754	602,070
Utilities	33,350	41,875	42,713	43,568	44,438	45,326
Internal Charges & Other	1,888,871	1,933,829	1,963,146	2,001,207	2,040,032	2,079,631
Debt Servicing	394,046	489,034	545,838	611,831	635,516	755,113
Grants & Subsidies	4,000	4,000	4,080	4,162	4,245	4,330
Annual Operating Expenditures	\$ 4,270,797	\$ 4,435,576	\$ 4,480,405	\$ 4,620,391	\$ 4,719,531	\$ 4,916,042

PROPOSED OPERATING BUDGET - WATERWORKS



	2021	2022	2023	2024	2025	2026
	Approved Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget
Revenues						
Water	\$ 23,296,282	\$ 24,411,497	\$ 25,653,254	\$ 26,956,639	\$ 28,324,717	\$ 29,760,702
Annual Operating Revenues	\$ 23,296,282	\$ 24,411,497	\$ 25,653,254	\$ 26,956,639	\$ 28,324,717	\$ 29,760,702
Expenditures						
Water	10,993,662	11,304,017	11,545,065	11,799,827	12,062,067	12,332,122
Annual Operating Expenditures	\$ 10,993,662	\$ 11,304,017	\$ 11,545,065	\$ 11,799,827	\$ 12,062,067	\$ 12,332,122
Net Annual Operating Revenues	\$ 12,302,620	\$ 13,107,480	\$ 14,108,189	\$ 15,156,812	\$ 16,262,650	\$ 17,428,580
Staffing (FTEs) - Budgeted	29.5	31.5	31.5	31.5	31.5	31.5



PROPOSED OPERATING BUDGET - WATERWORKS

	2021	2022	2023	2024	2025	2026
	Approved Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget
Expenditure Summary						
Wages & Benefits	\$ 3,662,253	\$ 3,657,588	\$ 3,730,739	\$ 3,805,353	\$ 3,881,461	\$ 3,959,088
Services & Supply Contracts	721,058	874,302	885,106	902,799	920,860	939,275
Materials & Supplies	1,797,550	1,872,741	1,938,697	2,007,397	2,078,988	2,153,578
Utilities	249,725	234,884	239,582	244,375	249,262	254,247
Internal Charges & Other	2,770,965	2,834,352	2,880,452	2,927,460	2,975,421	3,024,482
Debt Servicing	1,785,361	1,824,150	1,864,489	1,906,443	1,950,075	1,995,452
Grants & Subsidies	6,750	6,000	6,000	6,000	6,000	6,000
Annual Operating Expenditures	\$ 10,993,662	\$ 11,304,017	\$ 11,545,065	\$ 11,799,827	\$ 12,062,067	\$ 12,332,122