



# ENGINEERING & PUBLIC WORKS

## Public Works

*2021 Business Plan*

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# Public Works

## OVERVIEW

The Public Works Department at 2020 Labieux Road 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 corporate 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.

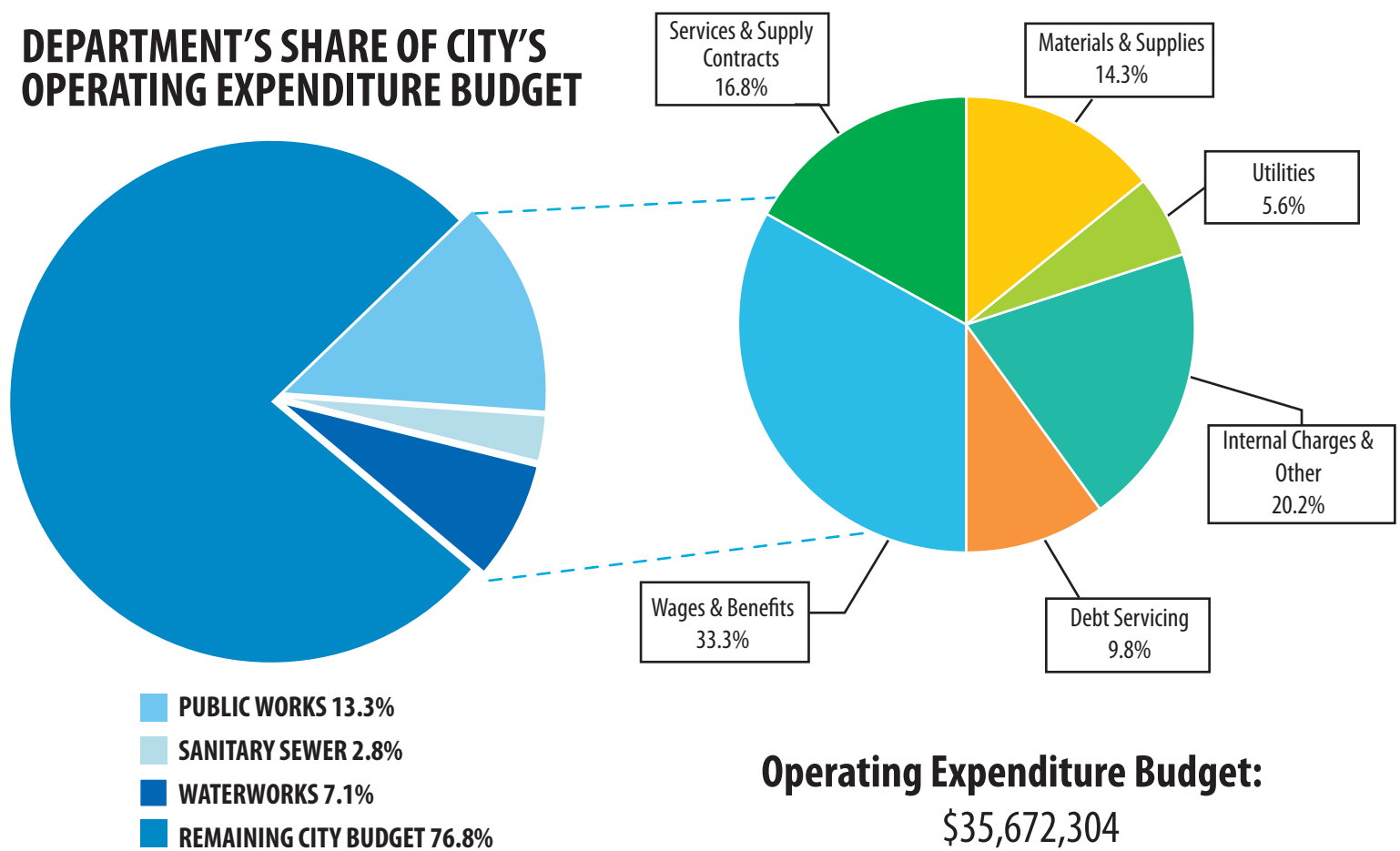
2020 started the year with uncertainty and heightened anxiety due to the COVID-19 pandemic. Public Works participated in the Emergency Coordination Centre (ECC) which was established in March to coincide with Provincial Pandemic State of Emergency. Public Works also established a Departmental Operations Centre (DOC) and worked closely with the ECC Director and 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.

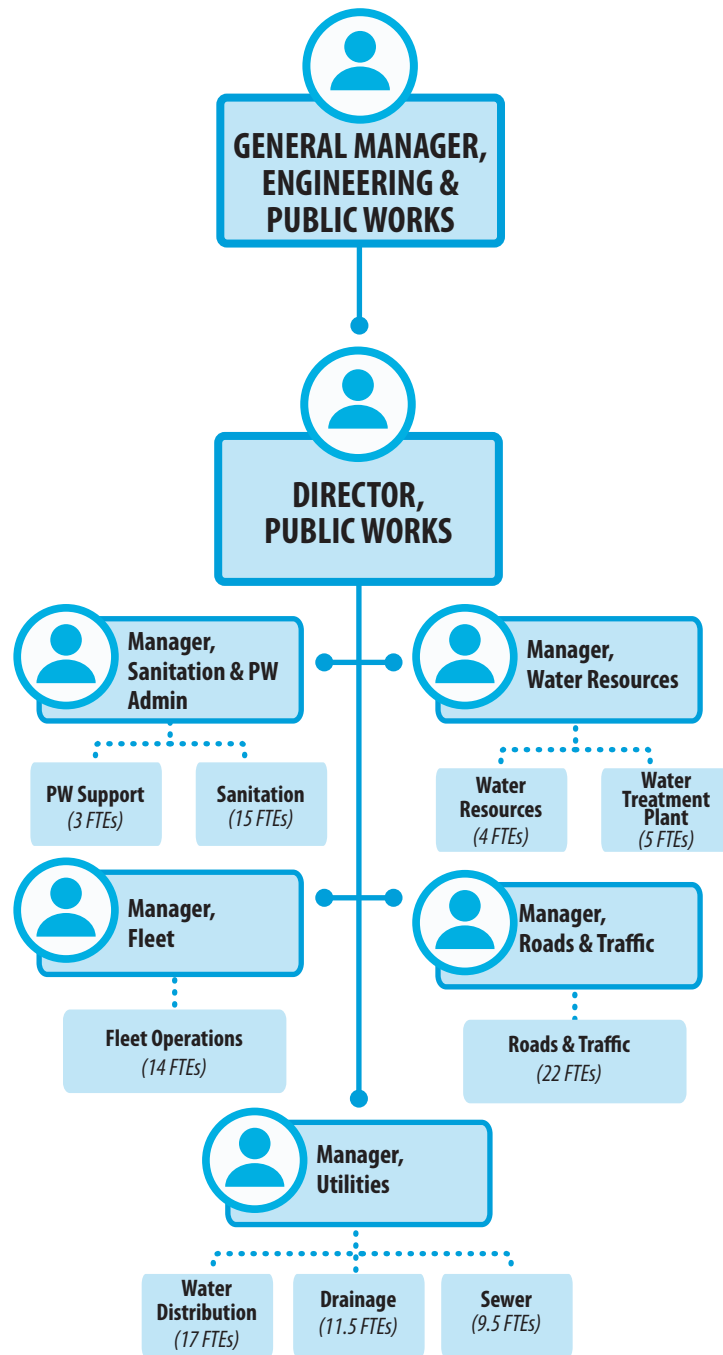
Being an essential service, staffing levels at Public Works were business as usual through the pandemic with few reductions to levels of service and annual maintenance programs.

Some activities included:

- Implement and update current Business Continuity Plan.
- Maintain regular DOC meetings with stakeholders and submit Situation Reports.
- Establish Essential Services Mutual Aid Agreement with neighboring municipalities and regional districts as per provincial directive.
- Redeployment of Parks and Recreation staff, as recreation facilities closed, to perform seasonal maintenance programs, rather than hire temporary staff.
- Develop and implement additional Safe Work procedures and physical distancing measures.
- Track expenses to submit to Province for recovery.
- Reduced or canceled programs, travel and training to ease financial impact of the pandemic.

## DEPARTMENT'S SHARE OF CITY'S OPERATING EXPENDITURE BUDGET





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

# Public Works

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## 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 high level of service and public interaction provided by Administration, deflects calls from supervisors and managers resulting in excellent efficiency.

### Background and 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.

### 2020 Accomplishments

COVID-19 added a new level of complexity to how Public Works provides services. All Public Works staff have continued to report to work throughout the COVID-19 pandemic. In an effort to keep permanent recreation staff meaningfully employed, we modified how we manage our seasonal maintenance programs. Public Works worked closely with HR and CUPE to redeploy Recreation staff to Public Works for the summer maintenance programs.

Administration staff typically create, dispatch and close over 9,000 work orders each year.. It is estimated that around 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.

### 2021 Opportunities and Initiatives

- 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 2021 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 2020 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 2020, there were:

- 522 km of roads, 445 km of sidewalks, 98 km of bicycle lanes.
- 53 signalized intersections, four roundabouts, 26,107 traffic signs.
- 18 bridges, 28 railroad crossings.
- 4,373 City owned streetlights, and 4,258 lights leased from BC Hydro.
- 1,293 marked crosswalks, and 53 pedestrian activated crosswalk-warning beacons.

### Background and 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.

## ROADS AND TRAFFIC, cont'd

- 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).
- 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.

### 2020 Accomplishments

- Renewed asphalt road surface, including patching on Boban Drive, Hammond Bay Road, Thunderbird Drive, Biggs Road, and Wakesiah Avenue.
- Completed upgrade of rail crossing at Jingle Pot Road, in partnership with Southern Railway.
- Increased effort to maintain alleyways, walkways and boulevards due to optimum growing conditions early in the summer.
- Successfully trained redeployed PRC staff in brush cutting, paving, signage and traffic marking operations.
- 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
- Converted the intersection of Commercial and Bastion to a 4-way stop
- Supported Transportation Engineering with the installation of new traffic calming programs, including Departure Bay, Bay St. and Georgia Ave.

### 2021 Opportunities and Initiatives

- 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.



## ROADS AND TRAFFIC, cont'd

- **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. An asphalt condition survey is planned for 2021, as is public consultation on service levels for asphalt condition maintenance and renewal.
- **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 any time 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 Signal Technician** –The City of Nanaimo currently has 52 signalized intersections for which we rely 100% on a Contractor to inspect and maintain. Recruitment for this role is active.
- **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.



## WATER SUPPLY & 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, fire fighting 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.
- 640 km of watermain.
- 9 reservoirs (storage tanks).
- Jump Lake Dam / Reservoir and South Forks Intake Dam.
- Water Treatment Plant.
- 8 pump stations.
- 26,000+ service connections.
- Energy Recovery Facility.
- 13.9 billion litres of treated water supplied per year.
- 2 Water Filling Stations

### Background and 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.

## WATER SUPPLY & DISTRIBUTION, cont'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 994 treated water tests throughout the water distribution system as of Sept 11, 2020.
- 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 2020 – 9 to date.
- 2020 Service Repairs – 25, plus 10 service renewals.
- 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.
- 33 New Fire Hydrants added to distribution system, 6 Hydrant repairs due to MVA's.
- 600 Hydrants flushed during annual flushing program.

### 2020 Accomplishments

- Bowen Rd water supply main broke on April 3, resulting in a loss of 21 million litres, \$250,000 in repair, but resulted in no significant damage, and was repaired in short order.
- 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.

- A new Emergency Water Pump Station to pump water from Nanaimo Forest Products, in the event of City supply failure, is complete.
- 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 Reservoir No. 1 Energy Recovery Facility is projected to be \$86,000 this year.
- Completed Towers Pump Station upgrades.
- Completed two bulk Water Fill Stations. Over 69 residential and commercial users registered.
- Completed Rock scaling and rip-rap replacement at South Fork Dam and Jump Creek Dam.
- Cleaned up landslide and re-graded access to water supply pipeline right-of-way in watershed.
- Emergency work repair from January storm; rock scaling South Fork right abutment, anchor block replacement for fisheries flow by-pass and replacement of rip-rap on the left bank below South Fork Dam.





## WATER SUPPLY & DISTRIBUTION, cont'd

- 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.
- Completed the Nanaimo River Flood Inundation Study.
- 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 2020 flushing program, maintaining high quality of potable water.
- Responded to catastrophic main failure on Bowen Road, worked with contractor to resume water flow and road traffic in 42hrs, cost \$250,000, no significant property damage.

### 2021 Opportunities and Initiatives

- 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 have started and early consultant / contractor engagement will commence in early 2021. 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.

- 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.



## 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:

- 590 km of gravity sewer mains and 31 km of forcemains (pressure pipes from pump stations).
- 262 km of lateral sewer service lines to individual properties.
- 8,783 manholes and 15 pump stations.
- 4step low-pressure sewer systems in specific neighborhoods.
- 13 flow monitor stations.
- 3 chemical injection sites to control fat buildup or odours.

### Background and 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.

### 2020 Accomplishments

- Maintain yearly sewer flow and rainfall monitoring program for city wide sewer model calibration.
- Video inspection and condition assessment of 39.6 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.

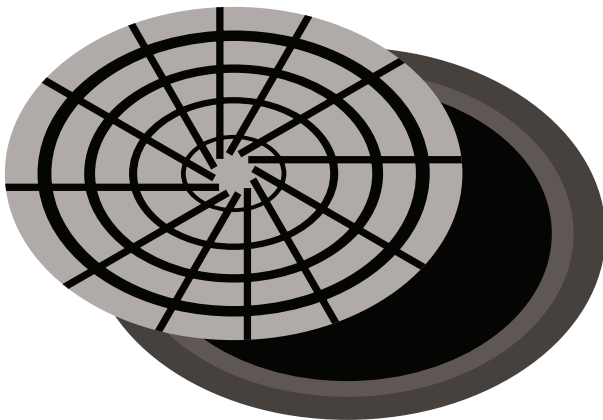
- Responded to 517 Work orders to date. (Sept 11, 2020)
- 105 service repairs/ upgrades, 15 services replaced.
- 130 kms flushed in 2020.
- Cleared 14 plugged SS services, 1 plugged SS main.
- Upgrade of remote data acquisition and recording of pump station maintenance information.
- New sewer lift station activated at Seventh & Park Ave, with two new syphons.
- Completed 53 development servicing reviews and 27 subdivision servicing reviews.
- Refurbishment of Brookwood Pump Station.
- Fielding Road Step system partial upgrade.
- New actuator valve installed at Protection Island Step system.
- New security fencing around Cameron Island Pump Stations.
- New CCTV vehicle ordered for Utilities section.
- Maintained essential operations during early phase of COVID-19 crisis, with reduced staffing.

### 2021 Opportunities and Initiatives

- 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.
- 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.
- Some of the major trunk sewers are more full 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.

## SANITARY SEWER, cont'd

- 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.
- 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.



## RAINWATER (DRAINAGE)

Rainwater 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:

- 592 km of storm drainage mains.
- 140 km of storm lateral services.
- 6,954 manholes.
- 12, 968 catchbasins.
- 33 detention or pond facilities.
- 29 active beaver dams.

### Background and 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.
- Annual vegetation control maintenance around storm infrastructure such as inlets, outlets, and detention ponds to ensure free flow and access.
- Inspections of storm water infrastructure in new subdivisions.
- Water Quality Control program collaborating with Nanaimo Port Authority. Acquired 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.

## RAINWATER (DRAINAGE), cont'd

### 2020 Accomplishments

- Video inspection and condition assessment of 14.9km of drainage pipe.
- Maintain yearly storm drainage monitoring program for 2 flow stations and 9 level stations.
- 8, 820 catchbasins cleaned to prevent sediment and heavy metal contaminants from entering storm system.
- Replaced 15m of 900 CSP with 900mm PVC pipe at 3709 Hammond Bay Road.
- Interdivisional coordination of Road Rehab and Traffic Calming programs to improve drainage and safety.
- Assisted with Bowen Road catastrophic main failure, cleaned all SD and SS mains and catchbasins during and after the event.
- Cleaned and rehabilitated portion of Departure Creek in conjunction with DFO, Friends of the Stream and Departure Bay Neighbourhood Association.
- Implemented web page on City site for ocean and lake shoreline water sample results.
- Completed City wide storm drain infrastructure inventory for SD model.
- Replaced & upgraded 104 m of failed corrugated steel pipe and responded to 547 work orders to date (Sept 11, 2020).
- Installed 14 new storm drainage services.
- Embraced relocated recreation staff at Public Works yard and completed inlet/ outlet program and brush clearing program for SD system.
- Maintained essential operations during early phase of COVID-19 crisis, with reduced staffing.



# Public Works

## RAINWATER (DRAINAGE), cont'd

### 2021 Opportunities and Initiatives

- 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.

## FLEET

The Fleet Section provides support, oversight and maintenance of the City's transportation and mobile equipment inventory. The group includes 14 permanent staff and a manager.

Characteristics of the service are:

- Approximately 150 heavy and light duty vehicles, 4 electric ice machines, 1 propane ice machine and over 300 smaller equipment including generators, mowers, tractors, compressors, trailers, attachments, etc.
- 3,000+ work orders per year for vehicle maintenance and repair.
- 6 service bays, 1 welding bay and 1 small equipment shop.
- 5 electric vehicles and charging stations for fleet vehicles.

### Background and Level of Service:

- Operate in three shifts to ensure coverage and avoid downtime.
- The City maintains a government certified commercial vehicle inspection facility to ensure efficient and timely service. Service work and commercial vehicle inspections are completed to government standards and timelines. Annual audits are undertaken for compliance and to maintain our inspection facility license.
- Provide monthly fuel consumption statistics to managers.
- Replace approximately 10 vehicles per year.
- Provide oversight and advisory services for purchases or new additions to the fleet.

### 2020 Achievements

Procurement and deployment of the following:

- new CNG garbage truck
- 2 – Medium Duty Cargo Vans
- 2 – Medium Duty Dump Trucks
- 4 – Electric Vehicles
- 1 – Tandem Axle Dump Truck
- 1 – CCTV Cargo Van
- 1 – Dual Roller and Trailer
- Developed Green Fleet Strategy for Council adoption and joined E3 Fleet (Energy, Environment, Excellence) Program.
- Awarded Silver rating for E3Fleet.
- Revise vehicle replacement plan to optimize vehicle life span.
- Revise vehicle service patterns to meet manufacturer's recommendations.
- Completed approximately 60 commercial vehicle inspections on time.
- Completed a space needs assessment and conceptual design for the future fleet shop including an office area, parts room, lunchroom, change area, dedicated high head CNG bays, separate automotive and heavy duty work areas and small tools shop all under one roof / building.
- Participate in Province-wide Fleet Managers forum.

## FLEET, cont'd

### 2021 Opportunities and Initiatives

- The Fleet world continues to technologically advance, which puts pressure on technician training, recruitment and development.
- The Fleet Services facility is not adequate to meet the diverse fleet that the City maintains. A number of units within the City's fleet are not able to be serviced inside the facility due to the length of the units being greater than the building. 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 and planning of a new fleet shop is required in the next 5 years.
- The City's fleet continues to grow and there is a demand for a higher level of Fleet management to mitigate climate change impacts.
- As advancement in green technologies continue and market demands provide feasible options, alternate fuel vehicles will become more prevalent to perform the functional requirements in all City fleet.
- Vehicle accidents and incidents continue to affect insurance premiums.
- Continue to build on corporate Green Fleet Strategy.
- Add to existing infrastructure to encourage electrification of fleet vehicles.
- Continue to build relationships with other municipalities.
- Sharing of technical specifications and procurement solutions with other municipalities.
- Continuing to explore alternative fuel solutions to reduce operating costs and GHG emissions.

## SOLID WASTE MANAGEMENT

The City provides weekly curbside collection of garbage, recycling and kitchen/yard waste organic matter. 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.

### Background and 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.

### 2020 Achievements

- Nanaimo has one of the only services that pick up three different types of waste with a single vehicle – many others use multiple vehicles.
- Injuries in the sanitation section have fallen by over 90% in the 24 months since the introduction of automated collection in summer 2018.
- Staff sickness has also reduced greatly.



# Public Works

## SOLID WASTE MANAGEMENT, cont'd

- Work orders relating to missed collections other operational issues have reduced by around 50%. This is likely due to the on-board computer that helps Refuse Collectors record “exceptions” when on route.
- Collection of 18% more material from residential curbside collection services to meet the additional demand due to the pandemic:

<i>Kilograms per Household</i>	<b>2019 (Jan-Aug)</b>	<b>2020 (Jan-Aug)</b>	<b>2020/2019</b>
<b>Landfill</b>	125	147	118%
<b>Recycling</b>	86	83	96%
<b>Organics</b>	163	196	120%
<b>Total</b>	373	425	114%

- While the weight of the recycling materials has slightly decreased, the volume of the recycling materials has significantly increased due to online purchasing and more packaging materials.
- Estimated 2020 total collection material forecasted for:
  - 8,600 tonne of garbage,
  - 6,600 tonne of organic materials, and
  - 3,500 tonne of recyclable materials.
- Diversion rate improved 1% in year 2018 and another 1% in year 2019. Due to pandemic, household waste disposal has increased more, resulting in 1% decrease in diversion rate.

<i>Kilograms per Household</i>	2016	2017	2018	2019	2020 (Jan-Aug)
<b>Landfill</b>	140	140	169	191	147
<b>Recycling</b>	118	118	126	126	83
<b>Organics</b>	133	133	182	247	196
<b>Total</b>	391	391	477	564	425
<b>Diversion Rate</b>	<b>64%</b>	<b>64%</b>	<b>65%</b>	<b>66%</b>	<b>65%</b>

### 2021 Opportunities and Initiatives

Growth was projected at 1.2% but in the first 8 months (Jan-Aug) 2020, growth has reached 2.0% with over 300 new accounts being added to existing refuse collection routes. Occasionally, the sanitation team has been unable to complete all collections. Compounding the issue is increased vehicle downtime as a result of the increased pressures on the fleet.

The Sanitation fleet consists of nine full time units and two spare. A new vehicle was ordered in Spring 2019 and is anticipated to come in to service in September 2020. This new truck should reduce route sizes to more manageable levels. In the meantime the Fleet Department is working to add an additional spare unit to the fleet to reduce the impacts of vehicle downtime.

- Lead times on new refuse collection vehicles have grown considerably from around 30 weeks to 60 weeks at present, meaning that funds need to be committed earlier for trucks that will be put in to service in the future. With robust growth continuing into 2021 and the extended lead times on new vehicles, staff need to plan now to prevent further under resourcing in 2021 and beyond.
- Landfill tipping fees continue to increase with fees for 2020 at \$130 per tonne moving to \$135 in mid 2021.
- 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 a Sanitation Service Review.
- Illegally dumped waste, needles and littering problems in the downtown core continue to swamp the Sanitation City Patrol and the Bylaw Departments. Additional resources, at least on a temporary basis, are likely required.
- Staff have developed a process for operators to report observed contamination and then to communicate/educate the residents. Reducing recycling contamination would be a priority in 2021.
- Staff has reviewed the collection work load and initiated routing optimization to increase efficiencies and collection capacity with modified zones and routes for 2021.
- Staff have developed carts inventory management process.
- Staff have initiated review of 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	931
Bowen Cemetery	Closed for sales of new plots. Open to burials in existing plots.	14,701
Wellington Cemetery	Closed for sales of new plots. Open to burials in existing plots.	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.

### 2020 Achievements

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. Year to date (August 31) in 2020, there have been 49 interments conducted, including 14 full burials and 35 cremation burials.

### 2021 Opportunities and Initiatives

- 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 2020-2021.



# Public Works

## PROPOSED OPERATING BUDGET - PUBLIC WORKS

	2020	2021	2022	2023	2024	2025
<b>Revenues</b>	<b>Approved Budget</b>	<b>Draft Budget</b>	<b>Draft Budget</b>	<b>Draft Budget</b>	<b>Draft Budget</b>	<b>Draft Budget</b>
Cemetery Operations	\$ 74,500	\$ 74,500	\$ 75,245	\$ 75,998	\$ 76,758	\$ 77,525
Drainage	41,500	41,205	41,629	42,058	42,491	42,928
Fleet Operations	-	-	-	-	-	-
Public Works Support Services	450,000	445,000	453,850	462,877	472,084	481,473
Solid Waste Management	6,003,045	6,429,186	6,624,588	6,853,683	7,057,120	7,264,418
Transportation	69,484	73,384	74,118	74,860	75,608	76,733
<b>Annual Operating Revenues</b>	<b>\$ 6,638,529</b>	<b>\$ 7,063,275</b>	<b>\$ 7,269,430</b>	<b>\$ 7,509,476</b>	<b>\$ 7,724,061</b>	<b>\$ 7,943,077</b>
<b>Expenditures</b>						
Cemetery Operations	\$ 273,598	\$ 267,475	\$ 280,986	\$ 286,604	\$ 292,337	\$ 298,179
Drainage	2,215,082	2,220,999	2,301,118	2,347,131	2,394,083	2,441,957
Fleet Operations	2,767,774	2,748,084	2,804,465	2,860,543	2,917,746	2,976,267
Public Works Support Services	1,779,387	1,797,907	1,851,105	1,887,979	1,925,589	1,964,482
Solid Waste Management	6,502,552	6,940,454	7,166,953	6,956,995	6,657,075	6,763,358
Transportation	6,371,666	6,474,916	6,607,213	6,733,626	6,896,769	7,076,712
<b>Annual Operating Expenditures</b>	<b>\$ 19,910,059</b>	<b>\$ 20,449,835</b>	<b>\$ 21,011,840</b>	<b>\$ 21,072,878</b>	<b>\$ 21,083,599</b>	<b>\$ 21,520,955</b>
<b>Net Annual Operating Expenditures</b>	<b>\$ 13,271,530</b>	<b>\$ 13,386,560</b>	<b>\$ 13,742,410</b>	<b>\$ 13,563,402</b>	<b>\$ 13,359,538</b>	<b>\$ 13,577,878</b>
Staffing (FTEs)	69.8	69.8	70.8	70.8	70.8	70.8

## PROPOSED OPERATING BUDGET - PUBLIC WORKS

	2020	2021	2022	2023	2024	2025
<b>Expenditure Summary</b>	<b>Approved Budget</b>	<b>Draft Budget</b>	<b>Draft Budget</b>	<b>Draft Budget</b>	<b>Draft Budget</b>	<b>Draft Budget</b>
Wages & Benefits	\$ 6,991,743	\$ 7,149,647	\$ 7,365,035	\$ 7,571,787	\$ 7,723,356	\$ 7,877,930
Services & Supply Contracts	4,691,145	4,979,123	5,099,617	5,194,836	5,298,739	5,404,707
Materials & Supplies	2,772,184	2,769,210	2,871,957	2,933,376	2,994,830	3,057,498
Utilities	1,776,189	1,703,670	1,737,743	1,772,499	1,807,947	1,844,107
Internal Charges & Other	2,431,445	2,557,423	2,639,627	2,784,600	3,046,741	3,103,397
Debt Servicing	1,247,353	1,288,562	1,295,617	813,491	209,651	230,935
Grants & Subsidies	-	2,200	2,244	2,289	2,335	2,381
<b>Annual Operating Expenditures</b>	<b>\$ 19,910,059</b>	<b>\$ 20,449,835</b>	<b>\$ 21,011,840</b>	<b>\$ 21,072,878</b>	<b>\$ 21,083,599</b>	<b>\$ 21,520,955</b>

# Public Works

## PROPOSED OPERATING BUDGET - SANITARY SEWER

	2020	2021	2022	2023	2024	2025
<b>Revenues</b>	<b>Approved Budget</b>	<b>Draft Budget</b>	<b>Draft Budget</b>	<b>Draft Budget</b>	<b>Draft Budget</b>	<b>Draft Budget</b>
Sanitary Sewer	\$ 7,811,142	\$ 8,344,863	\$ 8,760,394	\$ 8,847,998	\$ 8,936,478	\$ 9,025,937
<b>Annual Operating Revenues</b>	<b>\$ 7,811,142</b>	<b>\$ 8,344,863</b>	<b>\$ 8,760,394</b>	<b>\$ 8,847,998</b>	<b>\$ 8,936,478</b>	<b>\$ 9,025,937</b>
<b>Expenditures</b>						
Sanitary Sewer	\$ 4,078,519	\$ 4,294,593	\$ 4,453,613	\$ 4,528,542	\$ 4,665,894	\$ 4,814,113
<b>Annual Operating Expenditures</b>	<b>\$ 4,078,519</b>	<b>\$ 4,294,593</b>	<b>\$ 4,453,613</b>	<b>\$ 4,528,542</b>	<b>\$ 4,665,894</b>	<b>\$ 4,814,113</b>
<b>Net Annual Operating Revenues</b>	<b>\$ 3,732,623</b>	<b>\$ 4,050,270</b>	<b>\$ 4,306,781</b>	<b>\$ 4,319,456</b>	<b>\$ 4,270,584</b>	<b>\$ 4,211,824</b>
Staffing (FTEs)	9.8	9.8	9.8	9.8	9.8	9.8

	2020	2021	2022	2023	2024	2025
<b>Expenditure Summary</b>	<b>Approved Budget</b>	<b>Draft Budget</b>	<b>Draft Budget</b>	<b>Draft Budget</b>	<b>Draft Budget</b>	<b>Draft Budget</b>
Wages & Benefits	\$ 1,044,925	\$ 1,099,044	\$ 1,121,028	\$ 1,143,445	\$ 1,166,316	\$ 1,189,640
Services & Supply Contracts	255,161	295,691	301,605	307,633	313,788	320,058
Materials & Supplies	521,396	549,995	570,990	578,954	587,048	595,265
Utilities	34,700	33,350	34,017	34,698	35,391	36,099
Internal Charges & Other	1,854,944	1,883,921	1,920,398	1,957,605	1,995,559	2,034,267
Debt Servicing	363,393	428,592	501,495	502,045	563,547	634,454
Grants & Subsidies	4,000	4,000	4,080	4,162	4,245	4,330
<b>Annual Operating Expenditures</b>	<b>\$ 4,078,519</b>	<b>\$ 4,294,593</b>	<b>\$ 4,453,613</b>	<b>\$ 4,528,542</b>	<b>\$ 4,665,894</b>	<b>\$ 4,814,113</b>

## PROPOSED OPERATING BUDGET - WATERWORKS

	2020	2021	2022	2023	2024	2025
	Approved Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget
<b>Revenues</b>						
Water	\$ 21,618,184	\$ 22,714,462	\$ 23,867,568	\$ 25,077,843	\$ 26,348,126	\$ 27,681,403
<b>Annual Operating Revenues</b>	\$ 21,618,184	\$ 22,714,462	\$ 23,867,568	\$ 25,077,843	\$ 26,348,126	\$ 27,681,403
<b>Expenditures</b>						
Water	\$ 10,787,334	\$ 10,927,876	\$ 11,165,398	\$ 11,409,773	\$ 11,661,254	\$ 11,920,072
<b>Annual Operating Expenditures</b>	\$ 10,787,334	\$ 10,927,876	\$ 11,165,398	\$ 11,409,773	\$ 11,661,254	\$ 11,920,072
<b>Net Annual Operating Revenue</b>	<b>\$ 10,830,850</b>	<b>\$ 11,786,586</b>	<b>\$ 12,702,170</b>	<b>\$ 13,668,070</b>	<b>\$ 14,686,872</b>	<b>\$ 15,761,331</b>
Staffing (FTEs)	29.5	29.5	29.5	29.5	29.5	29.5

\* Restated budget reflects allocations of committed contingency as a result of CUPE contract settlement

	2020	2021	2022	2023	2024	2025
	Approved Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget
<b>Expenditure Summary</b>						
Wages & Benefits	\$ 3,568,204	\$ 3,630,391	\$ 3,702,998	\$ 3,777,062	\$ 3,852,600	\$ 3,929,650
Services & Supply Contracts	731,841	721,058	735,478	750,180	765,186	780,494
Materials & Supplies	1,745,925	1,775,415	1,837,428	1,902,008	1,969,288	2,039,369
Utilities	282,820	249,725	254,720	259,813	265,010	270,311
Internal Charges & Other	2,703,729	2,759,176	2,803,859	2,849,441	2,895,931	2,943,361
Debt Servicing	1,748,065	1,785,361	1,824,150	1,864,489	1,906,443	1,950,075
Grants & Subsidies	6,750	6,750	6,765	6,780	6,796	6,812
<b>Annual Operating Expenditures</b>	<b>\$ 10,787,334</b>	<b>\$ 10,927,876</b>	<b>\$ 11,165,398</b>	<b>\$ 11,409,773</b>	<b>\$ 11,661,254</b>	<b>\$ 11,920,072</b>

\* Restated budget reflects allocations of committed contingency as a result of CUPE contract settlement