

CAPITAL FUND - 2018 Capital Projects

		2018	
		Budget	IT
		Recommended	Reserve
		(\$000s)	(\$000s)
General Government	Page		
Information Technology			
Network Upgrades	145	30	30
GIS Enhancements	148	40	40
Server and Storage Replacements	150	56	56
Communication Infrastructure Renewal	152	25	25
Security Cameras	154	35	35
Secondary Site & Data Replication	156	20	20
Website/ Service Enhancements	158	25	25
Virtualization	169	25	25
Door Access Controls	160	20	20
Multi-function Devices and Printers	162	50	50
Computer Aided Dispatch Workstations & Monitors	270	75	75
Subtotal		401	401

CAPITAL FUND - 2018 Capital Projects

Department/Division Public Safety / Yellowknife Fire Division
 Project Computer-Aided Dispatch Workstations and Monitors

Expenditures & Funding Sources	2016 \$	2017 \$	2018 \$	Total Estimated Cost \$
Capital Cost			75,000	75,000
O&M Expenses				
Total:				
IT Reserve			75,000	75,000

Purpose

To ensure proper response times for emergency personnel when responding to the public and continue the monitoring of the City's water and sewer infrastructure.

Background

Computer-Aided Dispatch was approved by Council for 2014 and introduced at the City for the new dispatch operations in 2015. The existing workstations and monitors were acquired and deployed at that time.

This is a mission-critical function and equipment downtime presents an unacceptable risk to the City. These workstations are used on a 24-hour basis for Public Safety and Public Works dispatching and radio checks. It is therefore recommended that the associated hardware be replaced once it has provided three years of service.

If this replacement does not proceed, there is considerable risk of equipment downtime and/or failure. Recent experience has repeatedly shown that workstations and monitors become increasingly problematic throughout their service life and that by the fourth year of service problems and even complete failures are frequent. Forcing this equipment to last beyond three years will significantly increase the

chance of downtime – an unacceptable situation in a critical service like Dispatch – and will require inordinate amounts of technical support time, which could be more effectively invested in other areas.

Triple Bottom Line

Social

This project allows for the continued response to emergency situations by City responders providing a sense of safety to our residents. It also allows for the continued crucial monitoring of the City's water and sewer infrastructure through the Supervisory Control And Data Acquisition (SCADA) system.

Economic

This project is an investment in the City's emergency response capabilities. It is a proactive solution to ensure that emergency responders are dispatched accordingly for our residents, and ensures the continuous improvement of infrastructure for the provision of essential services to residents (water, sewer, emergency response).

Environmental

The Yellowknife Fire Division is often dispatched to incidents involving fuels or chemical spills and when dispatched in a timely manner, will



allow for quicker response times and less potential damage to the environment. Further, the monitoring of SCADA allows for after-hours personnel to be notified of issues with the water & sewer system prior to the issue causing a loss of water or the back-up or sewer systems.

Operational Impacts

It will be more cost effective – and present a lower risk to the City – to replace this equipment in a planned and orderly fashion than to experience problems that require excessive troubleshooting and repair or failures that create service outages. The dispatch centre impacts both Public Safety and Public Works essential service operations.

CAPITAL FUND - 2018 Capital Projects

		2018			
		Budget	Formula		Gas Tax
		Recommended	Funding	Grants	Rebate
		(\$000s)	(\$000s)	(\$000s)	(\$000s)
Community Services	Page				
Arenas					
Fieldhouse Track Access Door	273	90	10	80	
Parks/Trails					
Yellowknife Rotary Park -Trail Extension	183	20	20		
Ball Diamonds Upgrade	274	45	45		
Outdoor Recreation Facility	275	3,383	1,972		1,411
Pool					
Re-tiling of Pool interior	276	575	575		
Subtotal		4,113	2,622	80	1,411



CAPITAL FUND - 2018 Capital Projects

Department/Division: Community Services/Facilities Division
Project: Fieldhouse – Track Access Door

Expenditures & Funding Sources	2016 \$	2017 \$	2018 \$	Total \$
Capital Cost			90,000	90,000
O&M Expenses				
Total:				
Formula Funding			10,000	10,000
Grants			80,000	80,000

Purpose

To install an access door to the upper level of the Fieldhouse which will provide for proper monitoring of the facility and ensure fairness to all users.

Background

The Fieldhouse was opened to the public in the fall of 2010 and is now one of the City’s most popular recreation facilities. One of the major attractions of the facility is its 240-metre track.

The access door to the track is on the upper level of the building and, while it is monitored by a video camera, it is difficult to ensure that only people who have cards are able to enter the track area. As a result, the City is losing revenue.

As much as possible, staff follow up with users ensuring that fees are collected however it is often not detected. To ensure controlled access to the track, the City proposes to install a glass security wall leading up the stairs to the track entrance, and to move the card pad that allows access to the bottom of the stairs. This will ensure that the entrance can be properly monitored by staff and will allow for increased user fees and improved security for the track.

This project will allow the City to manage its assets wisely by strategically investing in infrastructure to optimize function and service.

Triple Bottom Line

Social

N/A

Economic

The management of public and corporate assets is optimized and based on continuous improvement of our facilities.

Environmental

The City strives to maintain quality recreational facilities which lead to active and healthy living choices.

Operational Impact

There will be some impact on O&M.

CAPITAL FUND - 2018 Capital Projects

Department/Division Community Services/Facilities Division
Project Ball Diamonds Upgrade

Expenditures & Funding Sources	2016 \$	2017 \$	2018 \$	Total \$
Capital Cost			45,000	45,000
O&M Expenses				
Total:				
Formula Funding			45,000	45,000
Grants				

Purpose

Replace shale on the City's Ball Diamonds to provide for an enjoyable playing experience and to respect the integrity of the game by upgrading the playing surface.

Background

The City directly administers five ball diamonds: two at Fritz Theil, two at Parker Field, and one at William McDonald School. Several of these diamonds use shale which requires periodic replacement and conditioning. This project will allow for the purchase of shale to address this need.

This project will allow the City to manage its assets wisely by strategically investing in infrastructure to optimize function, service and safety.

Triple Bottom Line

Social

Yellowknife has a natural and built environment that contributes to the physical, mental and social well being of all of its residents.

Economic

The management off public and corporate assets are optimized and are based on continuous improvement of our facilities.

Environmental

The City strives to maintain quality recreational facilities which lead to active and healthy living choices.

Operational Impact

This project will be covered under the normal operating budget.



CAPITAL FUND - 2018 Capital Projects

Department/Division: Community Services/Facilities Division
 Project Outdoor Recreation Facility

Expenditures & Funding Sources	2016 \$	2017 \$	2018 \$	Total \$
Capital Cost			3,383,000	3,383,000
O&M				
Other O&M Expenses				
Total:				
Formula Funding			1,972,000	1,972,000
MACA Capital Grant			1,411,000	1,411,000

Purpose

Design and development of a multi-use outdoor facility that would enhance the current recreational facilities within the City.

Background

The City has a number of outdoor recreational sport facilities, including six ball diamonds, three sport (soccer) fields, a 340-metre track, eight tennis courts, one skateboard park, and 17 playgrounds. Many of these facilities are at maximum use and some, such as two soccer fields and the track, do not meet the minimum acceptable standards. The City is currently working on an agreement with Con Mine to obtain eight hectares of land that would be developed into a major outdoor recreational facility. This facility would accommodate a soccer field, four ball diamonds, a track, a skateboard park, a playground and tennis courts and there would still be room for further development.

Phase 1 would develop the supporting infrastructure for the park. That would include upgrading the warehouse currently on the site to accommodate the staff of the Parks Division, as well as an adequate storage and shipping area. The upper part of the facility would provide storage room for all City Departments. Also Included in Phase 1 would be construction of washrooms and concession facilities for the park.

Phase 2 would entail surface preparation and development of the sport fields.

2018 Capital Cost	Develop Supporting Infrastructure	\$1,689,000
	Develop Sports Fields	\$1,694,000
	Total	\$3,383,000

This project will allow the City to manage its assets wisely by strategically investing in infrastructure to optimize function, service and safety.

Triple Bottom Line

Social

Yellowknife has a natural and built environment that contributes to the physical, mental, and social well being of all of its residents.

Economic

The management off public and corporate assets are optimized and are based on continuous improvement of our facilities.

Environmental

The City strives to maintain quality recreational facilities which lead to active and healthy living choices.

Operating Cost Impact

There will be some impact on O&M.

CAPITAL FUND - 2018 Capital Projects

Department/Division Community Services Department / Program Division
 Project Ruth Inch Memorial Pool - Re-Tiling of Pool Interior

Expenditures & Funding Sources	2016 \$	2017 \$	2018 \$	Total \$
Capital Cost			575,000	575,000
O&M Expenses				
Total:			575,000	575,000
Formula Funding			575,000	575,000
Grants				

Purpose

The purpose of this Project is to retile the basin and floor of the Ruth Inch Memorial Pool.

Background

The Ruth Inch Memorial Pool opened its doors to the public in the fall of 1988. The Pool continues to be a popular facility for residents and visitors. In 2010, the City contracted an engineering firm to do a life cycle analysis of the Pool. That study identified items that needed to be addressed to ensure the facility meets or exceeds its life expectancy.

Over the past 26 years, City staff have repaired areas of the tiling in, on and around the pool. These areas have been getting larger over the years, resulting in increased O&M spending and more pressure to complete the work within the annual shut-down period for maintenance.

Some issues that need to be addressed:

- Tank:
- tiles are lifting and the grout has been eroded
 - health concerns: inability to clean the basin properly
 - safety concerns: patrons could cut themselves on the sharp, exposed edges of the tiles
 - aesthetic concerns: rust stains on tiles
 - maintenance concerns: water penetrating the tiles and breaking down the rebar in the slab
- Floor:
- tiles are lifting and the grout has been eroded

- health concerns: inability to clean the floor properly
- safety concerns: patrons could cut themselves on the sharp, exposed edges of the tiles
- aesthetic concerns: mismatched colors (original color is no longer available)
- aesthetic concerns: the facility is showing its age

Triple Bottom Line

Social

The project will enhance that the longevity of our facilities and the ability to provide programs and services to those that wish to participate in them.

Economic

The project falls in line with the City's asset management plan by ensuring that our facilities will reach or exceed their life expectancy.

Environment

N/A

Operational Impact

There will be no effect on the O&M budget.



CAPITAL FUND - 2018 Capital Projects

2018			
		Budget	Formula
		Recommended	Funding
		(\$000s)	(\$000s)
Public Safety	Page		
Directorate			
Wildland Fire Mitigation -Emergency Measures	188	150	150
Fire & Ambulance			
Powered Parking Stalls	278	25	25
Subtotal		175	175

2018			
		Budget	Formula
		Recommended	Funding
		(\$000s)	(\$000s)
Planning & Development	Page		
50 th Street Revitalization	259	1,400	1,400
Subtotal		1,400	1,400

CAPITAL FUND - 2018 Capital Projects

Department/Division Public Safety / Fire and Ambulance Division
Project Powered Parking Stalls

Expenditures & Funding Sources	2016 \$	2017 \$	2018 \$	Total \$
Capital Cost			25,000	25,000
O&M Expenses				
Total:			25,000	25,000
Formula Funding			25,000	25,000
Grants				

Purpose

To provide additional powered parking stalls for Fire Hall staff or other people conducting training at the Fire Hall.

Background

The City's Fire Hall was built in 1989 and opened in 1991. Since that time, there has been one expansion (addition) in 2012 and minor retrofits of some of the operating systems within the facility.

When the building opened in 1991, the Division operated with only 12 full-time firefighters and 3 management staff. Now, weve 4 management staff and 24 full-time firefighters. This presents a problem when there is a full group alert (for larger fires) and an additional 12-15 paid-on-call volunteers show up at the Fire Hall.

Triple Bottom Line

Social

The improvements to the facility will ensure no interruption in essential emergency services to the residents of the City of Yellowknife, contributing to a safe community.

Economic

This project is a strategic investment in Yellowknife's only fire hall and

ensures the provision of emergency services within our community. Improvement and maintenance of our facilities is vital to continued provision of essential services to residents and ensures that our firefighters and visitors have appropriate parking available.

Environmental

Ensuring a powered parking stall during the winter months for YKFD personnel will ensure that employees reduce energy use when warming up their vehicles and sending more toxins into the atmosphere.

Operational Impacts

Aging infrastructure costs have a higher operational cost as they age. This project may have a minimal impact on the Division's O&M budget for electricity as some vehicles are plugging into other areas of the facility.



CAPITAL FUND - 2018 Capital Projects

		2018	
		Budget	M.E.R.
		Recommended	Reserve
		(\$000s)	(\$000s)
Public Works & Engineering	Page		
Fleet Management	281		
1002-05 F-250 W/Service Box		66	66
1155-05 F-350 Flat Deck		65	65
1158-05 F-550 Picker		88	88
1159-05 F-550 Steamer		87	87
1016-07 RAM 2500		67	67
1156-05 F-150		36	36
1021-08 4X2 Ranger		35	35
1072-07 Ranger 4x4		36	36
1123-14 Ford Explorer		64	64
2031-06 LT8500 Sterling Sander		164	164
2032-06 LT8500 Sterling Water		163	163
2060-06 Cat M318C Excavator		248	248
		1,119	1,119

		2018	
		Budget	Formula
		Recommended	Funding
		(\$000s)	(\$000s)
	Page		
Community Energy Plan (CEP) Initiatives	206		
Energy Coordinator		100	100
Solar Panels		150	150
Community Outreach		20	20
Interior LED Lighting		100	100
Design of City Hall Centralizd Boiler System		130	130
Design & Build Second Pellet Boiler at PH#1		600	600
		1,100	1,100

CAPITAL FUND - 2018 Capital Projects

		2018		Water &			MACA
		Budget	Formula	Sewer	M.E.R.	Gas Tax	Capital
		Recommended	Funding	User Fees	Reserve	Rebate	Grant
		(\$000s)	(\$000s)	(\$000s)	(\$000s)	(\$000s)	(\$000s)
Engineering & Garage	Page						
Traffic Lights Communications & Video Detection Equipment	217	80	80				
Roads & Sidewalks							
Road Rehabilitation	220	4,075	1,865				2,210
		4,155	1,945	-	-	-	2,210
Solid Waste Management	Page						
Landfill							
Recycling Depot Paving	282	50	50				
Baling Facility Mechanical Upgrades	266	25	25				
Centralized Composting Program	228	150	150				
Baling Facility Concrete Floor Repairs	284	100	100				
Solid Waste Facility Trash Fencing	286	100	100				
		425	425	-	-	-	-
Pumphouses/Liftstations (PHs/LSs)	Page						
Capital Upgrades	287	65		65			
Potable Water Reservoir Flushing & Cleaning	288	25		25			
Pump Replacement	289	100				100	
Monitoring & Controls Maintenance and Upgrading	291	75		75			
LS#5 Pipe Replacement	293	300				300	
Other							
Water Meter Replacement and Upgrades	294	15		15			
Potable Water Submarine Pipe Inspection	234	30		30			
PH & LS - Genset Installation	295	200				200	
Water & Sewer Infrastructure Replacement	236	3,500		-		3,500	
		4,310	-	210	-	4,100	-
PW Subtotal		11,109	3,470	210	1,119	4,100	2,210



CAPITAL FUND - 2018 Capital Projects

2018 Fleet Replacement Schedule

Unit #:	Description:	Year:	Class:	Replace. Year:	Estimated Budget:	End Use:
1002-05	F-250 W/Service Box	2005	2	2015	65,500.00	Low priority role.
1155-05	F-350 Flat Deck	2005	2	2015	65,500.00	Low priority role.
1158-05	F-550 Picker	2005	3	2017	87,550.00	Trade in.
1159-05	F-550 Steamer	2005	6	2017	87,550.00	Trade in.
1016-07	RAM 2500	2007	2	2017	66,950.00	Low priority role.
1156-05	F-150	2005	2	2015	35,920.00	Low priority role.
1021-08	4X2 Ranger	2008	2	2018	35,050.00	Low priority role.
1072-07	Ranger 4x4	2007	2	2017	36,050.00	Low priority role.
1123-14	1123-14 Ford Explorer	2014	7	2018	64,340.00	Low priority role.
2031-06	LT8500 Sterling Sander	2006	6	2018	163,500.00	Trade in.
2032-06	LT8500 Sterling Water	2006	6	2018	163,500.00	Trade in.
2060-06	Cat M318C Excavator	2006	5	2018	248,000.00	Trade in.
					1,119,410.00	

City of Yellowknife Fleet Replacement Cycle Guidelines Summary:

Class	Description:	Examples:	Life Cycle:
1	Small Equipment	Riding mower, ground thaw, line painter, snowmobiles, ATVs, etc.	Different replacement cycles dependant on use.
2	Light Duty	Cars, vans, half ton trucks, 3/4 ton trucks.	Review after 7 years, replace after 10 years.
3	Medium Duty	One ton to 5 ton trucks, includes zambonis.	Review after 6 years or 100,000 kms, replace after 10 years.
4	Heavy Duty	Trucks/ Trailers used for sanding, snow removal, waste removal, etc.	Review after 6 years or 6000 hrs, replace after 12 years.
5	Heavy Equipment	Loaders, dozers, excavators, backhoes, plows, etc.	Review after 8 years or 10,000 hrs, replace after 12 years.
6	Mobile Tractors	Heavy rollers, sander bodies, steamers, etc.	Review after 8 years or 10,000 hrs, replace after 10 years.
7	Municipal Enforcement	Cars, trucks, SUV ("sport utility vehicles").	Replace after 4 years or 100,000 kms.
8	Emergency Equipment	Fire trucks, tankers, aerial ladder, ambulance, etc.	Replaced based on industry standards and NFPA requirements.
9	Seasonal Vehicles	Any vehicle replaced but still servicable, summer trucks, etc.	Not replaced, removed disposed of if repair costs exceed \$500.
10	Stationary Engines	Used to pump water, sewage, produce emergency power.	Review after 15 years, replacement after 20 years.
11	Specialty Equipment	Graders, street sweepers, vactor trucks, etc.	Replacement depends on the use of the unit.

CAPITAL FUND - 2018 Capital Projects

Department/Division Public Works & Engineering / Solid Waste Management
Project Recycling Depot Paving

Expenditures & Funding Sources	2016 \$	2017 \$	2018 \$	Total \$
Capital Cost			50,000	50,000
Total:				
Formula Funding			50,000	50,000
Grants				

Purpose

To provide a smooth, paved surface for four of the City's recycling depots, creating a cleaner public area.

Background

The City of Yellowknife operates six recycling depots in various locations around the city where residents can dispose of recyclables such as paper, cardboard, plastics and tin. These depots play an important role in making residential recycling possible. This capital project would provide hard surfacing (asphalt) of four of the six recycling depots that are currently sitting on gravel pads. The proposed asphalt surface will improve operations and result in a cleaner, more efficient depot.

Recycling depots set on gravel pose two major issues: the difficulty of cleaning up trash around the bins and the tendency for the recycling bins to dig into the gravel during loading and unloading, rather than rolling smoothly on and off the trailer for transport to the Solid Waste Facility. A smooth, paved surface would reduce the amount of time staff spend cleaning the depots and allow the bins to load and unload safely.

Triple Bottom Line

Social

This project will provide a paved area that will be free of water and muddy conditions for public use when visiting the recycling depots.

Economic

Increased use of recycling depots will divert more waste from the landfill which has costs associated. Providing a cleaner area will encourage residents to recycle.

Environmental

Recycling is a major initiative that diverts materials from being landfilled. All these activities contribute to prolonging the life of landfill cells as well as recycling materials for future use, rather than putting them in the ground.

Operational Impacts

It will take the staff less time to maintain the depots and reduce loading time, both of which will result in better productivity. The less trash there is on the ground at the depots, the less will be blown onto surrounding properties where it has to be collected by staff.





CAPITAL FUND - 2018 Capital Projects

Department/Division Public Works & Engineering / Solid Waste Management
Project Baling Facility Concrete Floor Repairs

Expenditures & Funding Sources	2016 \$	2017 \$	2018 \$	Total \$
Capital Cost			100,000	100,000
Total:				
Formula Funding			100,000	100,000
Grants				

Purpose

To complete repairs to the concrete tipping floor in the Baling Facility.

Background

The City of Yellowknife Baling Facility is the center of the landfill and recycling operations. In 2014 the Baling Facility produced 7,860 waste bales and 1,618 recycling bales. Due to the high volume of usage the Baling Facility experiences wear and tear on its mechanical and structural systems. Solid waste contains harmful and corrosive products which ultimately cause erosion of the concrete floor. In order to maintain a safe and efficient workplace, the City needs to repair the floor.

In order to maintain a high level of production in the Baling Facility, the concrete floor needs to be kept smooth. Uneven work surfaces increase the chance of an incident, as the cutting edge of a vehicle's bucket can catch the uneven surface. The resulting sudden stop or jarring motion could cause operator injury or equipment damage.

Triple Bottom Line

Social

This project will provide City staff and contractors with a better working environment while inside the building.

Economic

This project is an investment in maintaining the infrastructure at the Solid Waste Facility and will help to maintain safe working activities inside the facility.

Environmental

An efficiently operating Baling Facility enables the City to properly dispose of municipal solid waste which will have a positive environmental impact.

Operational Impact

Operating equipment on a smooth, level surface reduces wear and tear on equipment, minimizing the cost of maintenance.





CAPITAL FUND - 2018 Capital Projects

Department/Division Public Works & Engineering / Solid Waste Management
Project Trash Fencing

Expenditures & Funding Sources	2016 \$	2017 \$	2018 \$	Total \$
Capital Cost			100,000	100,000
Total:				
Formula Funding			100,000	100,000
Grants				

Purpose

To purchase and install fencing around the active landfill cells to decrease the amount of windblown debris.

Background

The Solid Waste Facility (landfill) is challenged daily with windblown garbage. In order to protect the surrounding environment and wildlife it is proposed to install additional fencing around the active landfill areas (construction area, collection areas, landfill cells).

Trash fencing will allow garbage to gather along the fence lines, making clean-up of windblown garbage easier and less time consuming for staff. It will give a cleaner appearance to the Solid Waste Facility as a whole, and provide protection for the staff from wildlife.

Triple Bottom Line

Social

This project will allow City staff to mitigate as much windblown debris as possible which accumulates in the natural spaces surrounding the facility such as the Yellowknife Ski Club across the highway.

Economic

Creates a more efficient and more effective use of staff time.

Environmental

Reducing windblown debris will create a cleaner landfill facility and surrounding environment.

Operational Impacts

With less time spent collecting windblown garbage at the Solid Waste Facility site, staff will have more time to spend on other regular duties associated with the proper operation of the facility.



CAPITAL FUND - 2018 Capital Projects

Department/Division Public Works & Engineering / Water and Sewer
 Project Pumphouse and Liftstation Capital Upgrades

Expenditures & Funding Sources	2016 \$	2017 \$	2018 \$	Total \$
Capital Cost			65,000	65,000
Total:				
Water & Sewer User Fees			65,000	65,000
Grants				

Purpose

To continue upkeep and maintenance on large capital expenditures associated with various City pumphouses and liftstations.

Background

The City's six pumphouses and 14 liftstations are aging and some require increased architectural care and maintenance. These buildings have worn-out exterior cladding and inefficient windows, and it is suggested that insulation and windows be upgraded to reduce heating costs. This, in conjunction with new siding and roofing, will reduce operating costs for the buildings and help them to blend better with the surrounding neighbourhood. The amount of work that can be completed is budget-dependent.

In addition to the architectural upgrades, mechanical and electrical upgrades are required for the heating and ventilation systems. The upgrades include installation of energy-efficient furnaces and boilers, double-walled or self-contained fuel storage tanks and upgrades to air handling units.

Triple Bottom Line

Social

The City's pumphouses and liftstations are part of neighborhoods and have a visual presence. In addition to keeping the facilities in a good state of working order, they need to be visually maintained as being part of the make-up of a neighborhood.

Economic

This project invests in the City's water and sewer infrastructure and helps to address infrastructure deficit gaps that result from aging infrastructure.

Environmental

Activities such as fuel tank replacements will reduce the risk of spills that can contaminate the local environment.

Operational Impacts

Improving insulation and replacing the siding, roofing and windows will reduce heating costs and eliminate the need to paint every three to four years.



CAPITAL FUND - 2018 Capital Projects

Department/Division Public Works & Engineering / Water and Sewer
 Project Potable Water Reservoir Flushing and Cleaning

Expenditures & Funding Sources	2016 \$	2017 \$	2018 \$	Total \$
Capital Cost			25,000	25,000
Total:				
Water & Sewer User Fees			25,000	25,000
Grants				

Purpose

To carryout annual and cleaning of the City's potable water reservoirs to maintain safe and high quality drinking water for residents.

Background

The City has three water storage reservoirs that provide potable drinking water to our residents, as well as firefighting capabilities. The City's Water Licence MV2009L3-0007 was renewed with a condition that the main reservoir be cleaned. To remain compliant with its licence, the City should clean the main reservoir at Pump Houses #3 and #4.

Public Works & Engineering recommends the flushing, cleaning and repair of the City's water reservoirs once a year on a three-year cycle, as there are three reservoirs.

Flushing the reservoir requires advanced planning and management. The process includes draining the reservoir, removing and disposing of the sediment, and disinfecting the interior of the reservoir, all while maintaining a continuous water supply to the city. An additional requirement during the flushing is to evaluate the walls and grout small cracks.

Triple Bottom Line

Social

This project ensures that the City of Yellowknife is maintaining a safe and high quality drinking water for residents.

Economic

This is a direct investment in the City's potable water system and part of ongoing maintenance of the water reservoirs. It removes debris from the system which gains efficiencies in the addition of chlorine as part of the disinfection process.

Environmental

This project has minimal environmental impacts. Any debris removed from the reservoir can be disposed of at the Fiddler's Lagoon sewage treatment area.

Operational Impacts

Less debris in the reservoir will improve the effectiveness of the chlorine added to the water. This will increase the free chlorine residual and, in turn, reduce the quantity of chlorine required for disinfection. Additional savings will occur when any cracks found in the reservoir walls are filled and leaks abated.



CAPITAL FUND - 2018 Capital Projects

Department/Division Public Works & Engineering / Water and Sewer
 Project Pump Replacement for Pumphouses and Liftstations

Expenditures & Funding Sources	2016 \$	2017 \$	2018 \$	Total \$
Capital Cost			100,000	100,000
Total:				
Gas Tax Rebate			100,000	100,000
Grants				

Purpose

To continue replacing pumps at City of Yellowknife pumphouses and liftstations on a regularly scheduled basis.

Background

The City has six pumphouses and 12 liftstations which, along with water and sewer pipe networks, make up its water distribution and sewage collection system. Each station contains between two and nine pumps. Liftstations also use communitors (sewage grinders) to break down sewage before it returns to the collection system. The pumps and grinders must be maintained in order to ensure a continuous supply of water and discharge of sewage for residents. Failure of pumps or grinders at any liftstation can result in a sewage overflow, which has occurred in the past, resulting in sewage entering people’s homes. In 2003, a sewage overflow at Liftstation #6 cost the City \$25,000 for remediation.

Pump rebuilding costs about \$7,000 to \$25,000 per pump, while replacement costs \$10,000 to \$35,000 per pump. The costs to rebuild or replace a communitor are \$30,000 and \$80,000, respectively. Larger pumps, used in Liftstations #5 and #6, cost between \$30,000 and \$40,000 to replace.

A new standard for electric motors has been determined by the Water & Sewer Division. The new motor specification is more efficient and capable of upgrades to variable frequency drive in the future. Levels of

maintenance have also increased to ensure efficiencies are of the highest possible level. In many instances, specialized personnel and equipment must be utilized to achieve this level. Public Works & Engineering staff continues to improve the efficiency of the water and sewer service and increase maintenance standards to provide a high level of service to residents.

Based on standard industry procedure and the experience of Public Works & Engineering staff, pumps are to be replaced after approximately 25 years of operation. Pumps and communitors have been installed at different times, so the replacement dates of these items will be spread out. The high number of components and the high cost of repairs justify a capital expenditure that can be allocated to repair and replacement of these pumps and communitors.

Public Works & Engineering estimates that the total replacement value of the pumps is approximately \$1.6 million, and proposes to spend about \$100,000 per year for pump replacements and monitoring to continue the orderly replacement of pumps that are in poor condition.

Triple Bottom Line

Social

This project will ensure properly operating pumps for pumphouses and liftstations, which provide the residents of Yellowknife with essential water and sewer services.

Economic

Standard replacement of pumps is a proactive maintenance approach which has shown to be more economical than a reactive approach of replacing pumps due to failure.

Environmental

Failure of pumps can lead to situations such as sewage overflows which have a direct, and negative impact on the natural environment and local neighbourhoods where pumphouses and liftstations are located.

Operational Impacts

Generally, newer pumps are more efficient, requiring less energy to run. O&M funding should decrease as a result. Utility costs will be reduced and call-outs to check on failed pumps will also be reduced.



CAPITAL FUND - 2018 Capital Projects

Department/Division Public Works & Engineering / Water and Sewer
 Project Monitoring and Controls Maintenance and Upgrading

Expenditures & Funding Sources	2016 \$	2017 \$	2018 \$	Total \$
Capital Cost			75,000	75,000
Total:				
Water & Sewer User Fees			75,000	75,000
Grants				

Purpose

To re-establish ongoing investment in the City’s Supervisory Control and Data Acquisition (SCADA) system, this will continue to upgrade antiquated PLCs and communications between City facilities.

Background

In a three-phase program from 1997 through 2000, the City began automating all of its pump houses and lift stations. In addition, the City installed a dedicated communication line to interconnect its most crucial facilities in order to avoid the characteristic interruptions of a telephone line. Many parts are now obsolete and, with the advancement of computer technology, some replacement parts are no longer available and upgrades are required. The City’s new Water Treatment Plant project is the hub for the City’s SCADA system. The upgrading that has been continuous since 2007 will ensure up-to-date equipment and proper surveillance of the City’s water and sewer systems. The SCADA system allows all City facilities to be monitored via software called Wonderware. This software can show countless alarms and situations that exist in the pump houses and lift stations, such as door entry alarms or high level alarms in sewage wet wells that could result in sewage overflows.

Triple Bottom Line

Social

This project will ensure that the SCADA system remains functional and up to date. It will allow the City to be more reactive and responsive to

situations that may occur at water pump houses or sewage lift stations.

Economic

Having a properly operating SCADA system will allow City staff to address issues in a timely manner which could potentially save thousands of dollars in system down time or clean-up costs depending on the scenario. It is a necessary investment in the City’s water and sewer infrastructure and support system.

Environmental

If City staff is more responsive it can have a positive impact on the environment. A malfunction of equipment in a sewage lift station could result in an overflow situation which can contaminate the environment and local neighbourhoods. A properly operational SCADA system will inform staff immediately of a problem, which can be fixed before any damage can occur.

Operational Impacts

The upgrades to the monitoring and controls system will effectively increase the efficiency of the system and reduce operational maintenance by reducing the number of call-outs. With the proper repair of the SCADA system, Water & Sewer trades workers will be able to reduce building inspections and spend more time repairing worn components. Implementation of new water quality monitors will relieve the need for weekend rounds, improve compliance with water quality regulations and satisfy public expectations.



CAPITAL FUND - 2018 Capital Projects

Department/Division Public Works & Engineering / Water and Sewer
 Project Liftstation #5 Pipe Replacement

Expenditures & Funding Sources	2016 \$	2017 \$	2018 \$	Total \$
Capital Cost			300,000	300,000
Total:				
Gas Tax Rebate			300,000	300,000
Grants				

Purpose

To replace deteriorated pipe at the City’s main sewage lift station as a proactive approach to the operation and maintenance of this facility.

Background

Liftstation #5 is the main lift station for the city. All but one of the other lift stations in the city pump sewage to this facility and from there it is pumped to Fiddler’s Lake Lagoon. With twelve lift stations pumping to Liftstation #5, it is vital that it function at peak operating performance. Shutdowns for unplanned repairs are not viable as that would allow untreated sewage to flow into Kam Lake, and there are not enough trucks in Yellowknife to haul the sewage to the lagoon if a break should occur.

The pipe at Liftstation#5 has deteriorated over time to the point that it is now 40% of its original thickness. Average thickness at elbow bends is 50% of original thickness and most straight-run pipes are 60% to 65% of original thickness (A.D. Williams Engineering, November 2004). Leaks require repair approximately every two months. Should pipe replacement not be completed, it is inevitable that a main pipe break will occur resulting in the City being unable to remove sewage. The age of our water and sewer infrastructure is such that the City will have to rebuild the piping of a pump house or lift station yearly to avoid catastrophic failure.

Triple Bottom Line

Social

This project will allow the City to continue providing residents with essential water and sewer services. Liftstation #5 is one of the most vital pieces of the sewage disposal system. A failure in this infrastructure could have large impacts on residents, depending on its nature and severity.

Economic

This is a necessary investment in a vital piece of the City’s infrastructure. The cost of a pipe failure in this facility could be very costly and difficult to manage. The proactive replacement of this pipe is essential in proper management of the sewage disposal system.

Environmental

Given that all twelve lift stations feed into Liftstation #5, a main pipe break would have costly impacts on the surrounding environment and staff required to handle the sewage flow. It is necessary to invest in this infrastructure before such an event occurs

Operational Impacts

The welded pipe will be replaced with Victaulic-style connectors. Replacement piping will be coated with epoxy paint to prolong its life cycle theoretically. As a result of this project, future repairs may be done by City crews at significant cost savings.

CAPITAL FUND - 2018 Capital Projects

Department/Division Public Works & Engineering / Water and Sewer
 Project Water Meter Replacement and Upgrades

Expenditures & Funding Sources	2016 \$	2017 \$	2018 \$	Total \$
Capital Cost			15,000	15,000
Total:				
Water & Sewer User Fees			15,000	15,000
Grants				

Purpose

To replacing aging water meters with a new computerized model, allowing easier collection of data.

Background

In 1995 the City introduced a water meter replacement program, which began with the replacement or recalibration of the larger commercial units in the city. The remaining old meters were installed in the 1970s and they are now 20 to 30 years old. This replacement plan is intended to bring the City up to par with other major municipalities across Canada.

The aging of the meters has caused operational and maintenance inefficiencies, as well as inaccurate readings, which account for an estimated 12% to 25% of lost revenue to the City. The Corporate Services Department has identified a number of accounts with increased revenue after new meters were installed. In addition, unlike the newer meters installed today, old meters are not compatible with the latest computerized meter-reading and data-processing technology.

Triple Bottom Line

Social

This project will allow City Staff to replace old infrastructure that may produce inaccurate billing information for residents, which could result in billing errors and resident frustration.

Economic

Replacing antiquated water meters will help to close error gaps in data and billing systems and help to recover potential lost revenue from inaccurate meter readings.

Environmental

There are minimal environmental impacts associated with this project.

Operational Impacts

Upgrading the City's water meters to computerized water meters and meter-reading devices will reduce the labour required for meter-reading and data entry into the City's computer system. Also, the new meters have the capability to be upgraded to remote meter-reading. Should this be implemented, there will be a reduction in the amount of staff time spent on meter-reading and data processing in both Public Works and Corporate Services.



CAPITAL FUND - 2018 Capital Projects

Department/Division Public Works & Engineering / Water and Sewer
 Project Pumphouse and Liftstation Genset Installation

Expenditures & Funding Sources	2016 \$	2017 \$	2018 \$	Total \$
Capital Cost			200,000	200,000
Total:				
Gas Tax Rebate			200,000	200,000
Grants				

Purpose

To purchase and install a backup power generator (genset) at Pump House #3 to provide continuous operation during power outages.

Background

The age of our infrastructure is such that the City of Yellowknife will have to rebuild a pumphouse or liftstation genset regularly to avoid catastrophic failure. Gensets (backup generators), provide backup power in case of power failure. Backup power at pump houses is essential to ensure a continuous supply of water to the city.

In the original design for liftstations, backup power was not required because wells could receive sewage for hours and not overflow. With the growth of the city in recent years, however, any power outage lasting longer than 15 minutes at a high-flow time of day creates the risk of a lift station overflow. An overflow would result in sewage flowing into the nearest lake, causing an environmental hazard. The City’s Water Licence now requires all liftstations to have either a backup generator in place or a plan for dealing with sewage from the liftstation during a power outage.

In 2009, the City of Yellowknife started installing gensets in each pump house and lift station. The next facility scheduled to be equipped with or to replace its gensets is Pumphouse #3 in 2018.

Triple Bottom Line

Social

This project will provide redundancy in the City’s water and sewer system which will ensure the constant supply of water and sewer services, even during power outages.

Economic

Constant power provision will ensure constant movement of water, preventing freezing and repair costs. Fewer sewage spills will mean less costs associated with clean up.

Environmental

Fewer sewage spills will mean less impact on the environment and surrounding neighbourhoods.

Operational Impacts

The project would reduce staff time and costs associated with cleanup, should there be an overflow at one of the sewage liftstations.

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