Appendix 1

2017 Water Capital Projects Justification

December 1, 2016

This document provides justifications for the projects in CUI's 2017 capital plan.

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1. Abbreviations & Definitions

ADWF	Average Dry Weather Flow
Class Estimate	Project estimate Class designations range from 1 through 5 with Class 5 being the lowest level of project definition and Class 1 being the closest to full project definition. Class 5 cost estimates are most likely to increase / decrease as subsequent project planning is undertaken and Class 1 estimates are least likely to change. Class 5 cost estimates are typically used at feasibility project level. Class 3 cost estimates are typically used at a preliminary (budgeting) project level. Class 2 cost estimates are typically used at substantive (tender) project definition level.
Fines	The Alberta Government has significant discretion in levying fines for offences under the act; (a) in the case of an individual, to a fine of not more than $100 000 or to imprisonment for a period of not more than 2 years or to both fine and imprisonment, or (b) in the case of a corporation, to a fine of not more than$1 000 000.
FM	forcemain
H2S	hydrogen sulfide
L/S	liters per second
LS	lift station
m^3	cubic meters
MSA	City of Calgary / CUI / City of Chestermere Master Servicing Agreement
OSL	Off-Site Levy
PDWF	Peak Dry Weather Flow
PWWF	Peak Wet Weather Flow
Rate Base	existing residential and commercial customers
RRST	Rainbow Road Sanitary Trunk
UMP	Utility Master Plan
VFD	Variable Frequency Drive
WTS	Water Transfer Station

2. Water System Operations & Projects

CUI's water system distributes water throughout the City from a central reservoir and pump station. Treated water is supplied to the reservoir from The City of Calgary via two supply mains. The reservoir at the corner of Merganser Dr. West and Rainbow Rd is a series of four underground concrete vaults with a storage capacity of 13,600 cubic meters (m3). Storage of the treated water underground avoids contamination from environmental factors and reduces re-chlorination requirements prior to being pumped into the distribution system. The distribution system includes 75 KM of water mains, and the associated valves and fire hydrants as well as individual service connections.

EPCOR is under contract to CUI to ensure the safe and reliable operations of the water system. Services provided under this agreement include: regular bacteriological and water quality testing, installation and replacement of water meters, meter reading, water service connection / disconnection and water service repairs.

2.1. Meter Replacements

Background

Water losses in Chestermere are very high for a relatively new system. System water losses in 2015 were 22% representing 376,000 m^3 of water purchases. CUI set a target of reducing total water losses by 3% in 2016 working towards a longer-term goal of achieving a water loss rate of no more than 10% by 2020.

Water losses are affected by two key factors; operational issues and administrative issues. Operational issues affecting losses include main breaks and service leaks.

More than 4,000 meters in Chestermere are 10 years or older. As meters age, there is an increased risk of failure. Typically, meters fail low, meaning that they produce reads that are much lower than the actual consumption increasing the incidence of administrative water losses.

Scope

Identify at-risk meters by age and correlate to recent meter reading data. Where meter data suggests there could be a problem, these meters will be investigated and replaced as required. This will be an ongoing activity.

Assumptions for cost estimate

Exchange of 83 meters per month * 12 months * $455 = **$453,180 for 2017**

Risk of not executing the work

Customers don't pay for the water they consume, resulting in overall higher costs for all customers as these amounts are recovered through general tariffs. This approach violates the City of Chestermere's "User-Pay" principle as contained in their Strategic Plan. Furthermore, in the absence of accurate meter reads, customers are not able to adapt their behavior to manage costs.

Risk of deferring the work

The more the project gets deferred, the more difficult it will be for CUI to accurately bill customers and zero in on systemic issues contributing to real water losses (leaks, theft etc).

Recommendation

Implement in 2017

3. Sanitary System Operations & Projects

CUI's wastewater system is comprised of a 74 KM network of gravity sewer, more than 15 KM of forcemain and 13 lift stations. Currently all the City's wastewater is collected at Lift Station 10 and pumped to the City of Calgary for treatment through a 450 mm forcemain. A 250 mm forcemain is inactive and on standby for use in emergency situations.

Currently there are four sections of the collection system which are over capacity. This condition can cause sewer surcharging at manholes, backup into street and potentially backups into homes and businesses if backflow preventers are malfunctioning or missing.

Seven of CUIs lift stations do not meet Alberta Environment standards for PWWF. Where PWWF exceeds the pump capacity, the lift station would rely on wetwell and sanitary main storage capacity to meet demands. In the event that there is no storage capacity, back flooding of the gravity system may occur. The following table outlines the required pumping capacity for each of Chestermere's LSs per Alberta Environment standards. The existing firm capacity was established through performance testing which was conducted in the last year by the consultant engaged to draft the UMP.

Liters / Second Pumping Capability				
Lift Station	Existing Firm	Required PDWF	Required PWWF	Remedy Proj. Ref.
1	9.4	3.3	7.2	
2	13.3	12.5	22.3	3.3
3	12	15.5	33.7	3.3
4	71	19.7	49.1	
5	12.9	16.5	23.8	3.4
6	17.5	23.5	35.9	3.4
7	60.1	54.9	98.0	3.4 & 3.5
8	19.2	9.95	18.4	
9	36.5	29.9	51.4	3.8
10	240	135.3	287.1	3.1 & 3.2
11	94	24.1	50.2	
12	51.6	9.2	19.0	

CUI's MSA with the City of Calgary sets effluent quality standards for the wastewater delivered by CUI. Hydrogen sulfide gas levels (H2S) may not exceed instantaneous peaks of 10 ppm or an average of 5 ppm each calendar month. Where CUI fails to meet these standards, the City may, at its discretion, levy fines of up to $30,000 per month.

H2S is a colorless gas with a rotten egg odor and is commonly referred to as 'sewer gas'. Sulfur is present in human waste as organic sulfides. Sulfide containing contaminants in wastewater generate H2S in anaerobic conditions (no oxygen present). H2S is highly poisonous and can start to form sulfuric acid in sewers and lift stations, which will corrode cement and steel structures. As such, the City of Calgary is very diligent in ensuring its customers like CUI are actively managing the H2S levels of the wastewater delivered to its system.

EPCOR is under contract to CUI to ensure the safe and reliable operation of the wastewater system. Services provided under this agreement include: ensuring that lift stations and backup generators are tested for operational readiness, conducting preventative maintenance on the collection system and ensuring that effluent discharged to the City of Calgary meets their effluent standards.

3.1. LS 13 Forcemain ("LS 13 FM")

Background

As described more fully above, Chestermere's sanitary system is currently operating well beyond its designed capacity.

LS 13 (completed mid-2016) was designed to serve as Chestermere's primary LS, pumping Chestermere's wastewater to Calgary. In addition to providing capacity required to relieve the existing system constraints, it has also been designed to accommodate the growth expected over the next 25 years.

LS 13 FM will be required to divert wastewater from LS 13 to the City of Calgary sanitary network.

While not a primary driver for the project, an ancillary benefit of constructing LS 13 FM as a second discharge main to Calgary is the creation of operational redundancy within the system and potentially reducing the amount of emergency wastewater handling in case of a failure in one of the two main LSs.

Scope

Construct 5.5 KM of 550 mm forcemain from LS 13 to connect into the Great Plains Sanitary Trunk.

Budgeted cost and assumptions

$8.4 million based on a Class 3 cost estimate for the construction work including engineering.

Engineering includes only engineering support going forward for finishing the detailed design, tendering support and construction administration.

It is assumed that the gravel roads can be reinstated in gravel and that an upgrade to asphalt pavement is not required.

The costs for this project will be shared between existing rate base customers and developers through the OSL mechanism. When constructed, LS 13 FM will have a total flow capacity of 450 L/S (existing pumps with a 550 mm forcemain); 92 L/S is required to relieve current system constraints by connecting LSs 4, 5 and 12 via LS 13 to Calgary, with the remaining 358 L/S available to serve future development. The actual total project costs will be apportioned on the basis of % asset utilization, CUI estimates that the rate base will bear 20% of the project costs with the balance being recovered through OSLs.

CUIs 2016 capital plan estimated the cost of this project to be $11.466 million with 100% being recovered from developers through the OSL mechanism.

Risk of not doing the work

The existing system does not meet regulatory standards. In the event of major system failure, CUI and its owners are at risk to administrative fines and penalties which could be assessed by Alberta Environment, criminal prosecution and the possible costs and damages resulting from civil litigation.

If this project (together with RRST) are not implemented, new development in the City, especially to the west of Rainbow Road, will need to stop because of the lack of wastewater servicing of these areas.

Risk of deferring the work

The longer the work is deferred, the higher the risk of system failure and associated penalties described above. Deferring this project will also require that the City cease issuing any new development approvals and construction permits until the system is brought into compliance.

Recommendation

Implement in 2017 (design work already awarded).

3.2. Rainbow Road Sanitary Trunk ("RRST") Phase 1

Background

As described more fully above, Chestermere's sanitary system is currently operating well beyond its designed capacity.

LS 13 (completed mid-2016) was designed to serve as Chestermere's primary LS, pumping Chestermere's wastewater to Calgary. In addition to providing capacity required to relieve the existing system constraints, it has also been designed to accommodate the growth expected over the next 50 years.

RRST Phase 1 is required to create relief at LS 10 by diverting flows from LS 4 and LS 12 (including LS 5, once diverted to LS 12) to LS 13. The necessary system relief will only be achieved once both LS 13 FM and RRST are tied into LS 13 and operational.

Scope

0.7 KM of 1050 mm gravity main between Rainbow Falls Gate (connection of LS 4 FM) and LS 13.

Budgeted cost and assumptions

$4.2 million – based on a Class 3 cost estimate for the construction work including engineering.

Engineering includes only engineering support going forward for finishing the detailed design, tendering support and construction administration.

It is assumed that the asphalt roads need to be reinstated in asphalt and that the main can be constructed in the existing road ROW.

The costs for this project will be shared between existing rate base customers and developers through the OSL mechanism. The flows of Phase 1 of RRST will be limited by the capacity of LS 13 including LS 13 FM. When constructed, Phase 1 RRST will receive a total flow of 450 L/S; 92 L/S is required to relieve current system constraints with the remaining 358 L/S available to serve future development. The actual total projects costs will be apportioned on the basis of % asset utilization, CUI estimates that the rate base will bear 20% of the project costs with the balance being recovered through OSLs.

CUIs 2016 capital plan estimated the cost of this project to be $14.148 million with 100% being recovered from developers through the OSL mechanism.

Risk of not doing the work

The existing system does not meet regulatory standards. In the event of major system failure, CUI and its owners are at risk to administrative fines and penalties which could be assessed by Alberta Environment, criminal prosecution and the possible costs and damages resulting from civil litigation.

If this project (together with LS 13 FM) is not implemented, new development in the City, especially to the west of Rainbow Road, will need to stop because of the lack of wastewater servicing of these areas.

Risk of deferring the work

The longer the work is deferred, the higher the risk of system failure and associated penalties described above. Deferring this project will also require that the City cease issuing any new development approvals and construction permits until the system is brought into compliance.

Recommendation

Implement in 2017 (design work already awarded)

3.3. LS 2 & 3 Upgrade and Forcemain

Background

As described more fully above, Chestermere's sanitary system is currently operating well beyond its designed capacity. LS 3 is under capacity and addressing the capacity issue is currently the single greatest priority for CUI as it relates to existing infrastructure replacements and upgrades in Chestermere.

According to the 2015 Draft UMP, LS3 has a pumping capacity of 12 L/S and it needs a capacity of 34 L/S. A large amount of the flow into LS 3 is from LS 2. LS 2 also receives flow from LS 1.

CUIs 2016 capital program included a project to increase the capacity of this station, however, after an investigation by our advisors, it was determined that the planned upgrade would be insufficient. Concurrently, the Draft 2015 UMP was under development and the modeling showed that the gravity collection system downstream of LS 3 is undersized. It was determined that a better approach is to divert the LS 2 flows around LS 3. This project, as proposed, will resolve both issues, the LS capacity and the gravity line being under-sized.

Scope

Increase pump discharge head pressure at LS 2. This would involve installing new pumps and drives at LS 2.

Construct a new forcemain along East Lakeview Rd from LS 2 to just south of Township Road 241A to allow LS 2 to discharge into the LS 4 collection system. The forcemain would be a 200 mm diameter line approximately 1.1 KM long.

Budgeted cost and assumptions

$1.875 million cost is based on a Class 2 estimate and includes 20% contingency

Cost for this project is 100% to the rate base.

Risk of not doing the work

The ADWF to LS 2 is 3.3 L/S. In the event that the LS's pumps fail, there is approximately 6 m^3 of storage in the pump sump (manhole). Under normal conditions, the storage available in the pump sump provides an operator with a maximum of 30 minutes response time; less if the failure occurs during a severe weather event. In this 30 minutes the operator must, arrive at the site, assess the situation, determine whether a fix can be applied immediately. If the operator is unable to repair the LS immediately they would need to arrange for a hydrovac truck or temporary pump and hose to pump the wastewater to the LS 3 catchment area.

Many of the properties in the LS 2 catchment area do not have backflow preventers given that they were not required by the building code at the time the area was developed. Consequently, property damage at the 290 residences in the area resulting from operational failure would likely be high.

The population in the LS 2 catchment area is estimated to be 870 (around 290 residences) that could experience backflow of wastewater into their houses (assuming they are not equipped with backflow preventers).

The existing system does not meet regulatory standards. In the event of major system failure, CUI and its owners are at risk to administrative fines and penalties which could be assessed by Alberta Environment, criminal prosecution and the possible costs and damages resulting from civil litigation.

Risk of deferring the work

The longer the work gets deferred, the higher the likelihood that LS 2 fails or LS 3 floods and a higher risk of experiencing the associated penalties described above.

Recommendation

Continue with the project as scoped. The project charter has been signed, engineering for the work was tendered and awarded to ISL Engineering. Construction is to commence in early 2017.

3.4. LS 5 Forcemain Diversion

Background

LS 5 is equipped with a VFD and throttled to not cause any flooding issues downstream in the wastewater system at LS 6 or LS 7 by pumping PWWF. LS 6, into which LS 5 discharges, is under capacity as is LS 7, which receives flow from LS 6.

Scope

This project will relieve capacity constraints at LS 5 by allowing it to pump PWWF and at LS 6 by diverting flows from LS 5 to LS 12. This brings both LSs into compliance with regulatory standards. It frees up capacity in LS 7 and brings it closer to meeting regulatory requirements while also providing more operator response time in the case of unplanned outages. The additional wastewater flow diversion to bring LS 7 to meet regulatory requirements will be achieved by diverting LS 8 to LS 11 instead of LS 7.

Once LS 13 FM and RRST are constructed, wastewater from LS 5 and LS 12 will be diverted to LS 13 via the RRST, relieving capacity constraints at LS 10.

- Design and construct approx. 250 meters of 150 mm diameter forcemain.
- This includes 160 meters of road replacement and transmission line crossing.
- Capacity upgrades of the pumps are not required, as pumps are equipped with VFD's and currently throttled.

Budgeted cost and assumptions

$0.486 million – costs are based on the UMP (equivalent to a Class 5 cost estimate) and includes 20% contingency

Cost for this project is 100% to the rate base.

Risk of not doing the work

There is a relatively large risk that one of the three LSs (LS 5, LS 6 or LS 7) fails.

The ADWF to LS 5 is 4.5 L/S. In the event, that the LS's pumps fail there is approximately 9 m^3 of storage in the pump sump (manhole). Under normal conditions, the storage available in the pump sump provides an operator with a maximum of 33 minutes response time, less if the failure occurs during a severe weather event. In this 33 minutes, the operator must arrive at the site, assess the situation and determine whether a fix can be applied immediately. If the operator is unable to repair the LS immediately, they would need to arrange for a hydrovac truck or temporary pump to pump the wastewater to the LS 12 catchment area.

If LS 6 fails, LS 5 will need to be shut down immediately to prevent pumping more wastewater into a non-operational wastewater system. Both lift stations will need to be addressed by pumping wastewater to other lift stations or by trucking it out.

If LS 7 fails, both LS 5 and LS 6 will need to be shut down immediately to prevent pumping more wastewater into a non-operational wastewater system. All three lift stations will need to be addressed by pumping wastewater to other lift stations or by trucking it out.

The existing system does not meet regulatory standards. In the event of major system failure, CUI and its owners are at risk to administrative fines and penalties which could be assessed by Alberta Environment, criminal prosecution and the possible costs and damages resulting from civil litigation.

Risk of deferring the work

The longer the work gets deferred, the higher the likelihood that any of the three LSs fail and the higher the risk of experiencing the associated penalties described above.

Recommendation

Implement in 2017

3.5. LS 7 Refurbishment & West Chestermere Drive Gravity Sewer Upgrade

Background

As illustrated in the table in Section 3.0 of this document, LS 7 is identified as having inadequate capacity. The capacity issue is partially being addressed by the projects described in Sections 3.4 and 3.6.

LS 7 has been operational since 1990 and has been identified as requiring a lifecycle refurbishment and/or end of life replacement of the mechanical / structural and electrical components. Approximately $18,000 of safety related work was completed in 2016 with the remaining items to be completed in 2017.

The UMP also identified the collection system upstream of LS 7 consisting of a 250 mm gravity sanitary sewer in West Chestermere Drive (feeding into LS 7 south from the LS 6 catchment area) is over capacity at 221%. A 350 m section needs to be upgraded to 300 / 375 mm diameter pipe.

Scope

Refurbishment: Replace the bulb rack. Remove, refurbish and reinstall the pump. Refurbish the generation equipment and replace the transfer switch and any associated electrical components.

Gravity sewer upgrade: Replace existing gravity sewer 350 m x 250 mm diameter with larger 300 / 375 mm diameter pipe. Includes road replacement.

Budgeted cost and assumptions

$0.969 million comprised of $0.334 million for refurbishment work and $0.635 million to complete the sewer upgrade.

Costs for the refurbishment are based on a Class 3 cost estimate by EPCOR (including 20% contingency).

Costs for the sewer upgrade are based on the UMP (equivalent to a Class 5 cost estimate) and includes 30% contingency.

Cost for this project is 100% to the rate base.

Risk of not doing the work

In the event that the LS's pumps fail, there is approximately 6 m^3 of storage in the pump sump (manhole). Under normal conditions, the storage available in the pump sump provides an operator with a maximum of 6 minutes response time, less if the failure occurs during a severe weather event. In this 6 minutes the operator must arrive at the site, assess the situation, and determine whether a fix can be applied immediately. If the operator is unable to repair the LS immediately, they would need to arrange for a hydrovac truck or temporary pump to pump the wastewater to the LS 2 catchment area.

Many of the properties in the LS 7 catchment area do not have backflow preventers as they were not required by building code at the time the area was developed. Consequently, property damage at the 30 residences in the area resulting from operational failure would likely be high.

The existing system does not meet regulatory standards. In the event of major system failure, CUI and its owners are at risk to administrative fines and penalties which could be assessed by Alberta Environment, criminal prosecution and the possible costs and damages resulting from civil litigation.

Risk of deferring the work

The longer the work gets deferred, the higher the likelihood of system failure and the higher the risk of experiencing the associated penalties described above.

Recommendation

Immediately address safety issues and any concerns that might impact the operation of this LS and postpone other repairs until 2018 or later.

3.6. LS # 8 Forcemain Diversion

Background

As illustrated in the table in Section 3.0 of this document LS 7 is identified as having inadequate capacity, which is partially being addressed by the projects described in Sections 3.4 and 3.5 of this report. A contributing factor to the capacity constraints at LS 7 is that it receives flows from LS 8.

Scope

To alleviate pressure from LS 7, we will divert the effluent from LS 8 to LS 11. This requires tying into the existing forcemain and building a new forcemain from the tie-in point to LS 11.

Diverting the flow from LS 8 to LS 11 distributes the risk more evenly throughout the City and, in addition, should LS 11 fail in the future, it will always be possible to divert LS 8 temporarily back to LS 7.

- Design and construct 100 meters of 150 mm diameter forcemain.
- Includes 100 meters of road replacement.
- Includes adding a valve chamber at the new tie-off to enable diversion of the wastewater from LS 8 to LS 7 or to LS 11, depending on operational requirements or constraints in the wastewater network.
- Does not include capacity upgrades of pumps.

Budgeted cost and assumptions

$0.314 million - costs are based on the UMP (equivalent to a Class 5 cost estimate) and includes 20% contingency.

Cost for this project is 100% to the rate base.

Risk of not doing the work

LS 7 receives the wastewater from approximately one third of the wastewater produced in Chestermere, or about 1,800 residences. A failure at LS 7 would result in significant property damage and could result in the release of untreated sewage into the environment.

In the event that the LS 7's pumps fail there is approximately 6 m^3 of storage in the pump sump (manhole). Under normal conditions, the storage available in the pump sump provides an operator less than 6 minutes response time, less if the failure occurs during a severe weather event. In this 6 minutes the operator must arrive at the site, assess the situation, and determine whether a fix can be applied immediately. If the operator is unable to repair the LS immediately, they would need to arrange for a hydrovac truck or temporary pump to pump the wastewater to the LS 2 catchment area.

The existing system does not meet regulatory requirements. In the event of major system failure, CUI and its owners are at risk to administrative fines and penalties which could be assessed by Alberta Environment, criminal prosecution and the possible costs and damages resulting from civil litigation.

Risk of deferring the work

The longer the work gets deferred, the higher the likelihood of system failure and the higher the risk of experiencing the associated penalties described above.

Recommendation

Implement in 2017.

3.7. LS 8 refurbishment

Background

LS 8 has been in operation since 1995. Lifecycle refurbishments are required.

Scope

Replace the bulb rack. Remove, refurbish and reinstall the pump. Refurbish the generation equipment and replace the transfer switch and any associated electrical components.

Budgeted cost and assumptions

$0.334 million for refurbishment work. Costs for the refurbishment are based on a Class 3 estimate by EPCOR (including 20% contingency).

Cost for this project is 100% to the rate base.

Risk of not doing the work

In the event that the LS's pumps fail there is approximately 6 m^3 of storage in the pump sump (manhole). Under normal conditions, the storage available in the pump sump provides an operator with a maximum of 38 minutes response time, less if the failure occurs during a severe weather event. In this 38 minutes the operator must arrive at the site, assess the situation, and determine whether a fix can be applied immediately. If the operator is unable to repair the LS immediately they would need to arrange for a hydrovac truck or temporary pump to pump the wastewater to the LS 2 catchment area.

LS 8 receives the wastewater from 300 residences. Many of the properties in the LS 8 catchment area do not have backflow preventers given that they were not required by the building code at the time the area was developed. A failure at LS 8 would result in significant property damage and could result in the release of untreated sewage into the environment.

The existing system does not meet regulatory standards. In the event of major system failure, CUI and its owners are at risk to administrative fines and penalties which could be assessed by Alberta Environment, criminal prosecution and the possible costs and damages resulting from civil litigation.

Risk of deferring the work

The longer the work gets deferred, the higher the likelihood of system failure and the higher the risk of experiencing the associated penalties described above.

Recommendation

Finalize scope upon receipt of the consultant's inspection report; implement program to immediately address high priority safety issues in 2017 and postpone other repairs till 2018 or later.

3.8. LS 9 Capacity Upgrade

Background

LS 9 has been in operation since 1999. As illustrated in the table in Section 3.0 of this document LS 9 is also identified as having inadequate capacity.

Scope

Upgrade pumps to be able to meet PWWF

Budgeted cost and assumptions

$0.631 million for refurbishment work. Costs are based on the UMP (equivalent to a Class 5 cost estimate) and includes 20% contingency.

Cost for this project is 100% to the rate base.

Risk of not doing the work

In the event that the LS's pumps fail, there is approximately 12 m^3 of storage in the pump sump (manhole). Under normal conditions, the storage available in the pump sump provides an operator with a maximum of 23 minutes response time, less if the failure occurs during a severe weather event. In this 23 minutes the operator must arrive at the site, assess the situation, and determine whether a fix can be applied immediately. If the operator is unable to repair the LS immediately, they would need to arrange for a hydrovac truck or temporary pump to pump the wastewater to the LS 10 catchment area.

Given the age of development in the LS 9 catchment area, it is assumed that most residences are equipped with backflow preventers as those would have been required by code and, as a result the threat of individual property damage should be low. However, a failure of LS 9 could cause untreated sewage to spill into the street and flow into the Rainbow Falls stormwater system which would result in significant cleanup costs.

The existing system does not meet regulatory standards. In the event of major system failure, CUI and its owners are at risk to administrative fines and penalties which could be assessed by Alberta Environment, criminal prosecution and the possible costs and damages resulting from civil litigation.

Risk of deferring the work

The longer the work gets deferred, the higher the likelihood of system failure and the higher the risk of experiencing the associated damages described above.

Recommendation

Finalize scope upon receipt of the consultant's inspection report; implement upgrade and immediately address safety concerns in 2017.

3.9. Gravity Sewer Sandpiper Blvd

Background

The existing 250 mm gravity sanitary sewer in Sandpiper Blvd feeding into LS 4 from the west is over capacity at 147% and needs to be exchanged with a larger diameter pipe to bring the system into compliance with regulatory standards.

Scope

Replace 320 meters of 250mm gravity sanitary sewer with pipe which is 375 mm.

Budgeted cost and assumptions

$0.450 million. Costs are based on the UMP (equivalent to a Class 5 cost estimate) and includes 20% contingency.

Cost for this project is 100% to the rate base.

Risk of not doing the work

In a heavy rainfall event, the sanitary main might not be able to discharge all of the wastewater to LS4 in a timely manner. As a result, that wastewater would back up through the system. The main in question is 3.6 meters deep and the road surface is rising towards the upstream portions of the main. As such, it is assumed that the main can back up by approximately 2 vertical meters before wastewater starts to back up against the backflow valves of the service connections of the houses. If this occurs, the backup will prevent the wastewater from the individual properties from discharging into the sanitary main.

The catchment area served by this sewer main is growing rapidly which will serve to further stress the existing capacity of this section of pipe. While property damage to individual residences should be mitigated by the backflow preventers (which are required by building code), there is a residual risk of property damage in the event that the backflow preventer failure and could result in the release of untreated sewage into the environment.

The existing system does not meet the regulatory standards. In the event of major system failure, CUI and its owners are at risk to administrative fines and penalties which could be assessed by Alberta Environment, criminal prosecution and the possible costs and damages resulting from civil litigation.

Risk of deferring the work

The longer the work gets deferred, the higher the likelihood of system failure and the higher the risk of experiencing the associated penalties described above.

Recommendation

Implement this project in 2017.

3.10. H2S mitigation LS # 10

Background

The MSA with the City of Calgary has strict limits on H2S levels at the discharge point of the wastewater delivery system. This is currently controlled by injecting chemicals into the system costing approximately $350,000 annually. CUI has been investigating alternatives to chemical treatment in an effort to manage costs and maintain the H2S level compliance in a more environmentally friendly manner. In 2016, CUI conducted a pilot project with an oxygenation system at LS 11. The results of the pilot were successful in using oxygen (compressed air) to treat H2S levels and odor. The oxygenation system has a low operating cost with a 10-year projected expenditure of $1.2 million versus $4 million in O&M costs related to H2S chemical application.

Scope

Supply and Install a containerized oxygen generation system at LS 10. Installation will be done by a contractor to complete the mechanical and electrical tie-ins. This containerized package requires only a concrete or gravel pad from a civil/structural standpoint. The scope also includes engineering to update the drawings of record.

Budgeted cost and assumptions

$0.954 million based on a Class 2 cost estimate from vendor, includes 15% contingency.

Cost for this project is 100% to the rate base.

Risk of not doing the work

The results from the pilot study combined with the vendor's performance in other municipalities gives us confidence that that the system will work as designed, which would eliminate the need for the chemical injection going forward. Financially, this would mean that the project would break even after 3 years. Nevertheless, we investigated the consequences of the oxygenation system not performing as planned. Even if the forcemain still required 50% of the chemical dosing, the system would break even after 7 years.

Given this would be the first application of this system in Canada there is a risk that the system may not work as predicted due to any number of technical and environmental variables. Management will work to mitigate this financial risk via risk sharing mechanisms in the purchase contract.

Risk of deferring the work

Cost savings are deferred if the work is deferred.

Recommendation

Implement in 2017.

3.11. LS 14

Background

In the future, LS 14 will collect all the wastewater from the east side of Chestermere and pump it to LS 13. Based on recent discussions with the City of Chestermere and their development plans in the Chestermere Industrial Lands, indications are that this LS will be required as early as 2019. This would require design work be initiated in 2017 with construction of the LS in 2018.

Scope

Design LS 14.

Budgeted cost and assumptions

$2.53 million; $0.33 million in 2017, balance in 2018. Costs are based on the UMP (equivalent to a Class 5 cost estimate) and includes 20% contingency.

Cost will be recovered 100 % from developers through the OSL mechanism.

Risk of not doing the work

Development in Chestermere Industrial Lands or in developments east of Edgewater can only occur with LS14 being operational. Not building the LS will prevent the lands from being developed.

Risk of deferring the work

The development of the Chestermere Industrial Lands or of the developments east of Edgewater would be delayed if LS 14 is not built in time.

Recommendation

Confirm with the City of Chestermere the progress of the Chestermere Industrial Lands development schedule before starting with the design of the LS.

3.12. LS 14 Forcemain

Background

In the future, LS 14 will collect all the wastewater from the east side of Chestermere and pump it to LS 13 through the LS 14 FM. Based on recent discussions with the City of Chestermere and their development plans in the Chestermere Industrial Lands, indications are that this forcemain will be required as early as 2019. This would require that design be initiated in 2017 with construction completed in 2018.

Scope

Design LS 14 forcemain between LS 14 and LS 13.

Budgeted cost and assumptions

$1.84 million; $0.240 million in 2017 with the balance in 2018. Subject to completion of detailed design.

Costs are based on the UMP (equivalent to a Class 5 cost estimate) and includes 20% contingency.

Cost will be 100% recovered from developers through the OSL mechanism.

Risk of not doing the work

Development in Chestermere Industrial Lands or in developments east of Edgewater can only occur with LS 14 being operational, which required the LS 14 FM. Not building the LS and forcemain will prevent the lands from being developed.

Risk of deferring the work

The development of the Chestermere Industrial Lands or of the developments east of Edgewater would be delayed if LS 14 including the LS 14 FM is not built in time.

Recommendation

Confirm with the City of Chestermere the progress of the Chestermere Industrial Lands development schedule before starting with the design of the LS.

3.13. Security System (Water & Wastewater)

Background

As the CUI owned properties throughout Chestermere are not equipped with security systems and are susceptible to vandalism and other damage, it is prudent to extend the office security system to other CUI owned properties as well.

Scope

Installation of security systems that tie into the existing system at the WTS, as well as LSs 10 and 13.

Installation of security cameras and keypads at the 3 locations.

Budgeted cost and assumptions

$0.06 million – costs based on a Class 3 estimate.

Cost to be covered 100% by rate base.

Risk of not doing the work

No monitoring of the sites, no ability to determine unauthorized access until after the fact.

Risk of deferring the work

The benefits of the security system will be deferred by deferring the projects.

Recommendation

implement in 2017.

4. Stormwater System & Projects

CUI's stormwater system is comprised of a 61 KM network of storm gravity sewers, 1 KM of a storm forcemain, 950 catch basins, 13 storm scepters, six vortechs and seven other chambers within its stormwater network.

4.1. Westmere Pond Gravity Main

Background

As a result of heavy rainfall events in the City of Chestermere on July 12 and July 14, 2015, challenges with the existing discharge and emergency overland escape condition at the Westmere Pond stormwater management facility were encountered. Westmere Pond is located at the NW corner of Chestermere Blvd and Invermere Drive. There is no confirmed data available, but it is understood that preliminary assessments consider the July 12, 2015 storm event to be in the order of a 500-year return period frequency.

Compounding the magnitude of the July 12, 2015 storm event was the loss of power to the area. This caused the pump system, that serves as the primary discharge mechanism for the Westmere Pond, to cease operation. The nature of the emergency overland escape system for the pond then saw excess water encroaching onto Highway 1A / Chestermere Blvd. Emergency pumps were brought in to lower water levels but, flooding into adjacent homes had already occurred. In the past, the use of pumps was acceptable as an interim approach to managing stormwater. However, it is not an industry best practice and certainly not on a permanent basis as is the case at this pond currently. The deficiencies of this approach are evidenced by the failure experienced in the 2015 flood events.

Scope

Detailed design and construction support for the 1.2 KM 450 mm gravity line from Westmere Pond to Chestermere Lake.

Assumptions for cost estimate

$2.538 million – costs based on a Class 3 pre-engineering report by the consultant, Burnside, May 2016. City of Chestermere applied for a grant from the province under the Alberta Community Resilience Program, which if approved, will cover 90% of the total project costs.

Costs to be covered 100% by rate base.

Risk of not doing the work

Other similar flood events as experienced in 2015.

Risk of deferring the work

Civil litigation and costs related to property damage and cleanup costs.

Recommendation

Implement in 2017.