

Naka Power Utilities (Yellowknife) (Naka-YK) 2024-2025 General Rate Application (GRA)

Rebuilds & Pole Replacements

Business Case #01



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SECTION 1 - EXECUTIVE SUMMARY

1. Naka Power Utilities (Yellowknife) (Naka-YK) requires the Rebuilds & Pole Replacements annual program to provide safe and reliable electricity service to the City of Yellowknife (City). This program involves rebuild, replacement, and life extension work with respect to distribution poles and related system components that have been identified as End-of-Life Assets through pole testing programs, overhead line patrols and identification, either by Naka-YK or by third parties, including assessment of appropriate replacement timelines as required.

SECTION 2 - BACKGROUND

2. Typically, assets are identified as End-of-Life Assets due to the risk of physical and/or functional failure and are commonly a result of age-related wear, adverse weather, vehicle damage, or vandalism.

3. Naka-YK utilizes a system to complete annual categorization of the level of urgency for necessary replacements of End-of-Life Assets. End-of-Life Assets are scheduled to be replaced based on safety risks and risks related to customer impacts as follows:

- <u>Category 1</u>: Assets that present an imminent risk of failure that would compromise system reliability or present a public safety risk, which are replaced as soon as practicable; and
- <u>Category 2</u>: Assets with less degradation or damage that do not present an imminent risk, which are replaced within one or more years.

4. Naka-YK uses a coloured tagging system to mark End-of-Life Assets identified as Category 1 or Category 2 assets to ensure that annual rebuild, replacement, and life extension work is properly tracked and completed.

5. In some cases, distribution poles and related system components are further assessed by a qualified technician and an engineer who review the data provided from pole test and treatment reporting to determine an appropriate replacement timeline and treatment.



SECTION 3 - PROJECT DESCRIPTION

6. Once assets have been identified as End-of-Life Assets, they are typically replaced like for like as part of the annual Rebuilds & Pole Replacements program, with timing of the replacement based on their categorization as described above. To allow for increased efficiency, related system components are replaced along with poles where required, and other risk mitigation work may be completed (e.g. line to ground or circuit to circuit clearances) at the same time as the asset replacement. Through these scheduling efficiencies, Naka-YK reduces mobilizations or required scheduled outages to complete overall work in the area and thereby reduces the impact on customers.

7. End-of-Life Assets are fully assessed by an engineer when a different than like for like replacement solution may need to be implemented. In rare cases where new solutions are required, it is often due to a change in construction requirements, change in asset requirements, changes to the surrounding environment or changes required to facilitate improved future system operation and maintenance. For example, if a road is constructed under an existing power line, the clearance requirements are different for road crossings and an adjustment would be required to the line to ground clearances to satisfy CSA requirements.

SECTION 4 - PROJECT SCHEDULE AND COST

8. Forecasts for 2024 and 2025 to complete assessments and determine best solution regarding replacement of poles and related system components are based on historical trends, Naka-YK operational and engineering experience input, and the expected complexity of replacement. Costs for the Rebuilds & Pole Replacements Annual Program are as follows:

Table 1: Rebuilds, Replacements & Life Extensions Annual Program
Costs

2021	2022	2023	2024	2025
Actual			Fore	ecast
\$116,000	\$197,000	\$77,000	\$137,000	\$100,000

9. Annual fluctuations shown are due to variability in physical pole locations, including with respect to site access and ground conditions. This determines how complex assets are to replace, the related system components, the number of identified End-of-Life poles that are required to be replaced within a given year, and prioritizing required in-service dates for customer projects. For example, in 2023 the City completed civil construction in the Kam Lake area which included the addition of a number of streetlights, and Naka-YK was required to complete this work alongside the City and before the winter season. The impact of this increased work load for Naka-YK to install streetlights in 2023 to align with the City's civil construction resulted in fewer pole replacements completed in that year.

SECTION 5 - BUSINESS DRIVERS AND BENEFITS

10. The *Public Utilities Act* imposes the following requirements on Naka-YK:

A public utility shall provide safe, adequate and proper service and keep and maintain its property and equipment so that the public utility can provide the service.¹

11. Naka-YK Rebuilds & Pole Replacements annual program must be completed to meet the above requirement. If Naka-YK does not complete annual work as required under the program, there is risk of negatively impacting reliability and safety as well as creating a backlog of work, impacting future years, based on internal labour and contract services available.

SECTION 6 - EVALUATION OF VIABLE ALTERNATIVES & RECOMMENDATION

12. Naka-YK meets current CSA Canadian Electrical Code for power distribution lines. Naka-YK leverages power line construction and design guidelines from ATCO Electric, which has developed standards to meet the Alberta Electric Utility Code (AEUC) requirements. All standards provided to Naka-YK by ATCO Electric meet or exceed CSA code requirements.

¹ *Public Utility Act*, Section 76 (1).



13. After an End-of-Life Asset is identified, as described above, there are two viable alternatives:

- (a) Apply life extending treatment or equipment. Pole life is currently extended through treatment that is applied during contracted pole testing which primarily protects against deterioration of wood poles due to rot as well as insect, avian, or rodent damage. Other life extending equipment, such as galvanized steel to physically reinforce the pole at the base by extending above and below ground level, are also commonly used on power transmission and distribution poles by utilities. However, the use of steel pole stubs is very limited in Yellowknife due to the prevalence of bedrock throughout the area.
- (b) Replace the End-Of-Life Asset. Replacement will only become warranted after all reasonable measures have been taken to extend the life of the pole and its related system components without compromising Naka-YK's obligation to provide safe and reliable power to its customers.

14. The recommended alternative is to replace End-of-Life Assets, in accordance with timing considerations set out above, if they are assessed to be past their useful life, are at risk of failure, and have the potential to impact to Naka-YK's ability to provide safe and reliable power to its customers.



Naka Power Utilities (Yellowknife) (Naka-YK) 2024-2025 General Rate Application (GRA)

Streetlight Reconstruction & Additions

Business Case #02



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SECTION 1 - EXECUTIVE SUMMARY

1. Naka Power Utilities (Yellowknife) (Naka-YK) completes the Streetlight Reconstruction & Addition Replacement Program on an annual basis to keep the lights on in Yellowknife. The Program is completed in coordination with the City of Yellowknife (City) Water, Sewer and Paving Programs and includes the installation of streetlight conduit, bases, and davits. Working with the City allows Naka-YK to minimize disruption to the residents of Yellowknife and achieve efficiencies (minimizing excavation) through coordination to replace End-of-Life Assets while also adding new additions.

SECTION 2 - BACKGROUND

2. Bi-annually¹ Naka-YK meets with the City to review work plans for the summer construction season. During these meetings, City officials identify areas where the City will be performing civil works. Reconstruction of existing streetlight infrastructure is completed as needed with new streetlights added in areas to ensure current lighting requirements are met or an area currently without streetlighting is fitted with lights upon the City's request.

3. This Streetlight Reconstruction & Addition Replacement Program also includes the replacement of End-of-Life assets and bringing installations up to Naka-YK's current construction standards. Upgrading streetlights, in conjunction with the City's civil construction programs year over year (YoY), allows Naka-YK to continue to ensure the City is well lit in times of darkness. Naka-YK replaces lighting assets near End-of-Life and before reliability issues become significant. Adequate streetlighting is an important function of Naka-YK due to the positive effect of adequate lighting and overall public safety throughout Yellowknife.

SECTION 3 - PROJECT DESCRIPTION

4. Replace or add streetlight infrastructure in conjunction with the City's Water, Sewer, and Paving Programs.

¹ Prior to 2024 the meeting with the City took place annually.



5. Contractors' are selected by the City through a competitive bid process. These contractors' complete excavation as well as install conduits and streetlight bases on behalf of Naka-YK. Naka-YK technicians will install streetlight conductor, davits, and streetlight heads following completion of civil works by the City contractor.

6. The cost of civil construction works completed by the City contractor is shared between Naka-YK and the City. An increase in project costs in 2023 is related to a larger than average increase in streetlight additions – specifically in the Kam Lake area where approximately 30 additional lights were installed at the City's request. No costs are noted for 2024 due to an adjustment made by the City to complete work on their Water, Sewer, and Paving Program every two-years instead of annually. Naka-YK is now forecasting its Streetlight Reconstruction & Addition Program to shift to a bi-annual program to coincide with the City.

SECTION 4 - PROJECT SCHEDULE AND COST

2021 - \$349,000 2022 - \$259,000 2023 - \$970,000 2025 - \$237,000

SECTION 5 - BUSINESS DRIVERS AND BENEFITS

7. The *Public Utilities Act* imposes the following requirements on Naka-YK:

A public utility shall provide safe, adequate and proper service and keep and maintain its property and equipment so that the public utility can provide the service.²

8. Naka-YK's Streetlight Reconstruction & Additions project was, and continues to be, completed to meet the above requirement. Reconstructing and adding streetlight infrastructure in conjunction with the City's Water, Sewer, and Paving Lifecycle Replacement Program allow Naka-YK to replace near End-of-Life assets efficiently.

² *Public Utilities Act*, Section 76 (1).



Sharing of contractor costs for civil construction with the City results in cost savings for Naka-YK which are passed along to its customers through rates.

SECTION 6 - EVALUATION OF VIABLE ALTERNATIVES

9. <u>Alternative 1</u> – Do nothing. Naka-YK does not view this as a viable option as it would cause assets to no longer function.

10. <u>Alternative 2</u> – Combine the City of Yellowknife civil construction with the Naka-YK's Light Replacement Program. This alternative allows efficient streetlight infrastructure replacement within a designated area in coordination with the City's civil work, which will minimize disruption, increase efficiency, and result in costs savings for Naka-YK as well as its customers.

11. <u>Alternative 3</u> - Only replace infrastructure as it fails. The lights and City infrastructure are typically installed together, as both the City's and Naka-YK's infrastructure have started to reach End-of-Life. If the City replaced its infrastructure without Naka-YK, the complexity of their project would increase and result in an increase in cost and inconvenience to the residents of Yellowknife.

SECTION 7 - RECOMMENDATION

12. Proceed with Alternative 2, replacing Naka-YK streetlighting infrastructure in conjunction with the City's Water, Sewer, and Paving Program. This alternative will result in cost savings for Naka-YK and ensure that it can continue to meet its utility obligations.



APPENDIX 1

13. This has historically been an annual project. The same work is completed each year for the same reason. Below are the annual project costs for the period 2011-2020. Please refer to Attachment 11.1 for more information:

2012	\$133,000
2013	\$135,000
2014	\$121,000
2015	\$265,000
2017	\$302,000
2018	\$478,000
2019	\$341,000
2020	\$104,000



Naka Power Utilities (Yellowknife) (Naka-YK) 2024-2025 General Rate Application (GRA)

5L660 Pole Replacement and Realignment Business Case #03



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SECTION 1 - EXECUTIVE SUMMARY

1. Naka Power Utilities (Yellowknife) (Naka-YK) has completed the 5L660 Pole Replacement and Realignment Project in order to address the need to replace identified end-of-life assets as well as improve long term asset accessibility to facilitate required power system maintenance in the future. 5L660 is a mainline feeder within Naka-YK's power distribution system that provides electricity to Residential and Commercial customers in and around downtown Yellowknife, NT (the City). This work was required to ensure Naka-YK meets current industry best practices while improving the overall power system to avoid unplanned power system events.

SECTION 2 - BACKGROUND

2. In 2019, Naka-YK's contractor completed pole testing through Naka-YK's annual Test and Treat Program that identified seven poles in line 5L660 requiring replacement.

3. The poles had legacy copper conductor attached and in use that required replacement as end-of-life assets. Five other poles along the same line route in the immediate vicinity were also identified as near end-of-life such that pole replacement would be required in the near future.

4. In addition, the line route of the seven poles identified above was located behind the Garden Apartments building in the City, which presented a significant access issue. The horizontal distance from the poles to the nearest accessible area for equipment was too far for Naka-YK's equipment to reach in order to conduct maintenance work. Facilitating access for equipment to allow Naka-YK to complete maintenance on the existing line route would have required significant access development work due to challenging sloping terrain and bedrock prevalent in the area. Pictures of the area and pole realignment are provided in Appendix 1.

5. To mitigate the access issue, Naka-YK moved the seven poles on the 5L660 line approximately three meters to allow for equipment access adjacent to the line in order to support an effective response to planned or unplanned power system events, thereby increasing reliability. The realignment of the line, replacement of the five additional near



end-of-life poles, replacement of the two end-of-life poles, and legacy copper conductor replacement were combined under one project to achieve cost efficiencies and to minimize the impact on customers.

SECTION 3 - PROJECT DESCRIPTION

6. Replace two end-of-life poles, five near end-of-life poles, approximately 250 metres of legacy copper conductor and relocate a total of seven poles by approximately 3 metres to mitigate equipment access issues. The replacements and relocation were completed to avoid a power system event that would negatively impact customer safety and system reliability.

SECTION 4 - PROJECT SCHEDULE AND COST

2021 - \$218,000

SECTION 5 - BUSINESS DRIVERS AND BENEFITS

7. The *Public Utilities Act* imposes the following requirements on Naka-YK:

A public utility shall provide safe, adequate and proper service and keep and maintain its property and equipment so that the public utility can provide the service¹

8. Naka-YK's 5L660 Pole Replacement and Realignment was completed to meet the above requirement. The replacement of assets that are at the end-of-life, which have been damaged, or that no longer meet industry best practices is essential in order to meet a utility's obligation of providing safe and reliable service. End-of-life equipment must generally be replaced to avoid running components to failure, and the avoidance of an impending component failure mitigates risk of customer impacts due to an unplanned power system event. Moreover, improving equipment access to 5L660 increases Naka-YK's ability to effectively respond to unplanned or planned maintenance on the line improves customer reliability.

¹ *Public Utility Act*, Section 76 (1).



SECTION 6 - EVALUATION OF VIABLE ALTERNATIVES

9. <u>Alternative 1</u> - Do nothing. This alternative presents a safety risk to the public and risks unplanned power system events, which would violate a utility's obligation to provide safe and reliable service. Naka-YK does not view this alternative as a viable option.

10. <u>Alternative 2</u> - Replace only the two poles identified as end-of-life Assets. This alternative would reduce pole failure risk, but safety risk to the public and the risk of unplanned power interruptions would remain due to the remaining legacy copper conductor. The equipment access issue would remain, and the additional five poles along the line route identified as nearing the end-of-life would also not be replaced under this alternative. A deferred replacement of the legacy copper conductor would result in additional outages to customers to accommodate the work and would have resulted in increased costs.

11. <u>Alternative 3</u> - Replace the two poles identified as end-of-life assets and the legacy copper conductor at its existing location. This alternative would reduce pole failure risk and, due to the replacement of the copper conductor, would further reduce safety risk to the public and the risk associated with unplanned power system events when compared with Alternative 2. However, equipment access to complete maintenance work would not be available without a significant amount of additional work and equipment due to challenging sloping terrain with bedrock. Also, this alternative would not replace the five additional poles identified as nearing the end-of-life. Furthermore, costs of this project would increase due to construction timelines lengthening overall along side the need for outages now and in the future impacting the utility's ability to provide safe and reliable service.

12. <u>Alternative 4</u> – Replace all poles required to complete the realignment of 5L660. This option would replace the two poles identified as being end-of-life, replace the legacy conductor, and the additional five poles identified as near end-of-life. This alternative limits outages in the area, improves access to infrastructure, improves safety, and is expected to reduce future project costs and limit impacts on customers. It would not have been a feasible alternative to move the five poles and not replace them given how close they



were to end-of-life, it would have resulted in higher overall cost and more disruption to customers. This is why Alternative 4 is considered to be essential in meeting the utility's obligation to provide safe and reliable service.

SECTION 7 - RECOMMENDATION

13. Alternative 4 was completed for this project. This alternative has the lowest overall impact on customers, result in the least amount of construction time for Naka-YK, and best meets the requirement to provide safe and reliable service. This alternative allowed Naka-YK to improve the system by replacing legacy copper conductor as well as end-of-life and near end-of-life assets and by improving site access. Failure to complete this project would have negatively affected the power system reliability Naka-YK is obligated to provide to its customers and would have left site access issues unaddressed.



Appendix 1















Naka Power Utilities (Yellowknife) (Naka-YK) 2024-2025 General Rate Application (GRA)

Canadian Tire Line Re-Route Business Case #04



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SECTION 1 - EXECUTIVE SUMMARY

1. Naka Power Utilities (Yellowknife)'s (Naka-YK) Canadian Tire Line Re-Route project is to relocate a distribution line and leaning transformer to ensure safe and reliable service for customers. The existing distribution power line (Canadian Tire Line) crossed over the Canadian Tire parking lot near the shipping bay. In addition to distribution power lines, the poles contained NorthwesTel (NWTel) communication lines attached and strung below Naka-YK's electric distribution line. The shipping bay frequently has large trucks and equipment traversing the area. The riser pole and padmount transformer for the Canadian Tire Line had begun to lean towards the Canadian Tire building, presenting risk due to lower ground clearance of the Canadian Tire Line and due to the proximity of the transformer to the metal siding of the Canadian Tire building.

2. Completing this project will ensure that Naka-YK continues to provide safe and reliable power and satisfies Canadian Standards Association (CSA) code requirements.

SECTION 2 - BACKGROUND

3. Naka-YK identified through its annual patrols that the riser pole and padmount transformer for the Canadian Tire Line had begun shifting and continued to progress overtime. The line clearance was already noted as low, and ground clearance progressively decreased as a result of the progressing riser pole lean. Over time, the risk presented by the leaning riser pole and padmount transformer increased to an unacceptable level. The location of the leaning pole and Canadian Tire Line is frequented by residents of Yellowknife and those visiting the area. The area is also frequented by large trucks and equipment. If drivers and equipment operators driving in the area are not paying attention to their surroundings, an unfortunate event could result. These factors, compounded by the risk of line contact between the transformer and the metal Canadian Tire building, required action by Naka-YK.

SECTION 3 - PROJECT DESCRIPTION

4. Re-route existing Canadian Tire Line underground and relocate the associated transformer away from the Canadian Tire building. The NWTel communications line



attached below Naka-YK's Canadian Tire Line will also be re-routed underground in conjunction with work to re-route the Canadian Tire Lines. Completing this work will ensure that Naka-YK continues to meet its obligation to provide safe and reliable power as well as meets legal and regulatory requirements.

SECTION 4 - PROJECT SCHEDULE AND COST

2023 - \$123,000 2024 - \$5,000

SECTION 5 - BUSINESS DRIVERS AND BENEFITS

5. The *Public Utilities Act* imposes the following requirements on Naka-YK:

A public utility shall provide safe, adequate and proper service and keep and maintain its property and equipment so that the public utility can provide the service.¹

6. Naka-YK's Canadian Tire Re-Route Project was completed to meet the above requirement. The lack of clearance between the Canadian Tire Line and the ground, and between the transformer and the Canadian Tire building creates an unacceptable risk to the residents of Yellowknife and those visiting the area. While Naka-YK's primary concern for this project was the safety of those that are around the power system, the pole and corresponding transformer could also result in an unplanned outage.

SECTION 6 - EVALUATION OF VIABLE ALTERNATIVES

7. <u>Alternative 1</u> – Relocate the transformer. This alternative would address the progressive lean of the transformer towards the Canadian Tire building. However, this would leave a dangerous risk of low lines crossing the parking lot near the facility shipping bay. While relocating the transformer partially addresses safety and reliability concerns, mitigation of the progressive transformer lean does not fully address safety and reliability issues as line clearance remains inadequate.

¹ *Public Utilities Act*, Section 76 (1).



8. <u>Alternative 2</u> – Re-route the overhead line underground and relocate the transformer. This alternative allows both concerns (line clearance and transformer lean in proximity to the building) to be addressed simultaneously, ensuring minimal power disruptions for customers. As re-routing to address clearance issues requires additional work beyond that required for the transformer relocation, completing both at the same time minimizes impact to customers and reduces overall costs by eliminating the need to complete the power and communication line re-routes separately from the transformer relocation. This alternative fully addresses Naka-YK's obligation to provide safe and reliable power by eliminating a potential public hazard as well as to meet CSA requirements.

SECTION 7 - RECOMMENDATION

9. Proceed with Alternative 2 to relocate the transformer and re-route Naka-YK 25 kV power lines and the NWTel communication line underground. This alternative fully addresses Naka-YK's obligation to provide safe and reliable power as well as to meet regulatory and legal requirements. Failure to re-route the power and communications lines and relocate the transformer will increase the risk of public exposure to hazards associated with high voltage power lines.



Naka Power Utilities (Yellowknife) (Naka-YK) 2024-2025 General Rate Application (GRA)

25 kV Feeders 5L640 and 5L641 Load Redistribution Business Case #05



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SECTION 1 - EXECUTIVE SUMMARY

1. Naka Power Utilities (Yellowknife) (Naka-YK) completed the 25 kV Feeders 5L640 and 5L641 Load Redistribution project to provide safe and reliable power to homes, schools, and commercial buildings in the area around Range Lake in Yellowknife, NT (the City). The two 25 kV mainline feeders, 5L640 and 5L641, provide power to the area and need to be properly balanced to allow for timely power system recovery with less manual system operation. To correct this energy system problem, Naka-YK built a connection between 5L640 and 5L641 to allow for rebalancing and redundancy to ensure continued power services to Naka-YK customers.

SECTION 2 - BACKGROUND

2. Load growth on 5L640 has continued year over year (YoY) due to the overall increase in demand for electricity in the area served by the line. Meanwhile, load on 5L641, which serves an adjacent residential area, has remained stable with little load growth over the same period. The source of power for 5L640 and 5L641 is from Naka-YK's 7001S Butler Substation, with the two lines serving the areas on each side of Range Lake.

3. Further upstream, power to Butler Substation is provided by Naka-YK's Town Feeder 2 which connects to the generation source for the City. The electrical load on distribution feeders throughout the City is stipulated by the generation provider with a recommended maximum power amount of 3 mega-volt-amperes (MVA) load per feeder. The maximum recommended load was developed through consultation with the generation provider to ensure power restoration times remained acceptable. As load increases beyond 3 MVA on a feeder, restoration times are negatively affected. Power can be restored more quickly when the system overall can be re-energized with loads of 3 MVA or less on each of Naka-YK's distribution feeders. As a result of the load growth discussed above, load on 5L640 has increased beyond 3 MVA, which negatively impacts restoration time in the event of power outages in the area.



4. To correct this energy system problem, Naka-YK constructed a connection between 5L640 and 5L641 to rebalance the electrical load across both feeders and maintain the optimal load per feeder of 3 MVA to allow the quick restoration of power in response to power system outages.



 Table 1.1 – Feeder Orientation Map

Figure 1 Feeder Orientation Map

SECTION 3 - PROJECT DESCRIPTION

5. Redistribute load growth from 5L640 to 5L641 by connecting the two mainline feeders and adding associated switching points.



SECTION 4 - PROJECT SCHEDULE AND COST

2020 - \$184,000 2021 - \$37,000 2022 - \$60,000

SECTION 5 - BUSINESS DRIVERS AND BENEFITS

6. The *Public Utilities Act* imposes the following requirements on Naka-YK:

"A public utility shall provide safe, adequate and proper service and keep and maintain its property and equipment so that the public utility can provide the service"¹

7. The 25 kV Feeders 5L640 and 5L641 Load Rebalancing project was completed to correct the power system problem. Maintaining electrical load distribution across Naka-YK's mainline feeders below the recommended maximum threshold of 3 MVA will minimize the duration of power outages as well as the requirement for additional manual operation of the power system. Reduced outage times and minimizing manual operation of the power system positively impacts public safety and the safety of Naka-YK's technicians, respectively.

SECTION 6 - EVALUATION OF VIABLE ALTERNATIVES

8. <u>Alternative 1</u> – Do Nothing. This alternative allows reliability risk and risk to public safety and safety of Naka-YK technicians to continue with the continued load growth on 5L640. Risks of this alternative include a negative impact on reliability because feeder load is limited and then is required to be divided into smaller parts through manual switching, instead of remote operation, resulting in longer restoration times. Safety of the public and Naka-YK technicians is also negatively impacted as increased outage restoration times increase risk during extreme weather events, and manual operation of the power system inherently increases risks to technicians through increased exposure to weather and dangerous conditions.

¹ *Public Utilities Act*, Section 76 (1).



9. <u>Alternative 2</u> – Redistribute mainline feeder 5L640 electrical load to another mainline feeder instead of 5L641. This alternative would allow rebalancing of the electrical load across another mainline feeder in Naka-YK's distribution power system. However, the other mainline feeders in the area, 5L636 and 5L642, are also experiencing load growth in the Kam Lake Industrial and Engle Business District areas, independently of load growth increase on 5L640, so are not suitable to achieve load rebalancing on 5L640. In addition, redistribution options are limited because although connection between 5L640 and 5L642 has previously been established through normally-open switching points, connection to 5L636 would not be feasible due infrastructure between the two mainline feeders as well as increased distance when compared to connection between 5L640 and 5L641.

10. <u>Alternative 3</u> – Redistribute mainline feeder 5L640 electrical load to 5L641. This alternative would effectively rebalance the electrical load growth on 5L640 to 5L641. System reliability would be maintained as 5L640 overall load would not exceed 3 MVA, enabling continued effective restoration of the power system in response to outages. This alternative also mitigates the risk to public and Naka-YK technician safety described above.

SECTION 7 - RECOMMENDATION

11. Proceed with Alternative 3 by rebalancing the load growth on 5L640 through construction of a connection to 5L641. This alternative maintains optimal system operation and restoration times as well as addresses public and Naka-YK safety considerations. This meets Naka-YK's obligation to provide safe and reliable service to its customers. Failure to address the load growth on 5L640 and rebalancing the load through 5L641 would negatively impact Naka-YK's utility obligations.



Naka Power Utilities (Yellowknife) (Naka-YK) 2024-2025 General Rate Application (GRA)

ATCO CIS Replacement Project

Business Case #06



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SECTION 1 - EXECUTIVE SUMMARY

1. This project is for the lifecycle replacement of ATCO CIS with Oracle's Customer Cloud Service (CCS) solution to mitigate risks associated with the current (End-of-Life) system and to provide Naka Power Utilities (Yellowknife) (Naka-YK) with the right tools to perform Customer Care and Billing (CC&B) services in an accurate, reliable and efficient manner.

SECTION 2 - BACKGROUND

2. ATCO CIS was built in the early 1990s and is at End-of-Life. As a result, it is increasingly costly and difficult to maintain the underlying COBOL programming language as well as add functionality. In particular, the internal resources that understand the highly customized nature of ATCO CIS have retired, or are beginning to retire, and the number of skilled COBOL programmers in the marketplace is decreasing. The combination of these effects contributes to the increasing costs to maintain and support ATCO CIS.

3. Furthermore, cyber security risks increase with continued use of an antiquated system compared to modern software applications that are designed to minimize the ever-increasing risk of malicious attackers taking advantage of application vulnerabilities. Given that ATCO CIS enables critical business functions fundamental to Naka-YK's regulated, integrated electric distribution business, the risk of not replacing ATCO CIS was too great.

4. In addition, Naka-YK and its systems must be flexible, supportive, and responsive to increasing demands of electrification on the data collection and management cycle, including renewable technologies such as solar panels, as well as increasing the complexity of the billing systems. The replacement of the legacy ATCO CIS will allow Naka-YK to continue to meet these requirements and ensure needs can be met into the future. The cost of bringing the legacy ATCO CIS system up to speed to complete the above tasks would outweigh the benefits of doing so.



SECTION 3 - PROJECT DESCRIPTION

5. The ATCO CIS System was built in the early 1990s and was historically used by the ATCO Utilities, including Naka-YK. Due to the age and highly customized functionality of ATCO CIS, and consistent with the conclusion of a third-party report, it was determined that ATCO CIS posed too great of a business risk and should be replaced.¹ As a result, a procurement process was conducted to compare Oracle CCS against Tier 3 niche products available in the marketplace for fully integrated utilities that serve less than 100,000 customers. The evaluation confirmed Oracle CCS as the best alternative.

6. In addition to achieving the lowest cost option for customers, the goals of the project were: to maximize out-of-the-box functionality and minimize customization to facilitate lifecycle management, minimize future operating costs and risk, maintain a high level of customer care and billing service, support regulatory requirements, and reduce technology risk. Naka-YK will, as required, utilize the specialist(s) within ATCO Utilities to support Oracle CCS and related functions, including vendor support and regular CCS updates.²

SECTION 4 - PROJECT SCHEDULE AND COSTS

2023 - \$3,956,000 2024 - \$61,000

SECTION 5 - BUSINESS DRIVERS AND BENEFITS

- 7. The Business Drivers and Benefits of the ATCO CIS Replacement are as follows:
 - ATCO CIS is a critical system relied upon to manage all aspects of the meter to cash cycle. Without a working and capable CIS, Naka-YK would be unable to accept new customers, manage customer moves, calculate usage and charges, bill customers or collect and manage revenue.

¹ In Decision 26616-D01-2022, the Alberta Utilities Commission (AUC) approved CIS Replacement for the ATCO Distribution Utilities, paras. 254, 261-262.

² A Tier 3 niche solution would have required additional resources to support the billing Application unique to Naka Power Utilities (Yellowknife).


- Sudden or unexpected outages could have negative impacts on Naka-YK's ability to maintain acceptable levels of CC&B and meet its obligation to serve.
- Existing CIS is End-of-Life.
- Cybersecurity threats modern software applications are designed to minimize the ability of attackers to take advantage of application vulnerabilities.
- Availability of resources the number of skilled COBOL programmers in the marketplace is decreasing, creating a significant and growing skills gap. The number of experienced and qualified internal resources continues to decline as ATCO CIS ages.
- Ongoing internal support of existing CIS is disappearing as parent company no longer supports.
- The electricity industry is currently undergoing a transformation, including electrification (electric vehicles and Distributed Energy Resources), twoway communication between utilities and customers. This transformation will allow better enablement of price signals through rate design such as Time of Use (TOU) rates which will require far more data handling capabilities than CCS has over ATCO CIS.
- Oracle CCS was selected because of the high degree of functional fit with business requirements, technical compatibility and integration because Naka-YK already utilizes Oracle Enterprise Resource Planning software.
- Finally, Oracle CCS is a cloud-based application which receives monthly security based patches, and tri-annual software based improvements/enhancements that are mandatory to be deployed through the Oracle subscription, which will protect from cybersecurity threats.



SECTION 6 - EVALUATION OF VIABLE ALTERNATIVES



Figure 1.1: Cumulative Revenue Requirement over 20-years

8. Figure 1.1 above provides the Cumulative Revenue Requirement for all three of alternatives below. The data is based on the entire cost of the project that was allocated between the three ATCO companies in the North. Oracle CCS is the lowest cost alternative to Naka-YK customers.

9. <u>Alternative 1</u> - Status quo. Naka-YK continues to operate ATCO CIS. This option is neither acceptable nor feasible given the business drivers identified above. The ATCO CIS system is End-of-Life and requires replacement.

10. <u>Alternative 2</u> - Replace ATCO CIS with Oracle CCS. This option reduces the risk of a critical system failing and reduces cyber security threats. This option is the lowest cost alternative to customers.



11. <u>Alternative 3</u> - Replace ATCO CIS with Tier 3 commercial off the shelf solution. This option reduces the risk of a critical system failing and reduces cyber security threats. However, this option is more costly as it requires specialized implementation resources and training to use the system (e.g., interface training, upgrades and maintenance).

12. Please refer to Figure 1.1 for the annual revenue requirement and cumulative revenue requirement for each of the explored scenarios over 20-years. Of these explored scenarios, Oracle CCS was the lowest cost option.

SECTION 7 - RECOMMENDATION

13. Alternative 2 - ATCO CIS is at End-of-Life and requires replacement. Naka-YK recommends proceeding with the replacement of ATCO CIS with Oracle CCS, as detailed in the sections above. The business risk associated with continued use of ATCO CIS is unacceptable. Replacing ATCO CIS with Oracle CCS is beneficial to Naka-YK and its customers as it is the lowest cost option per the analysis in Figure 1.1.



Naka Power Utilities (Yellowknife) (Naka-YK) 2024-2025 General Rate Application (GRA)

Accommodation Requirements

Business Case #07



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SECTION 1 - EXECUTIVE SUMMARY

1. Naka Power Utilities (Yellowknife) (Naka-YK) acquisition of a single-detached home (the Property) in Yellowknife (the City) for employee accommodations to avoid rental costs for employees recruited to the City from other locations. The Property was occupied by Naka-YK managers since it began being rented from a third party and again when it was rented from Naka-YK after being purchased. At the start and end of managers' tenures there are relocation expenses and costs associated with finding rental properties or new homes for newly transferred or new employees. The purchase of this Property reduces these costs. The purchase was completed in 2021 when many challenges in the economic markets and physical isolation protocols were in place due to Covid-19. The purchase of easily accessible and well-maintained accommodations avoided employee disruption in the near term and increased Naka-YK's ability to attract talented management with relevant utility experience as well as widened appeal to candidates in a challenging labour market.

SECTION 2 - BACKGROUND

2. Naka-YK purchased the Property in December 2021 for the purpose of providing accommodation for employees that have been relocated to the City.

3. The Property was originally owned by a Naka-YK employee, but was transferred to a third-party management company when the employee relocated and left the City. Prior to purchasing the Property, Naka-YK was renting it from the third-party management company and in turn, rented it to two successive Naka-YK employees. This leasing arrangement took place for approximately 22 months.

4. In 2021, the third-party management company indicated that it was not in the business of long-term rentals and intended to sell the Property. Since, at that time, the Property housed company employees as tenants, a long-term solution for the employees and Naka-YK was required. Naka-YK purchased the Property to ensure its continued availability for use as Naka-YK employee accommodation.



5. Naka-YK's ownership of the Property provides a readily accessible accommodation option for new employees relocating to the City, which allows for a faster and more streamlined transition as well as better facilitation of employee relocations. The purchase also reduced employee relocation costs that Naka-YK, would otherwise have assisted with as part of the support that Naka-YK provides to employees in connection with relocations made for employment purposes.

6. Naka-YK's purchase of the Property is a capital investment that supports Naka-YK's ability to attract and retain qualified utility employees in the near and mid-term. If the Property is no longer required to attract employees to the City as an affordable accommodation alternative, it is expected it will be sold.

SECTION 3 - PROJECT DESCRIPTION

7. Purchase the Property in order to provide employee accommodation, in the near term and facilitate future new employee relocation to the City.

SECTION 4 - PROJECT SCHEDULE AND COSTS

2021	\$680,085

- Land \$170,021
- Building \$510,064

SECTION 5 - BUSINESS DRIVERS AND BENEFITS

8. There are two main drivers for the purchase of staff accommodations:

- Lack of affordable housing for employees to buy or rent in the City; and
- Avoiding the loss of Naka-YK's existing investment in Property maintenance.

5.1 Lack of Affordable Housing to Buy or Rent

9. There is a lack of affordable homes available to rent or buy in the City. The Canada Mortgage and Housing Corporation (CMHC) Northern Housing Report 2020, released in January of 2021, states that NWT has faced housing affordability issues over the years because of the high cost of ownership or renting in the territory, and that "over a 10-year



period (2009-2019), the proportion of houses with affordability issues more than doubled in Yellowknife, from 14 percent in 2009 to 29 percent in 2019".¹

10. At the time of the Property purchase, housing types in the City consisted of Row housing, Condominiums, Trailer (Modular), or single-detached homes. Prices ranged from \$359,000-\$600,000 for a Row house or Modular, and \$550,000-\$1,000,000 range for a single-detached home. Many of the modular, row housing, or condominiums have two to three bedrooms, with single-detached homes in the three plus bedroom range. Difficult construction conditions due to the high prevalence of bedrock, which requires blasting or drilling to establish foundations, increase construction timelines and the costs of new home builds in the City.

11. Figure 5.1, below, is a graph from the CMHC Northern Housing 2020 Report cited above that depicts the general decreasing trend in housing starts (the number of residential housing projects that have been started over a specific length of time) in the City. The graph shows an overall downward trend in housing starts in Yellowknife from 2012-2019. This trend increases the difficulty to find affordable purchases and rentals for prospective Naka-YK employees. An average price of a single-detached home with four or more bedrooms in Yellowknife was \$756,000 in October 2021, according to Century 21 Real Estate.²

¹ CMHC Northern Housing 2020 Report, p. 12.

² <u>https://www.century21yk.ca/blog/2021/11/moving-to-yellowknife-what-is-the-trues-cost-of-a-yellowknife-home/.</u>





Figure 5.1: Yellowknife House Starts

Source: CMHC Starts and Completions Survey via CMHC Northern Housing Report

12. The difficulty in finding suitable rental properties available in Yellowknife is driven by the low vacancy rate in Yellowknife's rental market, which was 4.2 percent in 2019, as illustrated in the graph below from the 2020 CMHC Rental Market Survey (Figure 5.2). However, this general vacancy rate is not representative of specific housing type or cost. As stated in the CMHC Northern Housing Report 2020, there was a rise in demand, and associated decrease in vacancy rates, for one and two bedroom units, as units with three or more bedrooms were not affordable for most people.³ This demonstrates that in the period leading up to the purchase of the Property, rental units were either not readily available or cost prohibitive to rent.

13. It is important that prospective employees are able to locate available housing that is comparable to what is available in the area from which they are being recruited. Housing availability and affordability impacts Naka-YK's ability to attract qualified, talented, and knowledgeable employees and, as a result, its ability to meet its utility obligations.

³ CMHC Northern Housing 2020 Report, p.13.



14. According to the CMHC Northern Housing Report 2020, the median rents for onebedroom apartments and units with three or more bedrooms went up by 5.7 percent and 4.8 percent, to \$1,483 and \$2,210, respectively, from 2018-2019.⁴ Considering inflationary factors, renting a three or four bedroom home or unit in 2021 would have been even higher than quoted figures.

15. Factors that further restrict already low vacancy rates include the personal needs of the employee such as family size and pets. Vacancy rates and home sales both have seasonal trends. The City experiences annual seasonal influx and outflow of residents who work for various government agencies and private sector organizations. The seasonal trend associated with vacancy rates and homes sales significantly impact availability during certain times of the year when Naka-YK can be recruiting prospective employees.





Figure 5 – Yellowknife Median Rent Vacancy Rate

Source: CMHC Rental Market Survey

16. The supply of rental and for sale properties in the City is compounded by its yearover-year (YoY) population growth since 2009 despite relatively flat population growth

⁴ CMHC Northern Housing 2020 Report, p.13.



across the NWT overall. Moreover, seasonal workers supporting summer infrastructure projects, large construction projects in the City, and mining projects bring an influx of temporary residents throughout the year, placing additional pressure on the rental market.

17. The challenge of retaining and attracting prospective employees is a common issue faced by employers in the North. Prospective employees are met with challenges associated with living in a northern climate and an isolated community with a high cost of living in addition to challenges associated with locating suitable housing. When it was renting the Property starting in 2018, Naka-YK consistently faced recruitment challenges backfilling a minimum of one position per year, including hires from outside the company, due to employee turnover.

18. Accordingly, as described above, at the time of the Property's purchase, it would have been difficult and likely cost-prohibitive for the employees renting the Property at the time to locate other accommodation. In addition, Naka-YK anticipates that the Property will assist with attracting and retaining future employees and facilitate their relocation to the City.

19. Loss of investment as described above, prior to Naka-YK's purchase in December of 2021, the Property was owned by a third-party company. It had been rented exclusively to Naka-YK employees for a twenty-two-month period. During the leasing arrangement, the third-party company, which does not typically carry long term rental properties, required Naka-YK to make payments on maintenance of the Property, which were made with management approval and expensed as they were incurred. Considering Naka-YK's investments in the maintenance of the Property, the lack of suitable alternative properties for new employees, and need to attract and retain qualified employees, Naka-YK determined that it would purchase the Property.

SECTION 6 - EVALUATION OF VIABLE ALTERNATIVES

20. <u>Alternative 1</u> - Purchase the Property. This alternative proposes that Naka-YK purchases the Property and takes responsibility for its maintenance under the direction of Naka-YK management. Senior management will provide oversight and direct



maintenance undertaken on the Property to ensure prudent expenditures and that upkeep issues are addressed in an efficient and timely manner. This alternative will also help Naka-YK attract future employees as the Property becomes available for rental.

21. <u>Alternative 2</u> – Move the employee renting the Property in 2021 to an alternative rental. This would uproot the employee and their family in an already challenging labour market. Based on the information obtained from the CMHC Housing report as well as the GNWT Bureau of Statistics, discussed above, it is unlikely that a future relocated employee under this alternative would find suitable or affordable housing in Yellowknife in a timely manner, which will hinder Naka-YK's ability to retain and attract employees.

22. <u>Alternative 3</u> – The employee renting the Property in 2021 purchases the house from the third-party owner. This alternative proposes that the employee would be offered the option to purchase the employee accommodations before the third-party owner listed it on the market, or that the employee would otherwise seek to purchase the Property on the market.

23. Although this would eliminate the hardship of an employee being required to relocate because of the sale, it introduces other costs to Naka-YK or the employee. To purchase the employee accommodations, an employee would be required to produce a down payment as well as pay legal fees associated with the purchase. In addition, an employee may not be in a financial position to incur these expenses at the time of resale selected by the third-party owner. This alternative will require future prospective employees to deal with Yellowknife housing challenges, negatively impacting Naka-YK's ability to the attract and retain employees in the future who would have to relocate to the City for their employment.

SECTION 7 - RECOMMENDATION

24. Proceed with Alternative 1 and Purchase the Property from the third-party owner. Under this alternative, Naka-YK will undertake the responsibility of prudently maintaining the Property through direct oversight by senior management. Since the Property is



currently rented, and staff retention is an issue in the North, Naka-YK has a strong preference for minimal disruption to its employees' lives.

25. This recommendation will provide the option to sell the Property in the future should the Property become vacant and there is no longer a need to be able to provide employee accommodations.



Naka Power Utilities (Yellowknife) (Naka-YK)

2024-2025 General Rate Application (GRA)

Kam Lake NWTel Joint Use Clearances

Business Case #08



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SECTION 1 - EXECUTIVE SUMMARY

1. The Kam Lake NWTel Joint Use Clearances project ensures appropriate clearance between pole connection points for NorthwesTel (NWTel) communication lines which attach below Naka Power Utilities (Yellowknife)'s (Naka-YK) distribution power lines on shared pole infrastructure (called "underbuilt" lines). The current clearances between the power lines and NWTel communication lines needed to be increased to meet The Canadian Standards Association (CSA) Canadian Electrical Code for power distribution. Naka-YK's typical solution in the case of inadequate clearance is to replace its existing structures with taller structures to allow for adequate clearance from NWTel's infrastructure. Naka-YK must complete this project to ensure the safe operation of the distribution system in the area in compliance with the CSA.

SECTION 2 - BACKGROUND

2. Naka-YK and NWTel required an increase in line-to-ground and line-to-line clearance for telecommunications lines built in the eighties that were underbuilt and not replaced during Naka-YK's conversion to a 25 kV system. The decision to complete the 25 kV conversion was approved in Board Decision 12-2004.¹ To facilitate NWTel's clearance requirements, Naka-YK was required to increase the overall height of the distribution lines to ensure that CSA clearance requirements between communications and the distribution lines could be maintained. This is required at all locations where Naka-YK and NWTel infrastructure is less than the minimum one-metre distance apart that is required by CSA Code C22.3 A.5.10.1 Overhead Systems (refer below to detailed description and illustrations). Measurements to assess the clearances between NWTel and Naka-YK lines resulted in a collaborative undertaking between the two companies to mitigate clearances over a multi-year project.

¹ PUB Board Decision 12-2004.



3. Excerpt from the C22.3 Overhead Systems:

A.5.10.1 Vertical separations at the structure — Normal level arrangement and Table 23

Figure A.5 illustrates the relative locations of supply and communication attachments on a joint-use pole where the normal level arrangement is used.

The minimum vertical separation required between supply and communication attachments on joint-use poles consists of a communication safety space, which varies with voltage and isolates the communication worker from electrical hazards, and a workspace to permit movement of a worker's body, tools, and work materials while working on the communication plant.

The minimum separations necessary to provide communication safety space for the voltage under consideration and to provide a workspace are given in Table 23. However, a company or utility may increase these separations where it believes additional workspace is necessary to ensure the safety of workers. Safety space is necessary for communication personnel safety.

It should be remembered that safety requires more than just space; it also depends on safe working practices. For example, stringing a communication strand under wires requires special precautions to ensure that the strand does not flip up into the communication safety space.





Table 23Minimum vertical separations at a joint-use structure

(See Clauses 5.10.1.1, 5.10.1.6, 5.10.1.7, 5.10.6.2, and A.5.10.1 and Figures A.6 and A.7.)

	Minimum vertical separation, m Voltage of supply conductors		
Between	0–750 V	> 0.75 kV ≤22 kV	> 22 kV ≤ 50 kV*
Live or current-carrying supply plant (including neutrals) and communication line plant	1.0†	1.2‡	1.5‡

SECTION 3 - PROJECT DESCRIPTION

4. Replace existing poles with taller poles to increase distance between Naka-YK and NWTel infrastructure. Naka-YK is required to increase the overall height of its distribution power lines to facilitate increases from NWTel communications lines and meet CSA requirements.

SECTION 4 - PROJECT SCHEDULE AND COSTS

2022 - \$97,000 2025 - \$100,000

5. There are no costs forecast for this project in 2024 due to delay in concluding a formal agreement with NWTel regarding the work.

SECTION 5 - BUSINESS DRIVERS AND BENEFITS

6. The Public Utilities Act imposes the following requirements on Naka-YK:

A public utility shall provide safe, adequate and proper service and keep and maintain its property and equipment so that the public utility can provide the service.²

7. Increasing the overall height of Naka-YK's distribution power lines to ensure CSA clearance requirements are met is essential to the provision of safe and reliable service. Failure to provide for adequate clearance would result in safety risks to Naka-YK and

² *Public Utility Act*, Section 76 (1).



NWTel utility workers because Naka-YK infrastructure would not facilitate safe joint use of poles in the Kam Lake area. Furthermore, as discussed below, addressing clearance between Naka-YK and NWTel lines without increasing the height of Naka-YK's distribution power lines would result in a risk to public safety due to low line-to-ground clearances on NWTel lines. Low clearance of NWTel lines increases the risk of contact by equipment in an industrial area of the city. As the communications lines are attached to Naka-YK distribution poles, an event which damages communications infrastructure has a high probability of also damaging Naka-YK's infrastructure which negatively impacts public safety in relation to Naka-YK's high voltage power lines.

SECTION 6 - EVALUATION OF VIABLE ALTERNATIVES

8. <u>Alternative 1</u> – Do Nothing. This alternative is not viable as Naka-YK would not ensure CSA clearance requirements are met and as discussed above, there would be inadequate line clearances presenting safety risk. Technicians would not be able to maintain adequate distances to high voltage power distribution lines when undertaking work in the Kam Lake area. Outages would be required in order to accommodate NWTel work on Naka-YK powerlines where clearance is less than one-metre, which would negatively impact system reliability.

9. <u>Alternative 2</u> – Request that NWTel lower the attachment height of its communications lines. This alternative would address CSA requirements with respect to clearance between attachment points for Naka-YK distribution lines and NWTel communications lines. However, the alternative is not viable because lower NWTel lines would introduce public safety hazards and negatively affect service reliability. Third party damage to NWTel lines attached to Naka-YK poles has a high probability to result in damage to power system infrastructure.

10. <u>Alternative 3</u> – Replace existing poles with taller poles to allow for increased clearance between NWTel communication lines underbuilt to Naka-YK power distribution lines. This alternative ensures that legal, safety and reliability requirements are met. Installing taller poles in place of existing poles will increase the overall height of Naka-YK



lines in the Kam Lake area and facilitate adequate line-to-ground clearances for NWTel communications lines as well as clearance between power and communication lines. This enables work to be safely undertaken by both utilities without introducing safety risks or negatively affecting reliability.

SECTION 7 - RECOMMENDATION

11. Proceed with Alternative 3 replacing existing poles with taller poles to increase the overall height of Naka-YK power distribution lines in the Kam Lake area, in order to meet CSA requirements and enable NWTel to safely maintain communications infrastructure as outlined in Alternative 3.



Naka Power Utilities (Yellowknife) (Naka-YK)

2024-2025 General Rate Application (GRA)

City of Yellowknife Lift Station 1 Line Re-Route Business Case #09



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SECTION 1 - EXECUTIVE SUMMARY

1. The City of Yellowknife (City) will be replacing Lift¹ Station 1 (Lift Station) located on the lot at the corner of Franklin Avenue and School Draw Avenue as shown in Appendix 1. The City has requested Naka Power Utilities (Yellowknife) (Naka-YK) to relocate its existing 34 kV overhead powerline (Power Line) to accommodate construction of the new Lift Station site, as outlined under Section 8 "Relocation of Facilities" in the 2020 Franchise Agreement between the City and Naka-YK.

SECTION 2 - BACKGROUND

2. The Lift Station is a critical piece of the municipal utility infrastructure in the City which pumps wastewater from a lower elevation to a higher elevation through pipes to allow for proper processing. The Power Line that has been requested to be moved by the City is part of Town Feeder 1. Town Feeder 1 is one of two 34.5 kV sub transmission lines that transmit power from the generation source to feed the three substations in the City's distribution system. From these three distribution substations, the voltage is transformed to 25 kV for distribution within the City.

3. The current line route, as shown in Appendix 1, crosses the proposed new location of the City Lift Station 1, requiring the relocation of the existing Town Feeder 1. The City has requested that Naka-YK relocate the 34.5 kV sub transmission line in accordance with Section 8 of the Franchise Agreement between the City and Naka-YK. Specifically, the request by the City to Naka-YK was made in reference to Sections 8.1 and 8.2(b). Section 8 of the Franchise Agreement is attached to this case in Appendix 2.

SECTION 3 - PROJECT DESCRIPTION

4. Relocate a portion of the existing Town Feeder 1 underground to accommodate construction of the Lift Station at the location identified by the City.

¹ A lift is a pump for wastewater or sewage.



SECTION 4 - PROJECT SCHEDULE AND COSTS

2024 - \$430,000

SECTION 5 - BUSINESS DRIVERS AND BENEFITS

5. In accordance with its Franchise Agreement with the City, Naka-YK must relocate a section of Town Feeder 1 in response to the City's request to accommodate the relocation of the Lift Station. Failing to relocate Town Feeder 1 in response to the City's request would violate its contractual obligations to the City through its Franchise Agreement and would be inconsistent with its utility obligations.

SECTION 6 - EVALUATION OF VIABLE ALTERNATIVES

6. <u>Alternative 1</u> – Do Nothing. This alternative would not allow Naka-YK to respond to the request made by the City under the Franchise Agreement. In addition, not properly responding to the City's request would unduly delay construction of critical municipal utility infrastructure. This alternative would violate Naka-YK's obligation to provide proper service to its customers.

7. <u>Alternative 2</u> – Re-Route the existing Power Line. This alternative would require extensive reconfiguration of the distribution system in the area through the replacement of ten poles. Each of these poles is actively providing electricity services to customers, and undertaking such extensive reconfiguration would require large and long outages for each pole. The imposition of large and long outages on customers for Naka-YK to safely complete construction negatively impacts system reliability and Naka-YK's ability to meet its utility obligations. In addition to the negative impact to customers due to the need for large and long outages, the design and construction required to re-route the Power Line is complex, which increases safety risks to Naka-YK technicians and the public. Naka-YK would be able to comply with the City's request under the Franchise Agreement by undertaking this alternative.

8. <u>Alternative 3</u> – Re-Route the existing Power Line underground. This alternative would require installing approximately 340 metres of underground cable and have the



least impact on customers. Although outages to customers will still be required to complete construction to re-route the line underground, a large portion of the work can be completed before outages are required to connect new underground conductors to the connection points on the existing Town Feeder 1. In addition, undergrounding lines are commonly used by utilities to increase reliability through decreased exposure to weather events and other foreign interference. This alternative provides the best alternative in consideration of impact to customers and overall safety which aligns with Naka-YK utility obligations. Naka-YK would be able to comply with the City's request under the Franchise Agreement by undertaking this alternative.

SECTION 7 - RECOMMENDATION

9. Proceed with Alternative 3 and re-route the Power Line underground. This alternative provides the best outcome in relation to customer impact and overall safety while ensuring Naka-YK meets its obligations to the City in accordance with the Franchise Agreement between the parties as well as its utility obligations under the *Public Utilities Act*.



Appendix 1





Appendix 2

8. RELOCATION OF FACILITIES

8.1 Northland shall, at the request of the City, move, alter or relocate all or portions of the Distribution System provided a reasonable alternate location is designated by the City.

8.2 The costs and expenses for the relocation of any portion of the Distribution System shall be governed by the following provisions:

- where the relocation is requested by a third party, the costs and expenses shall be the responsibility of the third party, subject to the terms and conditions of service as approved by the Board;
- (b) where the relocation is requested by the City, and the City is of the reasonable opinion that the relocation is of benefit to the community or a portion of the community, subject to clause 8.2(c), the costs and expenses of the relocation shall be the responsibility of Northland and the City shall not be responsible for any portion of the costs and expenses; provided, that where the estimated costs and expenses of the relocation requested by the City exceed the sum of SEVENTY FIVE THOUSAND (\$75,000.00) dollars, the City shall provide Northland with ONE (1) year's notice of the relocation;
- (c) Northland agrees that it shall use its best efforts to obtain approval of the Board to include in rate base the costs and expenses incurred by Northland in the relocation of any portion of the Distribution System at the request of the City and the City agrees that it shall support the inclusion of said costs and expenses in rate base; provided, that in the event that the Board does not approve the inclusion of said costs and expenses in rate base, then the City shall bear the said costs and expenses; and
- (d) where the relocation is requested by the City and the requirements of clause 8.2(b) have not been met, then the City shall be responsible for the costs and expenses of the relocation.

8.3 Where the City requires Northland to relocate any portion of the Distribution System for municipal purposes, the City, acting reasonably, shall specify a date upon which the relocation is to be completed, and in the event of a material default by Northland the City may, upon given TEN (10) days written notice to Northland, undertake or complete the relocation and Northland shall be liable to the City for the reasonable costs and expenses of the City in undertaking or completing the relocation.

8.4 Where the City requires Northland to relocate any portion of the Distribution System, Northland shall undertake the relocation in an expeditious and workmanlike manner and it is understood and agreed that the provisions of clauses 5.2 and 5.3 and Section 6 of this Agreement shall apply to the relocations done by Northland.



Naka Power Utilities (Yellowknife) (Naka-YK) 2024 General Rate Application (GRA)

Engle Business District Recloser Business Case #10



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SECTION 1 - EXECUTIVE SUMMARY

1. Electrical load growth on Naka Power Utilities (Yellowknife)'s (Naka-YK) mainline feeder 5L636 requires installation of a SCADA (remote-controlled) recloser to provide safe and reliable power to commercial and industrial customers in the Engle Business District in Yellowknife, NT (the City). The 25kV mainline feeder, 5L636, provides power to the Engle Business District area and requires division of the anticipated load growth due to limitations stipulated by the generation provider. If the load is not divided into segments of 3 mega-volt-amperes (MVA) or less system reliability will be negatively affected. This program will allow for timely power system recovery with less manual system operation. To address the incoming load growth in the Engle Business District, Naka-YK requires installation of a SCADA controlled recloser to effectively divide the load on 5L636 into smaller segments.

SECTION 2 - BACKGROUND

2. In 2023, the peak electric load observed on 5L636 was approximately 2,500 kilovolt-amperes (kVA). Since the observed peak loading in 2023, Naka-YK has connected an additional 450 kVA to 5L636 with a further addition of 600 kVA planned to be connected in the summer of 2024 based on project in-service dates.

3. The electrical load on distribution feeders throughout the City is stipulated by the generation provider with a required maximum power amount of 3 MVA load per feeder. The maximum required load was developed through consultation with the generation provider to ensure power restoration times remained acceptable. As load increases beyond 3 MVA on a feeder, restoration times are negatively affected. Power can be restored more quickly when the system overall can be re-energized with loads of 3 MVA or less on each of Naka-YK's distribution feeders.

4. To prevent future system problems, Naka-YK recommends installing a SCADA controlled recloser to divide the overall load, including projected load growth based on active projects in Engle Business District, into segments of 3 MVA or less. Dividing the electric load on 5L636 will ensure the distribution system can be re-energized in load



segments of 3 MVA or less to allow for quick restoration time in response to power system outages.

SECTION 3 - PROJECT DESCRIPTION

5. Install a SCADA controlled recloser to split the current and anticipated future load additions on 5L636 into segments which are below the stipulated 3 MVA limit.

SECTION 4 - PROJECT SCHEDULE AND COSTS

2025 - \$142,000

SECTION 5 - BUSINESS DRIVERS AND BENEFITS

6. The *Public Utilities Act* imposes the following requirements on Naka-YK:

A public utility shall provide safe, adequate and proper service and keep and maintain its property and equipment so that the public utility can provide the service.¹

7. The Engle Business District Recloser project is recommended to proactively address electric load growth on 5L636 and prevent power system problems. Addition of a recloser to 5L636 improves the reliability of customers served on this line as faults downstream of the recloser which result in outages will only affect customers downstream of the recloser. Without the recloser, all customers on 5L636 would experience an outage in the event of a mainline feeder fault. Further, dividing electric load across 5L636 into segments below the recommended maximum threshold of 3 MVA will minimize the duration of power outages as well as the requirement for additional manual operation of the power system. Reduced outage times and minimizing manual operation of the power system positively impacts public and the safety of Naka-YK's technicians respectively.

SECTION 6 - EVALUATION OF VIABLE ALTERNATIVES

8. <u>Alternative 1</u> – Do nothing. This alternative will increase the length of outages for customers served by 5L636 as the load will need to be reduced manually before power

¹ *Public Utility Act*, Section 76 (1).



can be restored. Any time Naka-YK performs manual operation of the power system it exposes technicians to hazards. Unplanned outages may happen at any time, and in all weather conditions. Manually operating the power system instead of remote operation increases safety risks to Naka-YK technicians who are required to respond to customer outages and restore power. Manual system operation will also delay restoration efforts considering travel time to the site will be required. This alternative negatively impacts Naka-YK's utility obligations to provide safe and reliable power to its customers.

9. <u>Alternative 2</u> – Install a SCADA (remote-controlled) recloser on 5L636. This alternative will allow the load to be controlled remotely, acting much like the existing breaker controls within Naka-YK's substations, ensuring seamless and quick power restoration. Manual operation of the power system will not be required under this alternative which significantly improves safety for Naka-YK technicians. Installing a SCADA controlled recloser will ensure that Naka-YK meets is utility obligation to provide safe and reliable power to its customers.

10. <u>Alternative 3</u> – Install a manually controlled recloser on 5L636. This alternative will allow Naka-YK to divide the electrical load on 5L636 into segment below 3 MVA, similar to a SCADA controlled recloser. However, this alternative carries the same safety and reliability related risks as Alternative 1. Manual operation of the power system will be required, and power restoration times will be negatively impacted. Although some benefits are realized through this alternative, it fails to fully meet Naka-YK's obligation to provide safe and reliable power as effectively as Alternative 2.

SECTION 7 - RECOMMENDATION

11. Proceed with Alternative 2 dividing the electric load on 5L636 into segments below 3 MVA. This alternative ensures that the distribution system can be re-energized in load segments of 3 MVA or less to allow for quick restoration time in response to power system outages. Alternative 2 fully meets Naka-YK's obligation to provide safe and reliable service to its customers. Failure to proactively address load growth on 5L636 will negatively impact Naka-YK's utility obligations.



Naka Power Utilities (Yellowknife) (Naka-YK) 2024-2025 General Rate Application (GRA)

Streetlight Davit & Base Replacement Program Business Case #11



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SECTION 1 - EXECUTIVE SUMMARY

1. Naka Power Utilities (Yellowknife) (Naka-YK) completes the Streetlight Davit and Base Replacement Program to ensure streetlights are in an acceptable physical condition which does not impose risk to the public. Streetlights are identified for replacement under this Program through a third-party inspection. Contracting a third-party to complete streetlight inspections on behalf of Naka-YK ensures that there is an objective assessment of base and davit replacement needs. Streetlights identified for replacement though the third-party assessment are considered End-of-Life assets and replaced.

SECTION 2 - BACKGROUND

2. In 2022, ASAP Solutions Inc. (ASAP) completed an inspection of 1,317 Streetlights throughout the City of Yellowknife. The purpose of conducting this inspection was to identify End-of-Life streetlight bases and/or davits which have physically deteriorated over time or contain damage requiring their replacement. Replacing streetlights ensures that Naka-YK meets its utility obligations to provide safe electricity services by ensuring aged or damaged streetlights do not become a danger to the public.

3. Streetlight bases and davits replaced through this Program are completed using the most current standards at the time of their replacement. Streetlight conductors inside the davit and base are also replaced at the same time as the davit and/or base replacement.

4. Streetlight condition was assessed by ASAP using the criteria outlined in Table 1 below. Streetlight base or davit that received a rating of 4, 5, or 6 were recommended to be replaced, with those that received a rating of 6 to be replaced immediately.



5. Inspection results for the davits:



6. Inspection results for the bases:



7. Summarized, the streetlight inspection by ASAP identified the following bases and davits for replacement:

- Davits
 - o 68 replacements overall with 2 immediate replacements.
- Bases
 - o 23 replacements overall with 1 immediate replacement.

8. All davits and bases identified in the inspection results as requiring immediate replacement (Rating 6) were completed in 2022, the same year the inspection was completed. Numbers for davit and base replacements do not translate directly to the total


number of complete streetlight structures (each streetlight structure contains a base, conduit, davit, conductor, and streetlight head) that are required to be replaced. The location of davits and bases that need to be replaced may overlap to a single streetlight structure.

Condition Rating	Description	Detailed Description
1	Excellent	Material appears to be in sound condition. No deficiencies identified. Appears to be new or galvanized and not rusted.
2	Good	Material seems to be in sound condition with minor defects. Minor to Moderate Corrosion identified.
3	Satisfactory	Material seems to be in satisfactory condition with moderate defects identified. Moderate to Heavy surface corrosion is identified but not causing excessive metal loss. Ultrasound test conducted and has positive results. Concrete base shows signs of moderate cracking, spalling, or delamination.
4	Deteriorating	Replacement recommended. Punctures, small holes with little rust. Rust holes up the pole that does not affect the area around the baseplate weld. Major defects are found such as Dents or cuts but do not have major impact on the structural integrity. Failed UT Test but does not have rust holes.
5	Medium Priority Replacement	Replacement recommended. Rust holes with major rust and pitting present on the pole. Major dents causing buckling. Broken/sheared bolt on base. Nuts cannot be tightened due to corrosion.
6	High Priority Replacement	Replacement recommended immediately. Structural Integrity is compromised. Examples: Rust holes identified on half of Structure sides. Buckling causing a severe lean. A broken frangible collar. 2 or more broken/sheared bolts.

Table 1: Streetlight Inspection Ratings



SECTION 3 - PROJECT DESCRIPTION

9. Replace all streetlight davits and bases identified with a rating of 4, 5, or 6 through the inspection completed by ASAP. Replace all streetlight davits and bases with a rating of 6 immediately.

SECTION 4 - PROJECT SCHEDULE AND COST

2023 - \$79,000 2024 - \$295,000 2025 - \$400,000

SECTION 5 - BUSINESS DRIVERS AND BENEFITS

10. The *Public Utilities Act* imposes the following requirements on Naka-YK:

A public utility shall provide safe, adequate and proper service and keep and maintain its property and equipment so that the public utility can provide the service.¹

11. The Streetlight Davit and Base Replacement Program ensures that End-of-Life streetlights which have physically deteriorated over time or sustained damage requiring their replacement are replaced. Replacing streetlights that have been identified through the third-party inspection as requiring replacement protects public safety and ensures that Naka-YK meets its utility obligation to provide safe electrical services to its customers.

SECTION 6 - EVALUATION OF VIABLE ALTERNATIVES

12. <u>Alternative 1</u> - Do nothing. This alternative exposes the public to unacceptable safety risks as deteriorated or damaged streetlight davits or bases identified as requiring replacement by a qualified third-party are not replaced. Failing to replace streetlights identified as requiring replacement though the third-party inspection violates Naka-YK's obligation to provide safe electricity services to its customers.

¹ *Public Utilities Act*, Section 76 (1).



13. <u>Alternative 2</u> - Replace streetlight davits and/or bases identified for replacement. This alternative replaces all streetlight davits and bases identified as requiring replacement through the inspection results provided by a qualified third-party. Streetlights that received a rating of 4, 5, or 6 will be replaced. Replacing streetlight davits and bases as recommended by the third-party inspection positively impacts public safety and ensures that Naka-YK meets its utility obligation to provide safe electrical services to its customers.

SECTION 7 - RECOMMENDATION

14. Proceed with Alternative 2, replacing all streetlight davits and/or bases identified for replacement through the inspection provided by a qualified third-party. Streetlight davits and/or bases that received a rating of 4 or 5 will be replaced. Streetlight davits and/or bases that received a rating of 6 were replaced immediately following the inspection in 2022. Completing the replacement of streetlight davits and bases under the Program ensures that Naka-YK adequately protects public safety and meets its utility obligations to provide safe and reliable power. Failure to replace streetlight davits and bases identified for replacement exposes the public to unacceptable risk and violates Naka-YK's utility obligations.



Naka Power Utilities (Yellowknife) (Naka-YK) 2024-2025 General Rate Application (GRA)

Advanced Metering Infrastructure Program Business Case #12



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SECTION 1 - EXECUTIVE SUMMARY

1. Install Advanced Metering Infrastructure (AMI) to enable real-time system monitoring and remote operation in order to support operational efficiencies and facilitate integration of further grid modernization technologies in Yellowknife. The Northwest Territories is currently experiencing changing government policies, technologies, and customer behaviors which will fundamentally alter the future operation of the electric distribution grid. Naka Power Utilities (Yellowknife) (Naka-YK) must modernize its electric distribution system to ensure it can keep pace with these changes.

2. As a distribution facility operator, Naka-YK has an obligation to serve its customers, and to maintain safe and reliable service. To accomplish this, Naka-YK must take action to ensure the continued operability of the distribution grid within the City of Yellowknife (the City), as load profiles become more complex and less predictable. Naka-YK's response to meet the need for grid modernization details how it will address the electric grid's rapidly changing requirements.

3. AMI is a fundamental building block for utilities to integrate grid modernization and respond to changing government policies, technologies, and customer behaviors. Installation of AMI in Yellowknife will replace the existing Automated Meter Reading (AMR) technology that is currently used to collect billing reads from customer meters. The existing AMR metering infrastructure is nearing end of life and upgrading the metering system in Yellowknife to AMI will ensure the continued safe and reliable operation of Naka-YK's grid by adopting and incorporating technologies in a planned, reasonable, and proactive manner.

SECTION 2 - BACKGROUND

4. The Government of Canada¹ is shifting its policies towards decarbonization, *Government of Canadian Net - Zero Emissions Accountability Act* and climate change,²

¹ <u>https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/climate-plan-overview/emissions-reduction-2030.html.</u>

² <u>https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/climate-plan-overview/emissions-reduction-2030.html.</u>



which will alter customer behaviour and attitude towards power usage and introduce new technologies that will change how the electricity grid has traditionally been operated and valued. Implementation of government policies, discussed below, are encouraging the implementation of new technologies categorized as distributed energy resources, which includes Electric Vehicles (EVs).

5. In addition, in 2018, the Government of the Northwest Territories (GNWT) issued its "2030 Energy Strategy: A Path to More Affordable, Secure and Sustainable Energy in the Northwest Territories".³ The strategies in this document include the reduction of Greenhouse Gas (GHG) emissions in electricity generation through the integration of small to large scale renewables as well as reductions in the transportation sector through the adoption of EVs. The integration of renewable generation to offset diesel consumption is a major objective of the GNWT energy strategy. Another strategy is to reduce GHG emissions from road vehicles by 10 percent per capita. Adoption of EVs is a way to achieve decarbonization in the transportation sector and there are currently incentives for individual consumers through the Arctic Energy Alliance (AEA) and GNWT.

6. The City's "Corporate and Community Energy Action Plan"⁴ also outlines municipal support for the adoption of energy transition technologies. In its plan the City sets targets for GHG reductions. The development of fast charging infrastructure for EVs and the adoption of EVs by residents are proposed as a means to achieve these targets. Installation of solar micro-generation by residents through the Net Metering program is another means being proposed by the City.

7. EV adoption and related support infrastructure as well as integration of renewal able generation will reduce electricity generation through diesel. This is exemplified by the active development of an EV charging corridor along NWT Highway 1 and 3 which are all-season highways, an active net-metering policy which has grown in Yellowknife

³ <u>https://www.inf.gov.nt.ca/en/services/energy/2030-energy-strategy</u>

⁴ <u>https://www.yellowknife.ca/en/living-here/resources/Energy/DOCS-485683-v1-</u> <u>CORPORATE_AND_COMMUNITY_ENERGY_ACTION_PLAN_2015_TO_2025_WITH_STUDIES.PDF</u>

year-over-year since its inception, as well as the undertaking of major projects including the Inuvik Wind Project and the Fort Providence Transmission Lines.

8. The impacts of widespread adoption of EVs throughout the northern territories is currently being studied at Yukon University. A study titled "Demand-side Management Strategies for Reducing Peak Demand due to Adoption of Electric Vehicles and Electric Heating" by Northern Energy Innovation discusses how mitigation of peak demand is a critical point to support EV adoption as well as integration of renewable generation which requires implementation of effective Demand Side Management (DSM) strategies.⁵

9. Furthermore, the integration of renewable generation from solar, due to its reliance on the sun, increases the frequency of fluctuation on the grid due to the intermittent nature of these generation sources. This makes supply spikes and drops an issue for grid management. In conjunction with increasing EV charging infrastructure and EV adoption through the Northwest Territories (NWT), traditional demand spikes in the morning and evening when customers are going about their daily activities are projected to become increasingly volatile and harder to predict. The facilitation of the government objectives discussed above, as well as ensuring safe and reliable power is provided to customers, requires Naka-YK to install AMI in the City.

SECTION 3 - PROJECT DESCRIPTION

10. AMI consists of a communications network and meters that use radio-based communications to provide real time data to support maintaining grid reliability in an increasingly complex environment. AMI is the inaugural piece of Naka-YK's grid modernization and ensures that it will be able to support decarbonization initiatives as a fundamental building block to enable system benefits such as:

• Enhanced customer information and control over electricity consumption which would allow for integration and management of DERs at a customer level. For example, if system load is high, AMI can be used to put heating back on GHG fuels but when the load is low AMI can be set to turn on electric heat and remove GHG fuel consumption during that time; Monitor the system grid optimization, and the

⁵ DEMAND-SIDE MANAGEMENT STRATEGIES FOR REDUCING PEAK DEMAND DUE TO ADOPTION OF ELECTRIC VEHICLES AND ELECTRIC HEATING, Northern Energy Innovation, November 30, 2023.



ability to maintain reliability, by identifying system problems before customers experience inconvenience;

- More accurate and dynamic planning models of the system, allowing improved analysis and real-time decision making, supporting higher penetration of DERs, and enabling dynamic rates such as time of use (TOU) rates;
- The ability to remotely connect a customer without the need for Naka-YK technicians to visit the site; and
- The ability to identify outage points to support quicker and more effective restoration of the system in response to a power event.

SECTION 4 - PROJECT SCHEDULE AND COST

11. Due to the integrated nature of the communication system required for AMI, AMI implementation needs to be coordinated by neighborhood throughout the City to maximize the functionality of the system as it is deployed. To ensure adequate installation of the communication system and coverage across the city this AMI infrastructure will first be installed in 2025 with some AMI meters. Once the infrastructure is installed and the AMI meters tested, the remainder of the AMI meters are forecast to be installed beginning in 2027 through 2029 as the AMR meters come to end of life. The complete transfer of all AMR meters to AMI is anticipated by 2030. The delay of installation of meters from between 2025 and 2027 will ensure adequate time for Naka-YK to validate the system and make program adjustments as needed.

2025 - \$690,000 2027 - \$3,033,871 2028 - \$3,033,871 2029 - \$3,033,871 (2027-2029 forecast assume 3,000 installs per year)



SECTION 5 - BUSINESS DRIVERS AND BENEFITS

12. The *Public Utilities Act* imposes the following requirements on Naka-YK:

A public utility shall provide safe, adequate, and proper service and keep and maintain its property and equipment so that the public utility can provide the service.⁶

13. Switching from existing AMR meters to AMI meters will ensure that Naka-YK contributes to government decarbonization objectives by facilitating DSM.

14. Replacement of AMR metering infrastructure will replace assets nearing end-of life and proactively address the risk of being able to provide sufficient long-term technological support for AMR systems as utilities transition to AMI. As more utilities move to AMI, maintenance costs associated with the existing AMR metering system will become more expensive due to decreasing supply.

15. As a fundamental building block of grid modernization, AMI will enable the implementation of DSM to accommodate increasing EV charging infrastructure and EVs as well as reductions in diesel consumption through integration of renewable generation into the electrical grid. The integration of these technologies is introducing increasing bidirectional flows of electricity between customers and utilities as well as creating increases in demand spike intensity and unpredictability. To meet the needs of these non-traditional challenges and to add functionality to support dynamic rate design, direct load control, and other demand side management tools, the installation of AMI is foundational.

16. Additionally, the remote feedback and controls available with AMI will reduce the time on the road for Naka-YK technicians as functions that currently require a site visit can be completed remotely. More targeted responses to outages can be carried out with better feedback and nested outages can now be more efficiently detected and repaired. All of the above supports Naka-YK's utility obligations to provide safe and reliable services to its customers as well as employees by ensuring that it remains proactive in the

⁶ *Public Utilities Act*, Section 76 (1).



implementation of technologies which support government decarbonization policies and objectives.

SECTION 6 - EVALUATION OF VIABLE ALTERNATIVES

17. <u>Alternative 1</u> – Status Quo. This alternative will not be sustainable in the years to come as technologies to achieve GHG reductions are further implemented. If Naka-YK does not implement AMI, it will not be able to facilitate DSM technologies to support an increasingly complex electrical grid with increasing adoption of EVs and renewable energy generation. Continuing the use of AMR metering in Yellowknife will not replace end of life assets which will be subject to increasing maintenance costs due to the decreasing use of AMR as utilities move towards AMI. If Naka-YK does not proceed with the installation of AMI, it will negatively impact Naka-YK's utility obligations as well as inhibit the realization of government decarbonization policies and objectives.

18. <u>Alternative 2</u> – Proceed with installation of AMI under a delayed timeframe. Naka-YK views this alternative as similar to the status quo. The GNWT's 2030 Energy Strategy as well as subsequent GWNT publications make it very clear that increased EV adoption and related support infrastructure as well as integration of renewable generation will reduce electricity generation through diesel supporting GHG emissions targets to be achieved. Reactively modernizing Naka-YK's AMR metering infrastructure to AMI would result in expensive solutions given that as more utilities move to AMI, maintenance costs associated with the existing AMR metering system becomes more expensive due to decreasing supply. This alternative will not allow Naka-YK to fully meet its utility obligations to provide safe and reliable power to its customers over the long-term recognizing the direction of decarbonization policies and need for proactive utility participation to achieve these objectives.

19. <u>Alternative 3</u> – Proceed with the AMI Program. This alternative will ensure that Naka-YK can fully support the clear direction of government to decarbonize the economy. AMI is a fundamental building block to enable DSM tools. The AMI Program will build the infrastructure to facilitate adoption of EVs as well as continue the adoption of renewable generation. This alternative is proactive and will ensure that Naka-YK continues to meet



its utility obligations. Completion of the AMI Program as outlined above fully meets Naka-YK's requirement to provide safe and reliable power to its customers by ensuring that the utility has infrastructure in place that will respond to the increasing grid complexity which will be required for decarbonization by proactively adopting AMI metering infrastructure.

SECTION 7 - RECOMMENDATION

20. It is recommended to proceed with Alternative 3 and complete the AMI Program as outlined herein. The proactive and reasonable approach outlined in this recommended approach ensures that Naka-YK is prepared for future conditions which are projected to be experienced on the electrical grid as a result of decarbonization including volatile and unpredictable demand and supply spikes between utilities and customers. The AMI program will ensure that Naka-YK meets its utility obligations over the long term through proactive adoption of grid modernization technologies.