THE CITY OF DAWSON

AGENDA - COUNCIL MEETING #C21-15
TUESDAY, July 13, 2021 at 7:00 p.m.
Council Chambers, City of Dawson Office- Safe spacing rules apply

1. **CALL TO ORDER**

2. **ADOPTION OF THE AGENDA**
   a) Council Meeting Agenda #C21-15

3. **PROCLAMATIONS**
   a) July 14, 2021 LBGTQ2SIA+

4. **SPECIAL MEETING, COMMITTEE, AND DEPARTMENTAL REPORTS**
   a) Request for Decision: 2020 (Fall Intake) Community & Rec Grants
   b) Request for Decision: Climate Change- Adaption Planning
   c) Request for Decision: Subdivision Approval Extension – Lot 28 Dredge Pond
   d) Request for Decision: Tr'ondëk Hwëch'in Jeze Zho Men's Shelter

5. **BYLAWS & POLICIES**
   a) Bylaw # 2021-05 being the Civic Addressing Amendment Bylaw No. 2 – Third and Final reading
   b) Bylaw # 2021-06 being the Municipal Election Bylaw – Second Reading
   c) Bylaw # 2021-06 being the Municipal Election Bylaw – Third and Final reading
   d) Bylaw # 2021-07 being the Harrington's Store Municipal Historic Site Bylaw– Second Reading
   e) Bylaw #2021-08 being the Billy Biggs Municipal Historic Site Bylaw – Second Reading
   f) Bylaw #2021-09 being the Zoning Bylaw Amendment No. 12 – Second Reading
   g) Bylaw #2019-06 being the Official Community Plan Amendment No. 3 – Third and Final Reading
   h) Bylaw #2019-17 being the Zoning Bylaw Amendment No. 6 – Third and Final Reading
   i) Bylaw #2021-11 Land Sale Bylaw No. 1 Little Blue Daycare
   j) Bylaw #2021-10 Council Remuneration Bylaw – First Reading

6. **CORRESPONDENCE**

7. **PUBLIC QUESTIONS**

8. **IN CAMERA**

9. **ADJOURNMENT**

PROCLAMATION

LGBTQ2SIA+ Day

July 14TH, 2021

Whereas July 14, 2021, marks the 17th anniversary of equal marriage rights for same-sex couples in the Yukon and provides the perfect opportunity to celebrate the contributions of the LGBTQ2SIA+ community and reaffirm our town's commitment to equality, and

Whereas The City of Dawson grows stronger when all of us can participate in the development of our community without fear of discrimination, and

Whereas members of the LGBTQ2SIA+ community have made significant andlasting contributions to the betterment of our town, and

Whereas The City of Dawson has a history of acceptance, diversity, respect for personal freedoms, and celebration of difference, now

Therefore I, Wayne Potoroka, as Mayor of the City of Dawson, Yukon Territory, do hereby proclaim *July 14, 20**21***, to be

"LGBTQ2SIA+ DAY"

in the City of Dawson, Yukon Territory, and I commit this observance to the people of the City of Dawson. I further encourage all Dawsonites to battle prejudice wherever they may find it and continue building a welcoming community for all.

_____

Mayor Wayne Potoroka
Dated this 13th day of July, 2021.

Report to Council

[x] For Council Decision [ ] For Council Direction [ ] For Council Information

SUBJECT:	**Community and Recreation Grants**	
PREPARED BY:	Paul Robitaille, Parks and Recreation Manager	**ATTACHMENTS:**
DATE:	October 1, 2020	
RELEVANT BYLAWS / POLICY / LEGISLATION: **Community Grant Policy #16-01,** **Recreation Grants Policy 2017-06**		

RECOMMENDATION

THAT Council approve the following grants as recommended by the Community Grant Committee in the amount of $11,967.71 and the Level 2 Recreation Grants, as recommended by the Recreation Board in the amount of $5245.00.

BACKGROUND SUMMARY

NOTE: These grants were brought to a Committee of the Whole meeting but then missed getting onto a Council meeting agenda for final approval. That is why they are on the current Council meeting agenda.

$40,000 is budgeted for Community Grants to be dispersed over the three intakes. Council approved a special intake in summer of 2020. The City of Dawson received seven applications for the September intake of community grants. If council approves the Community Grants as recommended by the Community Grant Committee in the amount of $11,967.71 there will be $0 remaining, and no intakes left for the year.

The Recreation Board dispenses two levels of funding under the Recreation Grant Program. Level 1 is intended for individuals or small groups. Level 2 is for community groups, organizations, non-profits and leagues. $43,051.00 is budgeted for Recreation Grants in the 2020 Budget. If council approves the Recreation Grants as recommended by the Recreation Board in the amount of $5245.00, there will be $22060.64 remaining.

ANALYSIS / DISCUSSION

The evaluation criteria for Community Grants applications is as follows:

- Provide a lasting infrastructure legacy to the community;
- Demonstrate significant volunteer involvement;
- Generate significant local spending and economic impact;
- Maintain open public access to the event or project
- Demonstrate partnership with other levels of government and community groups;
- Show large event attendance and local involvement;
- Have limited access to alternative funding sources;
- Generate awareness of City of Dawson;
- Create a sustainable public and social benefit;
- Involve youth and seniors
- and the *Recreation Grants Policy* establish the criteria

The evaluation criteria for Recreation Grants is as follows:

- Public benefit (number of participants, large target audience)
- Reduction of barriers (such as low fees, accessibility, reduce social & cultural barriers, location)
- Building capacity (leadership development, instructor training, activity promotion or infrastructure improvement)
- Application (complete, alternative funding sources, partnerships)

Based on the evaluation criteria established in the *Community Grants Policy* and the *Recreation Grants Policy* the respective committees make the following recommendations to Council for approval:

Applicant	Project Name	Request	Rec Board	Comm. Grants	Recommend
KATTS	Trail Work	$2245.00	$2245.00	$0.00	$2245.00
Child Development Centre	Early Childhood Programming	$1500.00	$500.00	$1000.00	$1500.00
CPNP	Baby & Me Pilates	$2280.00	$500.00	$1000.00	$1500.00
Humane Society	SNIP Program	$1200	$0.00	$1200.00	$1200.00
Jimmy's Place – Art Collective	Winter Studio Space	$2700.00	$0.00	$2300.00	$2300.00
(S)hiver Winter Arts Society	Arts Festival 2021	$2000.00	$2000.00	$0.00	$2000.00
Industrial Arts and Technology Society Yukon (IATSY)	Makerspace Project	$8000.00	$0.00	$6467.71	$6467.71
	TOTAL	$19925.00	$5245.00	$11967.71	$17212.71

APPROVAL		
NAME:	C Bellmore	**SIGNATURE:** C Bellmore
DATE:	July 9, 2021	

Report to Council

[X] For Council Decision [ ] For Council Direction [ ] For Council Information

[ ] In Camera

AGENDA ITEM:	Climate Change – Adaption Planning	
PREPARED BY:	Brodie Klemm	**ATTACHMENTS:** ▪ FPMBCL CoD Admin Bldg RCx Report ▪ FPMBCL CoD PW Shop RCx Report ▪ AMFRC Fuel Analysis
DATE:		
RELEVANT BYLAWS / POLICY / LEGISLATION: ▪		

RECOMMENDATION

- that council direct administration to engage with Chief Isaac in regards to pursuing a feasibility study on district biomass heating system for our respective facilities and other buildings in the North End.
- that council direct administration to switch from oil to propane as a heating fuel and pursue further design & planning in regard to replacing existing oil-fired boilers within the Administration building with a hybrid propane boiler/heat pump system.
- that council direct administration to prepare an RFP for design, build and installation of a hydronic heating loop using propane boilers within the Public Works building using completed recommissioning report as a basis of design.
- that council direct administration to prepare an RFP for design, build and installation of a 'solar roof' on the Public Works Shop that incorporates upgraded insulation levels and solar panels/shingles.
- that council direct administration to pursue energy mapping within municipal boundaries to identify the viability of local solar, wind and micro-hydro resources in order to promote and pursue local solutions for energy demands

ISSUE / PURPOSE

Council unanimously passed a resolution at their meeting on October 7, 2019 to implement changes that would reduce the environmental footprint and greenhouse gas emissions resulting from City operations. This plan will provide strategic direction for the municipality and has the potential to spur a number of new local industries related to energy production.

BACKGROUND SUMMARY

ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) level 2 energy audits were conducted on the Dawson City Administration Building and Dawson City Public Works Shop in January of 2020. These were conducted at the request of Energy Mines and Resources as a prerequisite for obtaining funding from the Community Institutional Energy Efficiency Program (CIEEP).

The results of these audits were reviewed and further researched by the Asset & Project Manager together with a Senior Energy Advisor from YG. Further recommissioning work was decided upon and administration engaged with Future-Proof My Building Consulting out of Whitehorse to perform a more detailed analysis of each to the two buildings and provide recommendations on how to best set each facility up for optimal energy performance now and into the future. A total of forty-six recommendations were received across both buildings with the major proposals including:

- Implementing a biomass district heating facility in collaboration with Chief Isaac to heat both CoD and Chief Isaac buildings as well as possibly Trinke Zho Daycare and the Parks Canada Maintenance compound
- Switching to propane as a heat source/backup heat source if biomass is installed in order to lower GHG emissions and mitigate environmental spill concerns.
- Upgrading the roof of the Public Works shop to accommodate higher insulation levels to reduce the required heat load and prevent seasonal ice-damming. Appropriate reinforcing is suggested to allow for the installation of solar infrastructure at a future date however this work may as well be done at the same time.
- Installing a Building Management System within the Administration building to increase overall efficiencies of all HVAC components

ANALYSIS / DISCUSSION

The Project Team has concluded the following to be necessary to continue to move its Climate Change adaption measures forwards:

1. Feasibility study of a Biomass District Heating System.

District Energy is a proven means of meeting demand for space heating, domestic hot-water and other services. It is well established in many Canadian cities and across Europe and Asia. The Asset & Project Manager along with the Building Maintenance team toured the local plant in Dawson as well as the Arctic Inland sawmill that supplies the plant with woodchips. Should Chief Isaac agree to partake in this project, a feasibility study is required to answer further questions including but not limited to:

- Number of buildings involved and their respective heat loads
- Understand how other buildings will best utilize the provided heat
- Most suited location(s) for the Plant
- Biomass supply and environmental impacts of harvesting increased amounts of fuel wood
- Engineering required to allow infrastructure that is buried in permafrost to be as safe as possible
- Opportunities for citizens to participate in the heating economy through the sale of fuel wood (as done in Teslin) and willow harvesting (as done in Old Crow)

2. Switching to Propane as a heat source.

Advantages of propane as a heat source include:

- Lower GHG emissions
- Operational efficiencies of up to 97%
- Biomass as the primary heat source with propane backup is the model that the territorial government are also working to implement.

Propane is not without its drawbacks however and further design and operational issues will need to be addressed such as:

- Propane will coagulate and cease to flow at temperatures below -42°C. Tank heaters exist to mitigate this issue and other options can also be explored
- Availability of qualified maintenance personnel within the municipality.

3. Upgrading the insulation and Installing Solar on the Roof of the Public Works Shop

In its current form, the roof of the PW shop is prone to ice-damming due to the limited amounts of insulation at the eaves. This allows warmed air from within the building to escape and melt the snow at the eaves

which later re-freezes and can cause damage to the roof system, become a hazard for occupants and leads to water infiltration into the wall cavity during spring thawing.

An upgrade to the roof system would include:

- Adding 4-6” of additional insulating material
- Extending the overhang where possible by 16-24”
- Incorporating a venting space that allows air to circulate and prevent ice-damming
- Installing solar panels/shingles that would off-set a portion of the buildings electrical draw

Further solar energy mapping could be done of other City owned properties and incremental installation of solar infrastructure worked into future capital budgets.

4. Continuous energy improvements at the City’s major energy consuming facilities.

Building Maintenance personnel have implemented a number of energy saving changes across City facilities and in particular the Art & Margaret Fry Recreation Centre. The upstairs, unfinished office area of the AMFRC never had proper insulation or vapour barrier installed on the exterior walls nor had the ventilation ducting connected from the downstairs administrative area to the air handler.

These two factors resulted in the unfinished offices to be under a state of negative pressure, continuously drawing outside air in through the exterior walls into the building. Building Maintenance personnel rectified this situation in January of 2021 for a materials and labour cost of $5,050 and measured an immediate reduction in heating oil consumption. This combined with operational changes instigated by former Building Maintenance Technician Stephen Kurth has led to an increase in fuel efficiency since 2019 of 51.1%

This was accompanied by a significant increase in electrical usage compared to previous years. The chief reason for this was due to issues with the ‘free air’ component of the chiller system used to create the artificial ice surface. This system allows the chiller to shut-off when the ambient temperature is less than -25°C and utilises outside air to maintain the ice surface. Leaks detected within the system resulted in it being inoperable throughout the winter and hence the chiller was required to operate continuously throughout the season. These issues will be resolved for the 21/22 season.

Additional upgrades to the AMFRC scheduled for 2021 include replacing the metal halide bulbs that illuminate the rink surface with LED equivalents and installing a REAL Ice™ system that would reduce the amount of heating required for flood water, eliminate short-cycling of the boiler system and allow the temperature of the chiller to be raised several degrees.

Other energy saving measures instituted by Building Maintenance staff included:

- Applying window film on all double glazed windows in the Administration building, Public Works Shop and Minto Park Concession.
- Systematic air sealing of all facilities utilizing a FLIR C2 Thermal imaging camera and various sealing mediums including new weatherstripping and door sweeps, spray foam, foam tapes and both batt and rigid insulation.
- Switching out of approximately 400 fluorescent bulbs across both the Admin and PW buildings to energy efficient, ballast-free LED equivalents
- Setting up the major facilities on the Energy Branch’s ‘Energy Star Portfolio Manager’ energy benchmarking platform. This tool will track trends in energy usage and costs over time for all the major energy consuming facilities.
- Increased electrical usage at the Minto Park Concession was identified during the winter month and solutions are being investigated in regard to more efficient heating options and re-programming the use of the HRV to only operate when the building is occupied.

APPROVAL		
NAME:	Cory Bellmore, CAO	**SIGNATURE:** 
DATE:	July 9, 2021	

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Client: City of Dawson

Administration Building

Recommissioning and Engineering Assessment Report

Prepared by:

Shane Wolffe P.Eng, LEED AP BD+C, CEA
APEY Member No. 2428

Issued to Brodie Klemm

City of Dawson Project Manager

ProjectManager@cityofdawson.ca (867)993-7405

Draft V3 Issued for Review May 10, 2021

Executive Summary

This report is a record of recommissioning and assessment activities of the City of Dawson Administration Building/Firehall located in Dawson City, Yukon. It explains components of the facility that were investigated during this project and provides guidance to building operators and project managers with regards to how to proceed with energy saving and greenhouse gas reducing projects. This project was initiated to aid proponents in bidding and provide a detailed scope of work as well as to comment on proposed ECMs from the Energy Audit Report.

Section 5 of this report defines the options available to the City of Dawson and should be fully considered prior to moving forward with implementing ECMs that may later have minor usage.

Proponents to the Request for Proposals should read this report and become familiar with it to assist with preparing their submission. Section 5 lays out the action items/criteria of the project that are being completed and bid on. The proponents are instructed to reference each item in section 5 individually as each item will be individually assessed according to the item reference number. This is intended to assist proponents with organizing their submissions and for the owner with regards to scoring proposals.[1]

At the request of the building owner this project focused on the future state of the building rather than its current state. Recommissioning activities took place during the winter.

Operators should familiarize themselves with recommissioning and energy auditing reports to assist with operating the building. Project managers should make themselves familiar with energy auditing and recommissioning reports prior to contracting services or making alterations to a building that has been recommissioned or energy audited to make the best usage of their time and resources. Energy Audit reports are a surface level investigation while recommissioning projects dig into the details of how a building is operating.

Operators should endeavour to continuously commission equipment through the life of a building.

Top recommendations to be implemented as part of this project include:

1. Install a biomass system to heat the Admin Building, Public Works Building and potentially Chief Isaac properties
2. Implement ECM-10 Control system to integrate other controls related ECMs
3. Insulate bay doors and metal exit doors
4. Implement ECM-3 LED Lighting Upgrades without occupancy sensors or dimmer switches
5. Implement ECM-17 Insulation Upgrade to roof
6. Upgrade boilers (optimally to propane) while funding is available

ECMs not recommended are:

1. Insulation upgrade to walls not recommended
2. Utilizing Energy Valve ECM-14 with Self Sensing Pumps ECM-6

[1] This report has a different layout than I expected because of the multiple options available to the City. Once the City selects which criteria to utilize, I will remove the components that are not applicable from section 5.

Table of Contents

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Disclaimer

Buildings are dynamic systems that are constantly changing according to operator inputs and environmental conditions. The observations, findings and operational recommendations within this report may change based on the actions taken by various parties involved with the facility. Terms such as "likely", "potentially", "approximately" etc. are used throughout the document because changes to a single system may greatly impact other systems within the facility rendering findings and predictions as recorded inaccurate.

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Future Proof My Building Consulting Ltd. cannot be held liable for the accuracy of predictions, measurements and findings as recorded in this document.

1 - Introduction

Future Proof My Building Consulting Ltd. (FPMBC) was contracted by the City of Dawson to carry out recommissioning activities at the Fire Hall/Administration Building in Dawson, YT to identify sources of excessive energy usage in the facility and provide recommendations for the correction of mechanical, electrical and control systems that can save energy in the facility and reduce greenhouse gas (GHG) emissions. The project is intended to help clarify and facilitate the successful implementation of energy conservation measures (ECMs) noted in the Energy Audit Report issued by 3D Energy Limited on April 17, 2020. The Energy Audit inspection appears to have been conducted in January or February of 2019.

Site visits by FPMBC were carried out on December 15 and 17th to assess equipment and the building in general and test controls, mechanical and electrical systems within the building. During the thermal inspection on December 15 the outdoor air temperature was -21°C. On December 17, it was -37°C according to the Weather Network.

This report highlights issues identified and opportunities to save energy within the facility and shall help inform proponents of issues that must be addressed as part of energy efficiency upgrades to the building. Consultation with building operators, engineers, technicians, design consultants and contractors will likely be necessary to address the issues and opportunities identified within this report. This report in whole or in part can be issued to the appropriate parties to request resolutions, provide guidance with detailed designs, provide answers to inquiries or for the sake of providing clarification.

1.1 - Definitions, Acronyms etc.

ESC – Energy Solutions Centre

FPMBC – Future Proof My Building Consulting Ltd.

AHU – Air Handling Unit

AH – Air Handler also referred to as RTU and AHU

BMS - Building Management System – the computer/software that displays the graphics and allows a building operator to control components within the building. The BMS is essentially a SCADA system that displays trends, graphics and monitors the control system to visually describe the state of equipment within a building.

City – Referring to the City of Dawson

CU – Cooling Unit

Cx – short for commissioning

DMP/DMPR – Damper – a device that opens and closes to allow air flow or restrict airflow.

EAD – Exhaust Air Dampers – dampers that exhaust return air to the exterior

EF – Exhaust Fan – a fan that removes exhaust air from a zone

FC or FCU – Fan Coil Unit

HAND – Industry term for "Manual" mode or "ON"

HOA – Hand/OFF/AUTO – a switch that puts equipment in HAND (manual ON), OFF or Automatic as determined by the control system

HtgVlv – Heating Valve – A valve that opens in order to allow hot water to flow through it into a heating coil or radiating device.

HWST - Hot water supply temperature. The temperature of the water that is provided to the building by the boilers.

HWRT – Hot water return temperature. The temperature of the water that returns to the boilers after being used by equipment in the building.

IPP – Independent Power Producers Program – A program administered by the Energy Solutions Centre that allows for selling renewable energy to the grid.

MAD – Mixed Air Dampers – dampers that mix return air with outdoor air

MCC – Motor Control Centre – A switch that allows for turning large equipment such as fans and pumps ON/OFF in HAND/AUTO.

Night Setback – An algorithm that holds a zone at a temperature several degrees below the regular occupancy temperature. A night setback during heating season is typically 17°C or 18°C. Also called an "unoccupied mode." In the Yukon, summer temperatures do not typically require a setback temperature due to cool nights.

OAD – Outside Air Dampers – dampers that open to allow fresh air into an AHU.

OAT – Outside Air Temperature

PID – Proportional Integral Derivative – A mathematically derived equation that controls the behaviour of equipment. A good PID loop is a program that makes equipment find a steady state of operation without oscillating between overshooting and undershooting the desired output.

RCx – short for recommissioning. Recommissioning is a re-optimization process for existing buildings. It ensures building equipment and systems are operating optimally to meet current occupant needs. It provides a rigorous investigation approach to identify problems and integration issues.
The RCx primary focus is on identifying "low cost/no cost" operational improvements given the building's current usage to obtain comfort and energy savings. [2]

[2] https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/canmetenergy/pdf/fichier.php/codectec/En/2008-167/NRCan_RCx_Guide.pdf

Reset Schedule – an algorithm within the control system that automatically modulates the output temperatures of a boiler according to the OAT. A good reset schedule should be operator adjustable so that the operator can adjust the boiler water temperature at a given OAT according to the dynamics of a building. Warmer OATs allow for cooler boiler water and colder OATs require hotter boiler water to meet the demands of a building. In buildings without a reset schedule, the same temperature water is used whether it's -40°C or 15°C.

RTU – Roof Top Unit – supplies large amounts of tempered air to a building.

SAF – Supply Air Fan – The fan within the air handling unit that pushes air through the zone/ductwork/system as it pulls return air back and mixes it with outside air.

SAT – Supply Air Temperature – typically from an air handling unit

SATSP – Supply Air Temperature Setpoint - the temperature that the AHU should be providing

SHGC - Solar Heat Gain Coefficient – a measure of how well solar gains are transmitted through glass to allow heat to be captured by the glass. SHGC = 1 means that all light frequencies pass through and cause heating. SHGC = 0 means that all visible light is reflected. No window will ever reach SHGC of 1 or 0.

Shoulder Season – typically fall and spring in which heating is required at night or on cloudy days and cooling is required during the heat of the day. The shoulder season is typically when HVAC systems can overheat or cool a building and use excessive amounts of energy unnecessarily. In Yukon the shoulder season can also refer to summer operating conditions.

SWT – Supply Water Temperature – the temperature of water that is being delivered from the boilers to heating equipment

TStat – Thermostat – A device that measures temperature in a zone.

Trends – Trends are graphs of the status of a point as measured or set by a control system. Having the status of points displayed graphically allows an operator or energy manager to understand how well equipment is operating. This assists with determining options that can save energy in buildings and allows for experimentation with regards to scheduling etc.

UPS – Uninterrupted Power Supply – A battery bank that is attached to electrical equipment to prevent the equipment from shutting down or experiencing power failure/power quality issues.

VAV – Variable Air Volume box – A device that mixes and tempers air for delivery to a zone at a setpoint temperature

VFD – Variable Frequency Drive – A device that changes the frequency of power that is delivered to a motor in order to control the speed of the motor. Running a motor with a VFD provides significant efficiencies with regards to electrical energy used if the motor isn't running at full speed. VFDs can also introduce harmonics and slightly alter the power factor of a circuit.

1.2 - General Notes regarding building history and findings[3]

Located in Dawson City, Yukon, the Administration Building (also called city hall/fire hall) has two stories and was originally constructed in 1898 with an approximate floor area of 657 m^2. According to the information provided to Energy Auditors, an interior renovation was done to the existing building in 1999 as well as a total of 541 m^2 was added to the north and south of the existing building including mezzanine level on south side. This facility has a total gross floor area of approximately 1,198 m^2.

The admin building houses a museum, equipment room, association (staff) room, washrooms and ancillary spaces on main floor; offices, council chamber, meeting room, washrooms and ancillary spaces on second floor and mechanical room on mezzanine level.

The city hall component of the building is occupied from 8am to 6pm on weekdays and closed on weekends. There are 10-12 regular staff plus a maximum of 5 visitors. The Fire Hall component is open year-round with training one night per week which is attended by approximately 30 fire fighters.

Based on the heating oil consumption records for 2017-2019, the facility uses an annual average of 21,232L of fuel oil per year at $1.05/L. That is an annual fuel cost of $22,270. The cost of a gigajoule of oil at $1.05/L is $27.41. The existing oil boilers are predicted to have an efficiency of 68% in the Energy Audit, however they have been regularly maintained and tested to have an 84.8% and 84.9% efficiency. The cost to deliver 1GJ of energy from burning oil @ $1.05/L in an 85% efficient boiler is $32.24/GJ.

ECM-13 from the Energy Audit recommends implementing a biomass boiler for this building[4] and predicts an annual oil savings of 16,185L (32 t CO_2e yearly reduction). The cost of heat provided by biomass to Haines Junction and the City of Whitehorse is approximately $10/GJ[5] at $150/ton of dry chips. This cost is likely due to an existing market and availability of seasoned, dry chips. The biomass system currently operating in Dawson is paying the sawmill $28/GJ to provide chips to the Yukon Government operated facility[6].

According to Brodie Klemm, the oil tanks for the Admin building are at the end of life and are due for replacement. The cost of oil tank replacement should be factored into their replacement costs. The costs of cleaning up an oil spill and insurance should also be considered since they will factor into the ongoing costs of the system. Though a reduction in premium has not been guaranteed by the current

[3] Many of the statistics from this report have been referenced from the Energy Audit report.
[4] Ideally a biomass district heating system will be constructed for this building, the Public Works building and potentially multiple Chief Isaac properties as well as the City's woodshop to reduce operating expenses and GHG emissions from all buildings connected to the heating loop.
[5] The cost of biomass heating depends upon the moisture content of chips and cost of supplied wood per ton.
[6] The chip quality and dryness will directly affect the performance and efficiency of the biomass system and thus it is recommended to procure dry, seasoned chips. If Chief Isaac or Tr'ondëk Hwëchin have a stake in the biomass system, they will likely participate in the acquisition of wood chips at a more competitive rate while investing in infrastructure to improve chip quality.

insurance provider, there may be some financial incentive to reduce the risk and liability of using an oil-based system.

Based on the electricity consumption records for 2017-2019, the facility uses an annual average of 75,950 kWh of electricity per year with a max peak demand of 31.62 kW in 2018. This usage puts the facility in Block 4 of the new Yukon Energy rate schedule (2020) with a cost of $0.20/kWh and a demand charge of $10.85/kW. The switch gear for the building indicates a Maximum Horizontal Bus Capacity of 400A, Maximum Interrupting Capacity of 22KAIC, Bus Bracing of 50KA at 120V/208V.

The facility heating and cooling distribution methods are:

- High temperature hydronic (hot water) heating (serving perimeter baseboard heaters, unit heaters and heating coils in AHU and FCU).
- Conditioned forced air supplied to the spaces via ceiling mounted grilles/diffusers.
- Forced air heating through unit heaters.
- Convective heat through baseboard radiation.

Currently the Admin building is heated from the combustion of oil-burning aged equipment. There is a hydronic heating system that is used to distribute the heat as well as temper air for the building. This makes it a prime candidate for implementing biomass heating. To significantly reduce the GHGs consumed by the building as well as operational costs, implementing biomass heating in the Administration Building as well as at the Public Works Building is recommended.

There are multiple potential options for implementing biomass heating in the building. Section 3 of this report will discuss potential options for constructing a biomass district heating plant that can be utilized by the City of Dawson as well as potentially Chief Isaac.

2.0 – HVAC Equipment

2.1 – Boilers

Items: 5.1, 5.2, 5.3, 5.18

The building is heated by 2 large 483MBH (141.55kW) oil boilers that were installed in December 1999 according to nameplate stickers. These boilers operate between 180F and 210F (82.2°C and 98.9°C) with water temperatures ranging from 155F to 170F (68.3°C to 76.7°C). The system appears to simply maintain the water temperature as long as the boilers are on. There is no outdoor reset and there are no temperature sensors that report boiler temperatures to the existing control system. Thermometers should be added to the hot water supply and hot water return lines of each boiler when upgrades to the boilers are made.

Hot water is distributed through the system to radiant wall heaters, the air handling unit AHU-1, a fan coil unit and unit heaters. With the exception of AHU-1, this heat is regulated by simple thermostats that have no unoccupied settings. Thermostats for radiant heating were tested and observed to be

functioning, however they must be manually controlled on Fridays to provide setback energy savings. Currently the building operator drops the setpoint by 3°C on Fridays and resets them on Mondays. The zones respond well.

Figure 1: Two large 141.55kW oil boilers heat the Administration Building. The controls cabinet for the building is in the blue cabinet on the left side of the image.

The City of Dawson should decide if oil will continue to be the backup heat source once a biomass system is installed. The oil tank is at end of life and will need to be replaced soon. It may be advisable to change over all equipment within the Administration building to propane now since propane equipment is more efficient, allows for better temperature modulation, creates less GHGs, and has less risk and environmental concern attached to it. The cost alone to replace an oil tank and infrastructure with propane infrastructure may be offset by the cost of cleanup from an oil spill or leaking tank.

In terms of economics, propane typically outperforms oil in terms of cost per heat delivered and has the benefit of reduced GHG emissions. The cost of propane to the City of Dawson was quoted at $0.9141/L on April 27, 2021 which is 208% higher than the $0.44/L that the City of Whitehorse paid in 2019. This equates to a cost of $37.59/GJ of heat delivered when utilized in a 95% efficiency boiler. The cost of a gigajoule of energy delivered from burning oil @ $1.05/L in an 85% efficient furnace (maximum efficiency) is $32.24/GJ.

Regarding expected propane consumption if a biomass boiler is added, the following can be inferred. The Admin Building used an annual average of 21,232L (813.5GJ) of heating oil from 2017 to 2019. The boilers operate at ~85% efficiency, thus only ~691GJ of the 813.5GJ of delivered energy was used for heating by the oil boilers. **691GJ worth of propane used in a 95% efficient boiler(s) is 28,513L per year** if no other energy conservation measures are taken. Since the building will use significantly less energy from ECMs and be approximately 80% heated by biomass, it is reasonable to assume between 2,850L to 11,400L of propane per year (10% to 40% of current energy demand) once biomass is installed and other ECMs are implemented. The 40% figure is in case the biomass is down for a period in the winter. 2,850L @ $0.9141 = $2605/year to 11,400L @ $0.9141 = $10,420. The high end of propane usage is pure propane 28,050L @ $0.9141 = $25,640 per year.

A significant drawback of using propane in Dawson's extreme climate is that it has the potential to stop flowing when outdoor air temperatures are colder than -42°C. There is equipment that is designed to mitigate the chances of propane coagulating under these conditions such as a tank warming electric blanket. A greater issue may be a lack of infrastructure in place and the availability of being able to receive reliable propane deliveries. All of these should be considered prior to making the decision to change to propane.

According to the Superior Propane website[7], 500Gal (2000L) and 1000Gal (4000L) tanks are available. The number of deliveries the City intends in a year will determine the tanks chosen vs. cost per tank. For fewer deliveries and potentially a better cost per liter, select larger tanks. If there is a delivery charge it should be considered as part of the ongoing costs since a delivery to Dawson will likely be expensive and thus the City will want to limit deliveries as much as possible. It is likely that the high cost per liter factors delivery into the cost.

The decision to remain with oil as a backup heat source to biomass should be made prior to moving forward with any equipment upgrades or renovations. If oil remains as a backup heat source, the decision to implement backup oil boilers to the biomass heating system may be advisable, dependent upon the equipment options selected.

This report will assume that oil will remain the primary backup heat source to biomass.

2.2 – Radiant Heating

Hot water from the boiler is circulated through the building and is used as primary heating for the administration area as well as the fire hall. If a biomass boiler system is implemented as discussed in section 3, the existing hydronic system is highly advantageous for making use of the biomass heated water.

Radiant baseboard heating is used throughout the upstairs administrative part of the building. The radiant heating is controlled via manual thermostats which were tested during the site visit. All were found to be controlling the control valves. As part of BMS upgrades, these thermostats will optimally be replaced by operator adjustable thermostats that are monitored and controlled by the BMS. These

[7] https://www.superiorpropane.com/tank-sizes

thermostats must allow for occupancy scheduling. Zones that may be occupied after hours such as the Council Chambers should have an occupancy sensor or zone override button that keeps the zone at occupied temperatures after hours as required. This will allow for maintaining heating setpoints in winter as well as cooling setpoints during summer. The Council Chambers can reportedly overheat during summer months due to solar gains as it is located on the south west side of the building.

Unit heaters are used within the firehall to heat the firehall and museum. The unit heaters are currently controlled by manual thermostats that activate flow through the unit heater.

According to building operators, some radiant valves have been changed out as required due to failure. The installed valves can remain until their end of life however it is recommended that during boiler upgrades all radiant control valves be replaced with Normally Open control valves and the radiant system be drained to replace the glycol in the system. A strainer for the glycol system should also be added or replaced if it does not currently exist.

2.2.1 – Radiant Heating Recommissioning Notes

- The Council Chambers has radiant heating around the south west perimeter.
- City Hall Office/Reception office radiators extend into the reception area. This radiant loop is controlled from a thermostat within the reception office. When the thermostat was adjusted, the valve responded and flow through the loop occurred within 2 minutes.
- The CFO office stays sufficiently warm and is controlled from the thermostat located outside of the office. It appears that the thermostat is in the file room or possibly the reception office. CFO opens a window to provide cooling when necessary and does not want a thermostat added to the room.
- The photocopier appears to be controlled by a single thermostat located in the photocopier room.
- The Archive Room (interior file room) has its own thermostat and radiant heater.
- The thermostat located above the edge of a radiator and next to the hallway reportedly controls the bathroom radiator (valve located in the bathroom), adjacent hallway and North exit hallway. The radiator temperature increased to 48°C when activated by the thermostat.
- The mayor's office in the northwest corner has its own thermostat for radiant heating which runs along the north and west walls. The temperature increased from ~35°C to 50°C when tested.
- CAO office has a thermostat for the CAO and Executive Assistant office to the north. When inspected, the rads were sitting at 33°C and increased to 48°C when the thermostat was tested.
- City Planning Office on north wall has a thermostat for that office and for the bylaw office (north east most office). The rads were cool and increased as expected when tested.
- The fire chief office has a thermostat located near the door and baseboard heater. The office is on the east wall near the north most. The radiator temperature increased immediately when tested.
- The northeast stairwell has a unit heater on the ground floor which is controlled by a manual thermostat.

- There are two thermostats that are located in the Firehall Training/General purpose room. One appears to control radiant heating and the other is likely for air conditioning.
- The thermostat for unit heater 2-3 and 2-4 is located in the fire truck room on the south wall.

2.3 – Cooling Equipment

Item 5.4, 5.5

In the summer, the boilers are manually shut down and air conditioning must currently be manually activated. Stage 2 of the air conditioning must be run manually via the control system because the setpoints don't work. This indicates that there are relays wired to the automation system to activate the AC units. Without the relays and automation working correctly, the AC literally must be turned on and off by building operations staff according to the feedback of occupants. Air conditioning is typically activated in the mornings and turned off at night or if the office gets too cold. Upgrading the controls shall address the automatic control of cooling systems so that setpoints are met in automatic mode.

Of note, the AC equipment was installed in 2000 along with the rest of the HVAC equipment[8] and is nearing end of life. Installing a heat pump to replace the AC within the building would allow for cooling in the summer as well as GHG free heating in the summer and shoulder seasons. The cost to operate a heat pump for heating varies according to the heat pump and outdoor air temperature; the colder the OAT, the less efficient the heat pump operates for providing heat. A standard heat pump with a COP = 3 will cost $18.52/GJ and produces no GHGs if the Yukon grid is being fully powered by renewable energy.

If a heat pump is installed, it will likely only be useful until outdoor air temperatures are approximately 5°C, however this will prevent the boilers from being necessary for up to a couple of months and will prevent the building from overheating on temperate days when heating is required in the morning and cooling is required in the afternoons. A heat pump would also help to offset heating that is provided by a biomass boiler system. By not activating the boilers and pumping hot water through the radiant system, the building is less prone to overheating during the summer and shoulder seasons. A heat pump used in this way will require the controls to have a HeatPumpDisableTemp setting that will allow the building operator to disable the heat pump for heating when outdoor air temperatures are colder than an operator adjustable temperature of approximately 5°C. Installing a heat pump to replace the existing air conditioning equipment will require a detailed design, however it is likely that much of the AC infrastructure can be utilized with the heat pump.

2.4 – Air Handling Unit AHU-1[9]

Item 5.6

A conventional AHU provides ventilation to the offices upstairs, council chamber and general area of the main floor. The AHU is controlled via the existing controller. The current controller measures outdoor air

[8] According to Owen Kemp-Griffin, building operator.
[9] Some information from this section is taken from the Energy Audit Report.

temperature, supply air temperature, mixed air temperature, return air temperature and the heating valve position. A heating coil with controlled valve opens to temper the air based on a measured mixed air temperature to meet a supply air temperature setpoint. A large volume of outdoor air is available for free cooling via the outdoor air dampers on the AHU.

Figure 2: View of the AHU from both sides. Note the marked drain line on the floor for reference.

There is a simple control panel that is located at the entrance to the City Hall Reception area on the 2nd floor. This panel provides feedback regarding the AHU being in an ON or FAIL state. The panel tells the control system to manually run the AHU via "AHU ON" or to run according to commands from the existing controller via the "AUTO" setting. For the building operators to shut down the AHU at night to save energy, it was revealed through testing that the "AUTO" setting on this panel must be selected. When this panel is in AUTO setting, the operator can shut down AHU-1 by changing the AHU1_FAN_STATUS to OFF. This command shut down the supply air fan and return air fan, however the outside air dampers reportedly did not appear to close as they should. When restarted, the RAF activated first then the SAF after approximately a 20 second delay.

The existing control system does not allow for scheduling the AHU to be off or for occupancy. This panel will be removed when the BMS is upgraded.

According to the Energy Audit report, that AHU fresh air minimum damper position is set to 25%. While onsite it was observed that during winter, on extreme cold days the minimum outside air dampers are set to 15% via the BMS to save energy and maintain a comfortable environment. Occupants did not express complaints of lingering odors and the air quality within the upstairs area was high during the site visit[10].

[10] During the site visit the OAT was ~ -37°C and the plumbing trap for the building dried up due to the cold dry air. This caused fumes from the sewer system to enter the offices. The trap was filled with water and the OAD were opened beyond 15% overnight to clear out the smell and returned to 15% the following day. The smell from the disturbance was removed.

A visual inspection of these dampers makes them appear nearly closed, however by testing the dampers it was observed that they are controllable and open when commanded. Opening the dampers past 15% was observed to create a sufficiently large temperature drop within the AHU to significantly reduce the supply air temperature and increase the amount that the heating valve must open. For this reason, the minimum OAD setting was manually set to 15% from 22% when OAT was -37°C.

No physical measuring devices were noted on the AHU. Upgrades to the AHU should include adding thermometers that can be viewed by operations staff and compared to temperature sensors that are monitored by the building management system. The existing supply air temp (SAT), return air temperature (RAT) and mixed air temp (MAT) sensors should be replaced as part of upgrading the BMS.

2.4.1 – Recommissioning Notes AHU-1

The outdoor air temperature (OAT) sensor was significantly out of calibration. The $OAT_{Weather\ Network}$ = -36°C when the BMS indicated that the sensor was OAT_{Sensor} = -23.3°C. This level of error in temperature readings will cause significant issues in program logic. Whatever option is implemented regarding the new control system, a properly calibrated outdoor air temperature sensor is very important to ensure that the system functions optimally.

The outside air damper (OAD) appeared to be fully closed (0%) when set at 15% which is minimum damper position setting. Tested the dampers at 0% and witnessed no air flow, 5% with no noticeable air flow, 10% minimal outdoor air flow, 15% which provided sufficient outdoor air flow. When tested at 20%, the outdoor air increased significantly from 15% and dropped the mixed air temperature several degrees with outdoor air temperatures at -36°C.

Minimum position was manually set back to 15% based on this observation. Given the cold outside air temperatures in Dawson, 15% was deemed adequate to maintain a healthy environment. The automatic damper position defaulted to 22% but was observed to greatly increase the position of the heating valve required to maintain the SAT. This minimum damper position may be the result of the faulty outdoor air temperature sensor reading -23.3°C when the actual outdoor air temperature was -36°C (feels like -38°C). Building operations staff reduced it to 15% due to cold air complaints during extreme cold temperatures. The OAD minimum position should be put back into AUTO setting if condensation is witnessed on windows and from spring to fall to ensure high levels of ventilation when temperature issues do not occur. The minimum damper position using the current configuration should not be reduced below 15% to ensure adequate ventilation during the most extreme cold weather.

- Changed AHU1_Mixing_Dampers value to 50% to test automation sequences and observed SAT and MAT drop as expected with heating valve opening. The boiler also kicked on at the same moment, but that may have been a coincidence.
- The relief air dampers were checked and observed to be fully closed.
- SAT_{Sensor} = 22.9°C , $SAT_{Measured}$ = 19.7°C – Sensor is slightly out of calibration but will be replaced with new control system.
- The supply air temperature setpoint is met well by the automation

- The Heating Valve responded as expected when tested.
- MAT_{Sensor} = 20.2°C , $MAT_{Measured}$ = 19.4°C – Sensor is working well but will be replaced with new control system.
- The mixed air temperature setpoint is met well by the automation.
- RAT_{Sensor} = 21°C , $RAT_{Measured}$ = 19.4°C, RAT_{Gauge} = 70F (21.11°C) – Sensor matches gauge and will be replaced with new control system.

3 – Biomass heating

Item 5.8,

At this time, fire smarting is being completed around West Dawson and this wood is being burned on site and wasted. This wood would be better utilized as a heating source for buildings within Dawson City.

Since there is a lot of capacity to provide wood chips in Dawson City due to the large biomass boiler already in place at the Water Treatment plant, a biomass boiler may be considered for installation as primary heat source for the Administration Building, Public Works Building, and for potentially multiple Chief Isaac owned properties in the vicinity.

ECM-13 of the Energy Audit recommends implementing a 120kW biomass boiler specifically for the Administration Building as top recommendation, however this sized boiler will be insufficient if multiple buildings are heated using biomass. Further, it is advisable to utilize multiple biomass boilers for this project so that they can be activated during colder weather and biomass can still be utilized if a single boiler requires maintenance.

Of important note, permafrost gets worse within Dawson City at the north end of town. Since the buildings that would benefit from biomass as discussed here are in the north end of town, permafrost concerns should be considered as part of the design and installation.

During the site visit, FPMBC investigated City property to determine where a biomass boiler could best be located. Due to the importance of access and egress from the Firehall, the most plausible option on City property is to possibly convert the existing woodshop into a biomass boiler facility. Even this option has complications however with regards to efficient chip deliveries regarding access and egress and thus the neighboring Chief Isaac property was considered.

FPMBC spoke with Gina Nagano past Chair of Chief Isaac Group of Companies. Ms. Nagano served 6 years on the board and is knowledgeable of the location. She indicated that Chief Isaac would be keen to discuss utilizing biomass at their office that is next door to the Firehall/Admin Building as well as in the Tr'ondëk Hwëch'in daycare which is across the street (behind the admin building). If the City has Chief Isaac/Tr'ondëk Hwëch'in First Nation as a partner, it should reduce the cost and complexity of implementing biomass for the Admin and Public Works Buildings. To size a biomass installation properly for such an application, it will be important to know the heat loads of Chief Isaac buildings and the wood shop if this building is also to be heated using biomass.

To create a biomass district/cluster heating system for use between Chief Isaac and the City, it will be important for the City of Dawson to have some type of heat purchase agreement, MOU or maintenance agreement if a biomass plant is to be constructed on Chief Isaac property for sharing between Chief Isaac and the City of Dawson at the Admin Building and Public Works building.

The only other option that appears possible is to construct a small biomass building in some of the parking spaces near the road on the north side of the Fire Hall/Admin building. This is an option if this building and chip delivery does not interfere with fire truck operation. Given the limited options for constructing a biomass facility on City property as well as the cost benefits of partnering with the First Nation, constructing it on the adjacent Chief Isaac property holds promise.

Figure 3: The area in front of the Firehall must remain clear so that fire trucks can easily exit and enter the hall. This leaves little space for implementing a biomass facility on City property. The exception may be to remove several parking spaces along the fence on the north side of the building (directly in front of the Museum entrance). The adjacent property owned by Chief Isaac holds promise for housing a biomass district heating plant for multiple buildings in the area.

The City of Dawson may wish to simply purchase heat from Chief Isaac, or they may take an ownership through a partnership of some kind. In terms of acquiring funding and reducing project costs, a partnership with Chief Isaac is likely the best option for the City.

In terms of operational costs, the cost of a gigajoule of energy produced from burning oil @ $1.05/L in an 85% efficient furnace is $32.24/GJ. The cost of heat provided by biomass is approximately $10/GJ[1] at $150/ton for dry wood chips. Lower quality (wetter) wood chips will increase the cost per GJ of heat and will increase the amount of maintenance that will be required to operate the biomass boiler(s). The cost of heat currently being paid for biomass heat in Dawson City is $28/GJ[11].

Figure 4: A google map of the City Fire Hall/Admin Building, City Public Works Building, City Woodshop, Chief Isaac Office, Tr'ondëk Hwëch'in Daycare and Chief Isaac wood working shop. The most likely location for a biomass facility is highlighted in red. The buildings that have potential for biomass heating have orange and yellow lines running to them. A detailed design would be required to accomplish this work. An engineering/energy assessment and optimally recommissioning of other buildings to be connected to the biomass must be conducted prior to detailed design to ensure that they are using energy efficiently and to prevent oversizing the biomass system.

[1] The cost of biomass heating depends mostly upon the moisture content of chips and cost of supplied wood per ton. There will also be losses through the distribution system.

[11] See Appendix 2 regarding costs provided to the City of Dawson. These costs will likely decrease with improved chip quality due to increased demand and infrastructure, participation from Chief Isaac/ Tr'ondëk Hwëchin and greater uptake of biomass in the Dawson area. Having a reliable demand for wood chips will help to improve the quality and supply.

By implementing biomass heating in the Administration building, the existing or replacement boilers will be required when the biomass boiler is unable to meet demand or if the biomass system fails. Since the building is already setup to utilize radiant hot water in unit heaters, radiant wall heaters and within the AHU, the Admin Building is an ideal candidate for the implementation of biomass heating.

Implementing biomass heating in this location would greatly reduce greenhouse gases, reduce the cost of heating fuel[12], provide local employment to Dawson citizens, and significantly increase the life expectancy of the new or existing oil boilers. If propane boilers replace the existing oil boilers, they would be able to be modulated more accurately to save further energy while also reducing greenhouse gases.

A trench will need to be created to run insulated hot water lines (supply and return) from the biomass building to the boiler room of the Firehall/Admin Building. The lines would tie into the building and connect with the existing hot water circulation system via a heat exchanger. The tie in point would be prior to the return water temperature sensor of the system. It is important that the heating loop used for the biomass system is a separate loop than what is utilized within the Administration building.

The biomass lines will likely run through the Fire Hall to the south side of the building to connect to the Public Works building. A small area will need to be excavated next to the building to run the biomass lines (~ 2-inch insulated piping) between the two buildings. A detailed design of such a facility and connection to Firehall would be required. The hot water biomass lines could potentially run through the firehall and trench to the Public Works building, or a more expensive option would be to trench the hot water lines directly to the Public Works building. Since permafrost is an issue in this area, avoiding underground trenching of hot water lines by running connection lines through buildings will not only reduce costs, but will reduce complications from permafrost melting issues while bleeding heat from lines into buildings rather than into the ground, thus increasing system efficiency.

3.1 – Biomass Heating Options

Item 5.9

Since the building is already heated by the circulation of hot water, the addition of a biomass boiler connection to the building would utilize the existing heating equipment. The AHU, unit heaters, and radiant wall heaters would all utilize the heat produced from a biomass system, however there will be times that the boilers will function to provide supplemental heat and as backup.

The boiler loop within the Administration building is a single loop that directly connects the boilers to the heating equipment. Because of this, the connection of a biomass heat plant to the Administration

[12] This option is particularly useful for reducing the high costs of and will help reduce greenhouse gases generated from burning oil. Wood chips are also significantly cheaper as a fuel source ($10/GJ @ $150/tonne in Haines Junction and Whitehorse area) than oil ($32.24/GJ @ $1.05/L consumed by 85% equipment) and electricity ($55.56 @ $0.20/kWh pure electric heating) while providing employment to locals and Tr'ondëk Hwëch'in citizens. The biomass facility in Dawson is currently paying $28/GJ for wood chips. It is likely that these chips are not as well seasoned or of as high quality as in Haines Junction. This cost is predicted to drop with improved infrastructure, experience and demand.

building will require the implementation of a heat exchanger loop that connects to the existing hot water loop since the biomass loop will be a glycol-based loop.

With regards to the existing oil boilers, they are rather large and thus the introduction of a biomass system will cause the oil boilers to fire whenever the water temperature setpoint is not being reached by the biomass system. This has the potential to make the boilers short-cycle which will significantly impact their life. A strategy to combat this is to utilize the control system to monitor all the zones in the building as well as the boiler water temperature and boiler water temperature setpoint. Once the water temperature setpoint cannot be reached by the biomass system AND several zones are at or below their setpoint, the controls will know that the biomass system is not providing sufficient heat. When this occurs the control system would temporarily raise the hot water setpoint by at least 10°C to a maximum of ~92°C so that the oil boilers activate for as long as possible to raise the system and building temperature. This would prevent boiler short-cycling while still allowing the biomass system to provide as much heat as possible. Once the temporary setpoint is reached by the system, the system would ideally default back to the previous hot water setpoint as determined by the reset schedule (outdoor air temperature).

If high efficiency propane boilers replace the existing oil boilers, the above scenario is not necessary because propane boilers are easier to modulate in temperature and will potentially allow for heating the building using lower water temperatures during the milder temperatures of the year in conjunction with the biomass system. If propane boilers are installed, the utility of replacing air conditioning with a heat pump is reduced.

4 – Building Envelope and related ECMs

FPMBC was provided with a word file providing ECMs that were being considered along with funding information for comment. Below is the section of that document relevant to this project with comments for each item in a separate section.

City of Dawson (2 buildings, up to $200,000/building) *(Administration &Public Works buildings)*	
Energy Upgrade Description	**Estimated Cost**
#1. City of Dawson Administration Building	*10th Feb. 2021*
Door Seals & Sweeps (ECM 1)	$2,250
Interior Lighting Upgrades (incl. EXIT signs to LED) (ECM 3)	$38,730
Sensors & Controls (ECM 2, 4, 9, 10, 14) $9,500 + $6,200 + $3,500 + $64,480 +$4,500	$88,180
Self-Sensing Pumps (ECM 6)	$9,600
Recommissioning (ECM 8)	$19,950
Baseline Oil Boiler Upgrade (ECM 15)	$19,600
Wall Insulation Upgrade (ECM 16) Audit estimate	$45,500
Roof Insulation (ECM 17)	$4,550
Magnetite storm windows ($27.24 - $35.30/sqft) (ECM 11)	$18,200
Admin. Bldg. sub-total #1	**$246,560**

Figure 5: Table of proposed ECMs for funding.

4.1 – Door Seals and Sweeps - ECM-1

Item 5.11

Door seals and sweeps improvement is a low-cost ECM that will reduce the heat loss through the bay doors of the Fire Hall as well as the main entrance by preventing heat migration from the interior to the exterior. Installing these sweeps is recommended. The thermal imaging report indicates the bay doors that have the most air leakage.

Figure 6: The middle rear bay door appears to have light shining through it at the bottom. The thermal image on both the interior and exterior indicate that a significant amount of heat is escaping through this door.

4.1.1 – Insulate the bay doors and metal exit doors to reduce heat loss

Item 5.12

This option was not indicated in the Energy Audit report, however after completing a thermal imaging inspection, most heat loss through the building envelope is occurring through the windows and bay doors. A cost-effective option to reduce this heat loss is to insulate the bay doors.

A product option to consider: https://www.curtain-and-divider.com/roll-up-dock-door-curtains/

Pre-cut insulated panels for bay doors are another option: https://www.homedepot.com/p/Cellofoam-Garage-Door-Insulation-Kit-8-Pieces-Garage-Door-Insulation-Kit-8-pcs/203630159

Likely the most cost-effective option is to simply cut some 1.5" – 2" rigid to size so that the pieces don't impede door movement at the hinges and adhere them to the panel portion of the bay doors using foam adhesive. The foam pieces should be combined with this reflective door cover https://www.smartgarage.ca/insulated-roll-up-garage-doors/ or an aluminum or fire resistant, thermally reflective film cover to provide the longest life expectancy and energy efficient benefits.

This same strategy can be utilized to reduce heat loss through metal exit doors. It is important to adhere the rigid to a clean and dry door and ensure that the rigid is covered with aluminum or a fire-resistant material that can handle the abuse that a door typically endures.

4.2 –Interior Lighting Upgrades and EXIT signs to LED - ECM-3

Item: 5.13

The Energy Audit report recommends upgrading all lighting to LED. It also recommends the installation of dimmer switches and timers. Given the dark mornings and late afternoons in the Dawson winter (October to March), the lights within the building will likely be on as long as the zones are occupied due to low natural lighting levels. Also, occupancy sensors are not recommended in offices that have an occupant working at a desk for long periods because they shut lights off when there is no movement.

From March until October, lighting within the offices can be manually implemented if the occupant doesn't find sufficient natural lighting available via windows. It is likely that dimmer switches and occupancy sensors will add to the project costs while adding minimal energy benefit, and they will likely not be well utilized. The exception is installing an occupancy switch in the washrooms.

Replacing all existing lighting with LED is recommended, but occupancy sensors and dimmer switchers are not likely worth the extra cost and are left to the discretion of the City. When replacing outdoor lighting, it is recommended that the replacement lighting is Dark Sky compliant to reduce light pollution levels.

4.3 – Sensors and Controls (ECM 2,4,9,10)

Item 5.14

The controls system at the Administration Building is antiquated and malfunctioning. It should be replaced with a modern control system. Within the Energy Audit report, the recommended functionality of a modern controls system is broken down into multiple ECMs using individual components. The recommended ECMs from the Energy Audit provide the ability to:

1) Monitor zone temperatures and provide occupancy scheduling to individual zones (ECM-2: Sensor Suite Thermostats)
2) Monitor and control the boiler and circulation pump according to outdoor air temperatures and demands of the system (ECM-4: Boiler and Circulation Pump Controls)
3) Provide sufficient ventilation without significantly increasing energy usage. Demand control ventilation via a controller and CO_2sensor (ECM-9: Demand Control Ventilation) is the recommended path in the Energy Audit Report.
4) Installing a Building Management System (BMS) to monitor and control all operations within the building (ECM-10: BMS System).
5) Improving the Delta T (heat transfer efficiency) of the heating coil within AHU-1 via the installation of an Energy Valve (ECM-14: Energy Valve)

Note that all of these individual components work to satisfy the functionality of a properly installed, programmed and commissioned modern control system with graphical interface. The successful implementation of these devices will depend upon their ability to be monitored and controlled by the

new BMS. Having individual components installed as part of an un-integrated system creates the high likelihood of certain components competing with each other and causing control issues.

4.3.1 - ECM-2: Sensor Suite Thermostat

Item 5.15

ECM-2 is estimated to cost $9,500. The solution as presented in ECM-2 looks to be economic and suitable for the application. This solution appears to allow occupants to adjust settings within the zone as appropriate while also allowing the building operators to control the zones. This solution should be simple to implement, but there may be some cost savings possible.

A typical BMS within a new building as per ECM-10 utilizes simpler thermostats[13] that are all wired directly to a controller, and that controller(s) communicates with the BMS. Given the complications and costs of wiring all 20 thermostats to a controller or multiple controllers, using the wireless thermostats and router as proposed is a simple solution.

The City may wish to consider wiring the upstairs thermostats to a compatible controller to the implemented BMS[14] if the office has a drop ceiling[15] and the City has electricians on staff. It may be advisable to wire the upstairs thermostats to a controller and utilize the wireless thermostats on the main floor to reduce the costs of thermostats and ongoing subscription costs. Since most of the 20 thermostats are upstairs, this can potentially cut the costs of this ECM significantly to improve the payback period. This is possible if the BMS/Control system installed is capable of using both wired thermostats connected to a controller and the wireless thermostats and routing controller proposed.

The ongoing subscription cost of the wireless thermostats is $480 per year for 20 thermostats which is significantly less than paying electricians/controls contractor to run wires to all the thermostats and connect them to a controller. This is likely why this option was proposed, however if much of the installation costs can be absorbed by the City, that changes the payback and options possible. Wired thermostats as installed by a controls company may be cheaper at around the 15-year life expectancy mark, but it may be worth using City staff to run thermostat wires in certain zones if it is easy to run these wires and save on the costs of thermostats for wired zones. Also wired thermostats tend to function and report better than wireless thermostats.

4.3.2 - ECM-4: Boiler and Circulation Pump Controls

Item 5.17, Item 5.18

The cost to implement ECM-4 is estimated at $6,200.

[13] The wired thermostats are assumed to be significantly cheaper than $450 each.
[14] If wired thermostats and a controller cannot work with the implemented BMS, then it is advisable to simply utilize the wireless thermostats throughout.
[15] A drop ceiling would making wiring the easiest, but it may be possible to run wires in an existing raceway etc.

Currently the boilers have a hot water setpoint that is the same whether the outside air temperature is 10°C or -40°C. This wastes a lot of energy which would be saved by implementing a boiler reset schedule. This can be accomplished via two methods:

1) Via programming of a modern control system with supply water temperature and return water temperature sensors via the BMS proposed in ECM-10.
2) Via a boiler and circulation pump control device as described in this ECM. Note however that the boilers and building receive flow via the circulation pumps[16] and thus the pumps must run continuously to provide heating to the building, contrary to the assumption in the Energy Audit report.

Replacing the existing circulation pumps with self-sensing pumps as per ECM-6 is recommended, but they must always run during periods of heating for the building to have access to the heat that the boilers produce.

The boilers require thermostats for monitoring supply and return water temperatures as none are currently installed.

Utilizing the BMS with sensors (ECM-10) is advantageous as it allows for more precise control and integration with the biomass system as long as it is programmed and commissioned correctly. This option is recommended since ECM-10 is budgeted for.

A device that accomplishes this function is unlikely to interface with the BMS or be adjustable by the operator according to the dynamics of the building. Without a BMS, this type of device is the best option for boiler control which is likely why it was recommended in the Energy Audit.

4.3.3 - ECM-9: Demand Control Ventilation

Item 5.19

The cost to implement ECM-9 is estimated at $3,500. This ECM is essentially to install a CO_2 sensor and programming to the control system of ECM-10 that will allow the control system to provide outdoor air according to the reading of the sensor. This method of accomplishing the functionality of ECM-9 is recommended.

The costs predicted for this ECM are based on assumptions that were disproven during recommissioning. The Energy Audit is incorrect regarding the nonexistence of motorized dampers and their current functionality. The motorized dampers already exist and are utilized by the simple control system that is currently utilized. The Energy Audit report indicates that the minimum OAD position is 25%, when it reality it has been reduced to 15% to ensure occupant comfort and energy savings in the coldest parts of winter. It also states that the dampers are manually adjusted to do cooling, which is incorrect because they automatically open to provide free cooling using the existing control system. The costing data for the ECM includes the installation of motorized dampers (already exist), $C0_2$ sensor, and

[16] As confirmed via Facetime video call on April 22, 2021 with Owen Kemp-Griffin.

electronic/wiring. Wiring already exists to dampers and AHU temperature sensors but not to a CO_2 sensor.

Installing a CO_2 sensor to monitor and control the OAD should also include the ability of the operator to manually set the damper minimum position, test the dampers, recalibrate the CO_2 sensor etc. It is unknown if the installation of the system as described will allow for a free cooling algorithm to be utilized for cooling the building at night during the summer or during the day. Since free cooling is an option on most nights and during many days of the summer, this is an important consideration that should be implemented.

Essentially this ECM is the installation of a sensor which can fall out of calibration and cause the building to be overventilated or under-ventilated according to the sensor output. The building operator should still have the ability to set a minimum damper position variable and override the sensor within the new control system.

The implementation of this ECM is recommended.

4.3.4 - ECM-10: BMS System

The cost to implement ECM-10 is estimated at $64,480. The implementation of this ECM is highly recommended as it allows the building operators to monitor and control equipment within the facility as well as troubleshoot systems and track the performance of equipment. Implementing this ECM correctly also negates the need to install a device to implement ECM-4 Boiler and Pump Control and a device for ECM-14 Energy Valve as this functionality will be built into ECM-10. This ECM also allows for the implementation of ECM-9 Demand Control Ventilation.

A good BMS also helps manage the boilers with regards to integrating the biomass system by having the ability to be programmed more efficiently for operation. Without a BMS, a simple boiler controller (ECM-4) is likely to activate the boilers whenever the hot water temperature is below the setpoint. This will not only activate the boiler more often the necessary, but it is likely to make the boiler short-cycle and thus significantly reduce the boiler lifespan.

Note that adding a heat pump to the system to replace the air conditioning as discussed in Section 2.3 will necessitate a more advanced controls system.

Installing a propane boiler system will allow for better temperature modulation through the system and will optimally utilize a more advanced control system in cooperation with the propane boiler controls. Figure 12 on page 37 of the Energy Audit report illustrates the additional potential savings possible from implementing a condensing propane boiler with outdoor reset.

Given the advantages of implementing ECM-10 correctly, it is advisable to seek a quote for implementing a control system with graphical interface that can accomplish the tasks of section 4.3 (monitoring and control of 20 zones, occupancy setpoints, operator adjustable boiler reset, CO_2 monitoring, AHU-1 heating valve control for Delta T optimization via the installation of either the Energy Valve (ECM-14) or some programming and a supply water temperature sensor and return water temperature sensor for the heating coil.

Ideally a BMS should also be capable of trending data, providing a graphical interface of each zone, remote monitoring by operators as requested, alarms to inform operators of equipment failure and monitoring and totalizing equipment runtimes[17].

Below is a list of points monitored by the existing control system[18]. Points that have control wires ran to them are indicated. These wires can be reused by the new controller, however the sensors should be replaced with new. The points associated with AHU1 will come from a controller located in the mechanical room that houses AHU1 and thus a controller bus to the main controller in the boiler room already exists and can likely be used by the new control system. Controls for the boiler and biomass interface can be ran to the main controller located in the boiler room.

Point Name	Point Type	Existing Wiring
ALARM_RESET	Digital Output	no
AHU1_FAN_STATUS	Digital Input	yes (assumed)
SUPPLY_AIR_SET_POINT	Analog software	no
AHU1_SUPPLY_AIR_TEMP	Analog input	yes
AHU1_HEATING_VALVE	Analog output	yes
MIX_AIR_SET_POINT	analog software	no
AHU1_MIX_AIR_TEMP	Analog input	yes
AHU1_RETURN_AIR_TEMP	Analog input	yes
AHU1_OUTSIDE_AIR_TEMP	Analog input	yes
DAMPER_MIN_POSITION	Analog software	no
AHU1_MIXING_DAMPERS	Analog output	yes
AHU1_EXHAUST_DAMPER	Analog output	yes
AHU1_COOLING_STG1	Digital output	yes[19]
AHU_COOLING_STG2	Digital output	yes

[17] By totalizing boiler runtimes, the amount of oil/propane consumed can be determined and compared against the quantities of oil/propane delivered.
[18] Point table compiled from photos of the interface taken by Owen Kemp-Griffin.
[19] As of April 23, 2021 there appears to be an issue with Stage 1 cooling. This may be a faulty relay or potentially an issue with the wiring.

AHU1_FILTER	Digital Input (assumed)	yes - assumed but could be a timed filter alarm

Figure 7: Table of control points within the existing automation system.

4.3.5 - ECM-14: Energy Valve

Item 5.20

The cost of ECM-14 is estimated at $4,500. This ECM would replace the existing hot water valve in AHU-1 with a "smart valve". This ECM intends to increase the heat transfer efficiency of the heating coil within AHU-1 by monitoring the supply water temperature to the heating coil and return water temperature after the heating coil. In doing this, the valve position can be modulated to slow the flow rate through the coil to transfer more heat to the air stream.

The operation of this device would typically be calculated by a modern control system that is programmed using a PID control algorithm. The installation of this device is intended to simplify the control system, but it is unknown how well this device would work to satisfy the supply air temperature. It is assumed that this device receives the supply air temperature setpoint and controls itself to meet that setpoint while also working to maximize the Delta T across the coil. It is assumed that this device was recommended as an ECM because ECM-10 BMS system was not recommended.

Note that the supply and return water temperatures measured by this device should be monitored and visible on the BMS control system. If this device is implemented, they may not be able to interface with the controls.

It is likely that this device will require flow input data from the variable flow pumps or it is likely that these devices will counteract each other. Ie. the variable speed pump may slow down to reduce pressure within the system and the valve may have to open more to counteract that or visa versa. This can lead to a problematic feedback loop that can't be controlled by the BMS because these are separate devices/systems. Devices like this must be monitored/controlled by the BMS or they can cause issues. If these devices are installed without a BMS, it is likely that they will fight each other, and it will be nearly impossible to troubleshoot because there will not be an interface to monitor the entire system.

The implementation of the functionality of this device is recommended. Ideally that would be accomplished using the new control system with a couple of new water temperature sensors installed to the supply and return lines. Installing these sensors will be relatively simple if a new controller is installed in the mechanical room because of the existence of the controller that is wired to the current main controller. This wiring is assumed to be reusable.

If this Energy Valve device is installed rather than a couple of sensors with a control algorithm, the contractor should confirm that the supply water temperature and return water temperature can be monitored (and hopefully trended) by the BMS implemented by ECM-10. It is recommended that this functionality is handled by the BMS using two new temperature input sensors with a control algorithm.

4.4 – Self Sensing Pump ECM-6

Item 5.21

The cost of ECM-6 is estimated at $9,600. This ECM would replace the existing circulation pumps with pumps that would sense the pressure within the system and adjust their speed accordingly. This will save electrical energy for pumping because the pump will not have to work as hard when the building is under less heating load due to radiant valves being closed. When valves are closed due to a zone being satisfied, the pumps should slow down and save electrical energy.

As mentioned above in section 4.3.5, self sensing pumps combined with an Energy Valve that modulates to maximize Delta T across a heating coil may not work well together. Also, if Self Sensing Pumps replace the existing circulation pumps, they should not be connected to boiler control shut offs as per section 4.3.2 Boiler and Circulation Pump Controls because these pumps are a single loop through the building and must run constantly to provide heat to the facility. These pumps can be shut down during summer when the boilers are no longer distributing heat.

Replacing the existing circulation pumps with self sensing pumps is recommended. Their operation in cooperation with an Energy Valve should be reviewed by the controls contractor prior to implementing the Energy Valve along with Self Sensing pumps.

4.5 – Baseline Boiler Upgrade – ECM-15

Item 5.22, 5.9

The cost of ECM-15 is estimated at $19,600. This cost is assumed to replace 2 – 169kW oil boilers (with 4 years of remaining life expectancy) with 2 – 144kW near condensing oil boilers (with 25-year life expectancy) as per the Energy Audit report.

As discussed in section 2, the decision to replace oil boilers with high efficiency propane boilers should be investigated prior to moving forward with this ECM. Switching to propane not only reduces fuel costs, but it allows for greater efficiencies and GHG reductions while likely reducing insurance and the costs of an oil cleanup due to the reduced risk to the insurance provider. High efficiency propane boilers are also much smaller in physical size than the existing oil boilers, which should free up space within the mechanical room. It is assumed that 3 - ~112kW high efficiency propane boilers could replace the existing oil boilers.

Figure 8: High efficiency propane boilers (IBC SL 80-399 TI Condensing Boilers) used in the Carcross Learning Centre are 95.7% efficient and have a CSA rated output of 22.6kW – 112kW (77 – 382 MBH) per boiler. Based on the current boilers at the Administration Building, it is assumed that 3 of these propane boilers would work well with a biomass system or as stand alone. Since these boilers can be modulated significantly, their implementation would reduce the usability of a heat pump in replacement of the existing air conditioning equipment. They would also work much better than oil boilers for supplementing the performance of a biomass system.

Note that if the existing oil boilers are changed out, they could potentially be utilized as backup heating for the Public Works Building as indicated within that report. They may even be considered as backup heating to the biomass system by connecting them directly to the biomass loop. This would be for extreme circumstances and would be useful in the event of a biomass boiler shutdown and situation in which buildings on the district energy system require extra heat.

Another option is to leave these boilers within the Administration Building as backup heating to a biomass heating system, as discussed in Section 3. Using the existing oil boilers as backup heating may

extend their life significantly past the expected 4 years as indicated in the Energy Auding report. Since funding is available now and this work can be coordinated as a large project, it is recommended that these boilers are changed out now.

4.6 – Wall Insulation Upgrade – ECM-16

Item 5.23

The cost of ECM-16 is estimated at $45,500. The Energy Audit report indicates that the existing exterior walls are installed at RSI 4.64 (R-26.35). The proposed upgrades are to install 50mm of Rigid XPS Insulation to add an additional RSI of 1.72 (R-9.77), for a total wall performance of RSI 6.36 (R-36.12).

A thermal graphic inspection of the Administration Building was completed on December 15, 2020 and found that the building envelope is in good shape with the exception of two obvious flaws as noted in the report. As indicated in the Energy Audit report, the costs to upgrade the building envelope are high with a very long payback period. Further, the implementation of this ECM would require a great deal of labor and would affect the aesthetics of a building envelop that is aesthetically pleasing and in apparent good shape.

The thermal investigation also showed how most of the heat loss through the building envelope is occurring through the bay doors and office windows. Thus, it is advisable to improve the energy performance of those components as discussed in Section 4.1.1 regarding the bay doors and exit doors and Section 4.8 regarding the windows.

Upgrading the wall insulation is not recommended.

4.7 – Roof Insulation – ECM-17

Item 5.24

The cost of ECM-17 is estimated at $4,550. The Energy Audit report indicates that the existing roof insulation is comprised of batts that are 300mm thick with an RSI 7.50 (R-42.59). The proposed upgrades are to install an additional 102mm of cellulose insulation to add an additional RSI of 2.6 (R-14.76), for a total insulation performance of RSI 10.1 (R-57.35). The effective RSI-value of the roof after the upgrade is expected to be 9.93 (R-56.39).

This upgrade has a low installed cost and a modeled payback period of just over 2 years. This ECM is recommended for implementation. Note that care should be taken not to block or obstruct any venting within the attic space as part of installation.

4.8 – Magnetite Storm Windows – ECM - 11

Item 5.25

The cost of ECM-11 is estimated at $18,200. The Magnetite windows appear to be a good option to replacing the windows and will help to reduce the heat loss via the glass. This will improve the comfort of office staff while saving energy. These panels are cheaper to implement than replacing the existing windows with triple pane and will help reduce heat loss through the lowest performing parts of the

building envelope. Additionally, in the accompanying thermal imaging report, windows throughout the Administration Building appeared to be installed well, thus replacing them is not as attractive as upgrading the performance of the existing windows.

If occupants will be opening windows for cooling, care will need to be taken to ensure that the Magnetite panels for operable windows are stored safely so that they do not crack or get scratched when removed from the windows during summer months. As indicated in section 2.2.1, the CAO currently addresses her office overheating by opening the window, even during winter. This situation will likely make the Magnetite window useless.

Installing Magnetite Storm Windows for the Administration Building is recommended.

5 – Recommendations for the City of Dawson to consider

The City should decide which recommendations they wish to pursue and discuss this with the Energy Solutions Centre.

5.1: Determine if oil will remain as a fuel source or if propane shall be used prior to selecting heating equipment

Reference: Section 2

The Energy Audit report assumes that oil shall remain as a heat source in the building despite several advantages of implementing propane. A significant drawback of propane in Dawson's extreme climate is that it has the potential to stop flowing when outdoor air temperatures are colder than -42°C. Tank heating equipment such as an electric heating blanket exists that can prevent this from happening. A greater issue may be a lack of infrastructure in place and the availability of being able to receive reliable propane deliveries. All of these should be considered prior to making the decision to change to propane.

The decision to remain with oil as a backup heat source to biomass should be made prior to moving forward with any equipment upgrades or renovations.

Recommend cost out utilizing propane and changing over infrastructure to propane versus the costs of replacing the oil tank, oil insurance costs etc. prior to moving forward with oil burning equipment upgrades. This step is not required but recommended as significant cost savings may be found from switching as part of this project. Be sure to include propane warming equipment in the estimates.

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.2: Replace the oil tank if oil continues to be used as primary or secondary fuel

Reference: Section 2

The oil tank for this facility is due for replacement. Recommend plan to replace the oil storage tanks along with oil-based heating equipment if oil remains as a primary fuel source and include this expense with project costs as it is a necessary expense.

Response (Project Manager, CAO, Energy Solutions Centre):

Signed: _____ Date: _____

5.3: Replace zone valves, install strainer, drain system and replace glycol as part of project

The installed zone valves can remain until their end of life, however it is recommended that during boiler upgrades and installation of the biomass heating loop, all radiant control valves be replaced with **Normally Open** control valves and the radiant system be drained to replace the glycol in the system. A strainer for the glycol system should also be added or replaced if it does not currently exist.

Response (Project Manager, CAO, Energy Solutions Centre):

Signed: _____ Date: _____

5.4: Test AC relays via the control system and replace as necessary for this summer

Reference: Section 2.3

In the summer, the boilers are manually shut down and air conditioning must currently be manually activated via the control system. The air conditioning must be run manually because the programming doesn't work despite the automation system having cooling points within the program. Owen has indicated that stage 2 of the cooling is controllable, but not stage 1 at this point. The fact that stage 2 can be controlled via the automation system indicates that there are relays wired to the automation system to activate the AC stages.

Recommend test the relays and replace as necessary. If possible, reprogram the cooling algorithm with the following logic:

> If RAT > 24°C AND OAT > 15°C then COOLING = ON
>
> ELSE COOLING = OFF

NOTE that the OAT sensor is currently mis calibrated and must be recalibrated for the temperatures with this logic to work correctly.

If the automation is not able to be reprogrammed, a simple thermostat within the return air duct can be rigged to activate a single stage of cooling when the RAT > ~24°C. This thermostat should be adjustable so that the operators can disable cooling on weekends or adjust the cooling setpoint manually during summer. Note that the activation of the AC unit should be tied to the operational status of AHU1. If a thermostat is used within the ductwork and the AHU is OFF, it is likely that the AC will activate when the fan is not running on hot weekends or after hours. This would likely damage the AC unit and should be avoided. The contractor should ensure that AHU1 is running in order for the AC unit to activate.

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.5: Replace AC units with a heat pump(s) to provide cooling and some heating

Reference: Section 2.3

The AC equipment was installed in 2000 along with the rest of the HVAC equipment[20] and is nearing end of life. Installing a heat pump to replace the AC equipment within the building would allow for cooling in the summer as well as GHG free heating in the summer and shoulder seasons.

Recommend replace the AC units with Heat Pump(s) as part of the tender. Detailed designer to provide pricing for replacing AC units vs. heat pumps. The energy benefit of heating with heat pump during summer and shoulder seasons should be considered. Note that if high efficiency propane boilers are installed, the benefits of using a heat pump during shoulder season are slightly reduced.

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.6: Test and replace all components of AHU in order to run in AUTO

Reference: Section 2.4

No physical measuring devices were noted on the AHU. Recommend install thermometers in the air streams and on supply water and return water lines next to sensors of AHU1 (same as ECM-14) so that

[20] According to Owen Kemp-Griffin, building operator.

these values can be viewed by operations staff and compared to temperature sensors that are monitored by the building management system.

Recommend replace the existing supply air temp (SAT), return air temperature (RAT) and mixed air temp (MAT) sensors as part of upgrading the BMS. Replacing the existing damper actuators and heating valve actuator are also recommended for replacement if they are original to the system. Controls technicians to test all relays and replace as necessary to operate the supply air fain and return air fan in AUTO.

Response (Project Manager, CAO, Energy Solutions Centre):

Signed: _____ Date: _____

5.7: Perform testing and air balancing of all conditioned zones serviced by AHU1 as part of controls upgrade

The performance of AHU-1 will change as a result of this project. The air balancing during the initial installation is likely to have shifted since 2000 and may not have been completed optimally at that time.

Assessing and testing the air flow to each zone should be completed once all upgrades to the controls and mechanical systems are complete.

Response (Project Manager, Energy Solutions Centre, CAO):

Signed: _____ Date: _____

5.8: Contact Chief Isaac group to discuss a biomass facility for the Admin Building, Public Works Building, Wood Shop and Chief Isaac buildings

Reference: Section 3

Chief Isaac would be keen to discuss utilizing biomass at their office that is next door to the Firehall/Admin Building, at their adjacent wood shop, as well as in their daycare which is across the street (behind the admin building). If the City has Chief Isaac as a partner, it should reduce the cost and complexity of implementing biomass for the Admin and Public Works Buildings.

To size a biomass installation properly for such an application it will be important to know the heat loads of Chief Isaac buildings and the wood shop if this building is also to be heated using biomass. FPMBC would be keen to help assess the wood shop as well as the Chief Isaac buildings.

Recommend reach out to Gina Nagano, Former Chair of Chief Isaac group of companies to discuss an agreement for heat purchase, MOU or joint venture regarding a biomass district heating system. Her phone number is 867-334-7609 and email is gina.nagano@gmail.com.

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.9: Be aware of the advantages of propane boilers vs. oil boilers with regards to implementing biomass heating

Reference: Section 3.1, Section 4.5

Oil boilers have a limited temperature range and are rather large in size which creates the potential to short-cycle. Short cycling will significantly impact their life.

If high efficiency propane boilers replace the existing oil boilers, they are programmed to automatically modulate in temperature and will allow for heating the building using lower water temperatures during the milder temperatures of the year in conjunction with the biomass system. If propane boilers are installed, the utility of replacing air conditioning with a heat pump is reduced because of improved boiler efficiency.

Response (Project Manager, Energy Solutions Centre, CAO):

Signed: _____ Date: _____

5.10: Determine the operational state of the boiler and generator in the City owned portable trailer for potential use as backup heating and power to the biomass system

There is a portable trailer located next to the Fire Hall that is owned by the City. The trailer contains an electrical generator that is rated at 53.6KVA on a single phase and 100KVA on three phases. The trailer also contains a 646MBH (189.3kW) boiler. If this boiler still works, it could be connected to the future biomass system to provide backup heating to the public works building and potentially the workshop or another part of the district heating system. The electrical generator could also be hooked up to the biomass system to provide backup power to the biomass system in the event of a prolonged outage. The operational condition of this equipment is unknown, but apparently this trailer was constructed to provide emergency power and heating to a facility.

Recommend check records and/or test this equipment to determine if it can be used with the future biomass district heating system to reduce the project cost for the City.

Response (Project Manager, Energy Solutions Centre, CAO):

Signed: _____ Date: _____

5.11: Door Seals and Sweeps ECM-1

Reference: Section 4.1

Door seals and sweeps improvement is a low-cost ECM that will reduce the heat loss through the bay doors by preventing heat migration from the interior to the exterior. Installing these sweeps is recommended.

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.12: Install insulation panels or insulative blanket on bay doors and metal exit doors

Reference: Section 4.1.1

Recommend implement one of the options provided regarding insulating the bay doors and metal exit doors. This will have a much lower capital cost and higher energy savings than upgrading the building envelope.

Response (Project Manager, CAO, Energy Solutions Centre):

Signed: _____ Date: _____

5.13: ECM-3 Upgrade to LED lighting

Reference: Section 4.2

Recommend install an occupancy sensor in the washrooms and upgrade all lighting to LED. Recommend replacement outdoor lighting is Dark Sky compliant to reduce light pollution levels.

Response (Project Manager, Energy Solutions Centre):

Signed: _____ Date: _____

5.14: Get estimates for a modern control system (from several venders) that uses sensors and programming rather than hardware components – ECM-10

Reference: Section 4.3

The Energy Audit recommends splitting the functionality of a modern control system (ECM-10) into multiple ECMs that have the potential to conflict with each other. Multiple devices that have a mind of their own are recommended within the Energy Audit rather than a centralized control system that accomplishes the same functionality using sensors and common HVAC programming.

Recommend utilizing a centralized control system to accomplish the functionality of ECM-2, ECM-4, ECM-9 and ECM-14 as part of ECM-10. The wireless thermostats and router of ECM-2 will likely be required in much of the facility.

Note that since there is already a controller in the mechanical room of AHU-1, a new controller to control AHU-1 can easily be installed to accomplish ECM-9 and ECM-14 using sensors and programming. ECM-4 functionality can be wired directly into the new main controller using a few feet of wire and 2 sensors that will replace the existing controller in the boiler room.

Given the advantages of implementing ECM-10 correctly, it is recommended that the City seek estimates for implementing a control system with:

1) Graphical interface that can accomplish the tasks of section 4.3 including provide a graphical interface of each zone, boiler operation, cooling equipment operation, AHU-1 operation, biomass system integration
2) Monitoring and control of 20 zones using either wireless or wired thermostats
3) Occupancy/unoccupancy setpoints
4) Operator adjustable boiler reset
5) CO_2 monitoring with OAD control
6) AHU-1 heating valve control for Delta T optimization via the installation of either the Energy Valve (ECM-14) or some programming and a supply water temperature sensor and return water temperature sensor for the heating coil.
7) Ideally the BMS should trend data
8) Remote monitoring by operators via web-based interface
9) Alarms to inform operators of equipment failure
10) Optimally monitoring and totalizing boiler runtimes to calculate fossil fuel consumption

It is assumed that utilizing the BMS of ECM-10 as a single system will improve efficiency, reduce component costs of individual ECMs, simplify the system operation and monitoring, and likely reduce the total costs of the control system.

Response (Project Manager, CAO, Energy Solutions Centre):

Signed: _____ Date: _____

5.15: Install occupant-adjustable thermostats that are monitored by the BMS and allow for occupancy scheduling - ECM-2

Reference: Section 4.3.1

As part of BMS upgrades, recommend replace manual thermostats with occupant-adjustable thermostats that are monitored and controlled by the BMS. The thermostat should allow for occupancy scheduling. Zones that may be occupied after hours such as the Council Chambers should optimally have an occupancy sensor built into the thermostat (smart thermostat) or zone override button that keeps the zone at occupied temperatures after hours as required.

Response (Project Manager, Energy Solutions Centre):

Signed: _____ Date: _____

5.16: Determine if wires can be ran to control thermostats upstairs or in fire hall - ECM-2

Reference: Section 4.3.1

Does the City have electricians on staff who can easily run wires to thermostats or the ability to run wires from the location of existing thermostats to a wired controller? If so, recommend wire these thermostats to a controller location for the controls contractor to install. This will reduce installation costs and ongoing subscription fees.

Response (Project Manager, Energy Solutions Centre):

Signed: _____ Date: _____

5.17: Implement an operator adjustable boiler reset schedule (ECM-4) using the control system as part of ECM-10

Reference: Section 4.3.2

Recommend have the controls contractor run a sensor to the supply water line and return water line near the boiler to monitor these temperatures and create an operator adjustable boiler reset schedule based on outside air temperature. This allows the operator to optimize the water temperature according to building dynamics. This option is more adjustable than implementing a device, which is typically not monitorable or controllable by the operator.

Using the BMS to create the reset schedule is also beneficial with regards to efficiency regarding the implementation of a biomass system.

The BMS should only shut down the circulation pumps (self sensing as per ECM-6) according to outdoor air temperatures. Ie. when OAT > ~15°C. The shut down temperature will also depend on the implementation of a heat pump or not. If a heat pump is implemented, the shut down temperature for the boilers will be a colder temperature of approximately 0°C.

Response (Project Manager, Energy Solutions Centre):

Signed: _____ Date: _____

5.18: Install thermometers to monitor boiler water temperatures for comparing to sensors

Reference: Section 2.1, Section 4.3.2

The boilers require thermometers for monitoring supply and return water temperatures as none are currently installed. These should be installed near the supply water sensor and return water sensor locations.

Response (Project Manager, Energy Solutions Centre):

Signed: _____ Date: _____

5.19: Implement demand control ventilation via CO_2 sensor – ECM-9

Reference: Section 4.3.3

Recommend install a CO_2 sensor for demand control ventilation while including the ability of the operator to manually set the damper minimum position, test the dampers and recalibrate the CO_2 sensor.

The implementation of this ECM is recommended with a reduced minimum damper position of ~5% and CO_2 threshold of ~850ppm to modulate the damper open up to ~25%.

Response (Project Manager, Energy Solutions Centre):

Signed: _____ Date: _____

5.20: Implement Delta T control via the BMS ECM-14

Reference: Section 4.3.5

The implementation of the functionality described by ECM-14 Energy Valve is recommended via the new control system using new water temperature sensors installed to the supply and return hot water lines. Installing these sensors will be relatively simple when a new controller is installed in the mechanical room because of the existence of the controller that is wired to the current main controller.

If the Energy Valve device is installed rather than a couple of sensors with a control algorithm, it is recommended that the contractor confirm that the supply water temperature and return water temperature measured by this device can be monitored (and hopefully trended) by the BMS implemented by ECM-10.

Response (Project Manager, Energy Solutions Centre):

Signed: _____ Date: _____

5.21: Replace circulation pumps with self sensing pumps – ECM-6

Reference: Section 4.4

Replacing the existing circulation pumps with self sensing pumps is recommended. If an energy valve device is utilized rather than a BMS controlled algorithm, the self sensing pump operation in cooperation with an Energy Valve should be reviewed by the control system contractor prior to implementation to ensure that the Energy Valve and Self Sensing Pumps don't fight each other.

Response (Project Manager, Energy Solutions Centre):

Signed: _____ Date: _____

5.22: Replace oil boilers with new propane or oil - ECM-15

Reference: Section 4.5

Since funding is available now and this work can be coordinated as a large project, it is recommended that these boilers are changed out now despite using the existing oil boilers as backup heating may extend their life significantly past the expected 4 years. Changing these old boilers for new, more efficient boilers of either propane or oil will also help to reduce GHGs whenever they operate.

Response (Project Manager, Energy Solutions Centre):

Signed: _____ Date: _____

5.23: Building Envelope insulation upgrade ECM-16 - Not Recommended

Reference: Section 4.6

A thermal graphic inspection of the Administration Building found that the building envelope is in good shape with the exception of two obvious flaws as noted in the report. As indicated in the Energy Audit report, the costs to upgrade the building envelope are high with a very long payback period. Further, the implementation of this ECM would require a great deal of labor and would affect the aesthetics of a building envelop that is aesthetically pleasing and in good shape. Unless the City has plans to change or upgrade the building exterior, upgrading the building envelope is not recommended.

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.24: Upgrade roof insulation ECM-17

Reference: Section 4.7

This upgrade has a low installed cost and a modeled payback period of just over 2 years. This ECM is recommended for implementation. Note that care should be taken not to block or obstruct any venting within the attic space as part of installation.

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.25: Magnetite window covers

Reference: Section 4.8

Installing Magnetite Storm Windows for the Administration Building is recommended.

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.26: Commission the biomass system as well as backup heating equipment once all projects are complete

Ensuring that the new biomass equipment functions optimally and in cooperation with the boiler equipment will be important to ensure long term energy savings and equipment life expectancy. This should be done by a third party with control systems expertise if the control system for the biomass system interfaces with the buildings in a complex manner.

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.19: Implement "Energy Star Portfolio Manager" or other application to track facility energy usage

The City of Dawson would likely benefit from implementing "Energy Star Portfolio Manager" because the electrical, oil and propane bills for each facility managed by the City would be entered into the application as they arrive and then can be easily tracked. Since the expenses will be reduced for buildings that undergo improvements, it is wise to track and compare these expenses to previous years.

By implementing "Energy Star Portfolio Manager" or a similar program, it will be easier for staff to observe/verify energy saving measures that are implemented in buildings and throughout the community over time and would lead to higher productivity with regards to tracking the costs of facilities.

The Energy Branch is in the process of setting up an Energy Benchmarking initiative that utilizes "Energy Star Portfolio Manager" for buildings such as this. It is recommended that the City of Dawson add the Administration building to the list of buildings the Energy Branch will contact for this initiative.

Response (Project Manager, Energy Solutions Centre):

Signed: _____ Date: _____

Appendix A: Recommissioning Email

From: Project Manager <ProjectManager@cityofdawson.ca>
Sent: March 11, 2021 11:46 AM
To: Shane Wolffe <shane@futureproofmybuilding.com>
Subject: RE: Recommissioning Reports
Hi Shane

Just to re-iterate the paragraph below, we would like your report to have a significant focus on the ECMs that are outlined in the table attached as these are directly what our TPA is based upon.

Any suggestions you have on the implementation of these ECM's, alternative options, design considerations, cautions, past successes in other communities etc are all of great interest

Cheers

Brodie

Has the City moved forward with implementing or procuring ECMs (energy conservation measures) from the Energy Audit Reports? Do you want my recommendations to include these ECMs or simply to comment on them? If so I will simply copy and paste the information into the Recommendations Section. The City can then decide which recommendations they wish to pursue.

Our funding agreement with YG is completely based on the remaining recommendations from the report that we have deemed appropriate as well as some extra measures that I have been researching. All funding estimates have also been taken from the audit report. Please see the attached table and please comment on these ECMs as this is what YG has agreed to fund at this time.

Our BM staff have begun with the switching of fluorescent tubes to LED substitutes across both facilities. We have been waiting to receive your report before moving on anything else

From: Project Manager
Sent: Wednesday, March 10, 2021 4:49 PM
To: 'Shane Wolffe' <shane@futureproofmybuilding.com>
Cc: CAO Dawson <cao@cityofdawson.ca>
Subject: RE: Recommissioning Reports
Hi Shane

Comments in red

From: Shane Wolffe <shane@futureproofmybuilding.com>
Sent: Tuesday, March 9, 2021 7:42 PM
To: Project Manager <ProjectManager@cityofdawson.ca>
Cc: CAO Dawson <cao@cityofdawson.ca>
Subject: RE: Recommissioning Reports
Hi Brodie,

I'm working on the report and I have a few questions that I have added to this email as I have been progressing. Please respond to each question individually in RED so that I can keep track of answers. If you have comments please also indicate them in red.

First of all, I spoke with Gina Nagano who is the Chair of Chief Isaac group of companies. She indicated that Chief Isaac would be keen to discuss utilizing biomass at their facility that is next door to the Admin Building as well as in their daycare which is across the street (behind the admin building). If the City has Chief Isaac as a partner it should reduce the cost and complexity of implementing biomass for the Admin and Public Works Buildings. To size a biomass installation properly for such an application it will be important to know the heat loads of these buildings as well and for the City of Dawson to have some type of heat purchase agreement, MOU or maintenance agreement if a biomass plant is to be constructed on Chief Isaac property for sharing between Chief Isaac and the City of Dawson at the Admin Building and Public Works building. Given the limited options for constructing a biomass facility on City property, constructing it on the adjacent Chief Isaac property holds promise. You may want to grease some wheels with the City to see what their appetite for this type of arrangement is. In the report I will indicate other potential locations for the biomass facility. Note also that the City may wish to simply purchase heat from Chief Isaac or they may take an ownership through a partnership of some kind. I am quite certain that a partnership with them is the best option for the City in terms of finding funding and reducing project costs. In terms of operational costs, the cost of a gigajoule of energy produced from burning oil @ $1.02/L in an 85% efficient furnace is $31.32/GJ. The cost of heat provided by biomass is approximately $10/GJ[1] at $150/ton. Biomass heating costs about 1/3 as much as burning oil and the price of oil is likely to climb, plus the biomass can be sourced locally. I definitely like the idea but assume it will be outside the scope of the Community IEEP funding. This will likely have to be a completely separate project.

The Energy Audit report ECM-2 indicates using a Smart Thermostat which is adequate to control a regular furnace but will not likely work for some of the biomass heated options I am proposing. This is a fairly simple means of control that is lower cost than an advanced control system but has limited functionality. If the City goes with more than a furnace, I don't see this as an option. This ECM has been omitted from our funding agreement. From what I understand (and please correct me if I am wrong) the City would like to be able to remotely monitor their buildings and equipment? A more advanced control system is required to do this but it will come at a higher cost than what is recommended in the Energy Audit. Since the Public Works and Admin Building are next to each other, are both intended to utilize biomass heating and will be tendered at approximately the same time, it makes sense that both buildings would utilize the same control system. This should reduce the costs of installation and will allow the City to monitor the buildings remotely while improving their energy efficiency via better controllability. Please let me know if this is the desired outcome? I will comment on the recommendations from the Energy Audit report with regards to this as I am providing a couple of options in the report. Remote monitoring is not really as much as a priority as a general upgrade to the controllability of our HVAC systems across the two buildings that allow for an Occupied/Unoccupied settings. This is currently managed via programmable thermostat setbacks in the PW building and via

[1] The cost of biomass heating depends upon the moisture content of chips and cost of supplied wood per ton.

manually shutting down the system by BM staff for the Admin building. A modular/scalable system that can be added to if/when a biomass system is introduced to heat both buildings would be advantageous (such as a Canadian version of Autani)

Has the City moved forward with implementing or procuring ECMs (energy conservation measures) from the Energy Audit Reports? Do you want my recommendations to include these ECMs or simply to comment on them? If so I will simply copy and paste the information into the Recommendations Section. The City can then decide which recommendations they wish to pursue.

Our funding agreement with YG is completely based on the remaining recommendations from the report that we have deemed appropriate as well as some extra measures that I have been researching. All funding estimates have also been taken from the audit report. Please see the attached table and please comment on these ECMs as this is what YG has agreed to fund at this time.

Our BM staff have begun with the switching of fluorescent tubes to LED substitutes across both facilities. We have been waiting to receive your report before moving on anything else

What does the City pay for a liter of fuel oil? The Energy Audit indicates $1.02/L but this is less than the City of Whitehorse pays so I am a bit skeptical.

The City is on 'Contract Pricing' with North 60 that is quite dynamic and changes monthly. I have pulled the following from our invoices for filling the tank at the Arena for 2020:

JAN – 1.09040
FEB – 1.09040
MAR – 0.97240
APR - 0.71340
MAY – 0.65040
OCT – 0.72940
NOV – 0.80140
DEC – 0.84640
Carbon tax of appox 9.5% is added to this pricing.

Note that Arena is closed and doesn't require heat through the summer

How old are the oil tanks used at the Public Works building and Admin Building? The Energy Audits do not consider replacing oil as a heating source with propane despite the GHG reductions possible as well as the environmental costs of using oil (remediation, replacement tank costs, spill costs etc.). If the oil tanks are nearing their end of useful life, it gives more power to the argument of implementing biomass and eventually replacing the oil infrastructure with propane (if the tanks still have a few years of useful life left). Also if the tank at the Public Works building is nearing end of life and an oil furnace and replacement oil based unit heaters are installed, then the City must continue to use oil until the new equipment wears out. If there is a desire to change to propane, the decision to do so should be made now! Propane boilers to backup the biomass are preferable because they have much better temperature modulation and higher efficiency.

Oil tanks at the Admin building are at the end of useful life and will be upgraded along with the boilers. The PW building has the tanks stored within the building and probably could also be replaced but had no noted deficiencies during our last facility condition assessment (apart from having no secondary containment)

I was under the impression that propane was not a viable heat source here due to the propane turning gelatinous and consequently boilers failing during the coldest months. I am also unsure of the infrastructure in place and the availability of being able to receive reliable propane deliveries.

Thanks,

Shane Wolffe P.Eng, LEED AP BD+C, CEA, Level 1 Thermographer
Principal Engineer
Cell:(306)261-8846
Future Proofing the North from Whitehorse, Yukon

Appendix B: Propane and Biomass Costs Email

From: Project Manager <ProjectManager@cityofdawson.ca>
Sent: May 7, 2021 4:33 PM
To: Shane Wolffe <shane@futureproofmybuilding.com>
Subject: RE: City of Dawson Recommissioning Reports V2 with Propane costs and updates

Yes, there is a bit of friction between the 2 for sure in regards to how efficiently/inefficiently the boiler is run.

Talking to Louise today, they supplied what they thought would be 10,000GJ of wood for the biomass but it only produced 3000-4000GJ

From: Shane Wolffe <shane@futureproofmybuilding.com>
Sent: Friday, May 7, 2021 4:24 PM
To: Project Manager <ProjectManager@cityofdawson.ca>
Subject: RE: City of Dawson Recommissioning Reports V2 with Propane costs and updates

Just to clarify…. so the saw mill simply provides chips and YG monitors the heat use of the system and pays accordingly?

From: Project Manager <ProjectManager@cityofdawson.ca>
Sent: May 7, 2021 4:21 PM

To: Shane Wolffe <shane@futureproofmybuilding.com>
Subject: RE: City of Dawson Recommissioning Reports V2 with Propane costs and updates

Yes it is for heat purchase

YG still runs the biomass since the City never took ownership of the Waste Water Treatment Plant that it is attached to

From: Shane Wolffe <shane@futureproofmybuilding.com>
Sent: Friday, May 7, 2021 4:14 PM
To: Project Manager <ProjectManager@cityofdawson.ca>
Subject: RE: City of Dawson Recommissioning Reports V2 with Propane costs and updates

Hi Brodie,

Did they mention how they are measuring the cost per GJ? Does YG have a heat purchase agreement with them? That's what I am assuming based on being paid per GJ rather than per ton of wood.

This quote will have the same meaning to the City of Dawson if you have a heat purchase agreement as opposed to a wood purchase agreement. Whoever owns and maintains the boilers will be an important consideration regarding that. I would assume that if the boilers are owned and operated by an entity other than the City or Chief Isaac/Tr'ondëk Hwëch'in then they will charge a premium to own and operate those boilers which explains the significantly higher cost of heat than I indicated in the report.

Do you know how much they are charging per ton of wood if the City of Dawson runs the biomass system? According to the information I was given, the City of Whitehorse and Village of Haines Junction are paying $150/ton of wood which equates to ~$10/GJ. Using simple math, that means that the City of Dawson would be paying $420/ton of chips, which is significantly more. That definitely affects the economics of utilizing biomass for heating unless the City is also paying for a 3rd party to own and operate the boiler system.

I can put that quote into the report, however please confirm if that quote is related to a heat purchase agreement or a wood purchase agreement.

Thanks and have a great weekend.

Shane

From: Project Manager <ProjectManager@cityofdawson.ca>
Sent: May 7, 2021 11:26 AM
To: Shane Wolffe <shane@futureproofmybuilding.com>
Subject: RE: City of Dawson Recommissioning Reports V2 with Propane costs and updates

Hi Shane

Just got back from a visit to the lumber mill that supplies the YG biomass system in town

Their current contract that was recently renewed has them being paid $28/GJ

Can you please update your report(s) to reflect this actual cost

Thanks

Brodie

From: Shane Wolffe <shane@futureproofmybuilding.com>
Sent: Thursday, April 29, 2021 6:35 PM
To: Project Manager <ProjectManager@cityofdawson.ca>
Subject: City of Dawson Recommissioning Reports V2 with Propane costs and updates

Hi Brodie,

Please find attached version 2 of the draft reports for the Admin Building and Public Works building. As requested, I have updated the reports with the propane costs based on the estimate you received on April 27. I also found that replacing the furnace in the Public Works building with another furnace of equal efficiency makes no real sense.

We can discuss on the phone tomorrow.

Let me know if you have questions or concerns.

Thanks,

Shane Wolffe P.Eng, LEED AP BD+C, CEA, Level 1 Thermographer
Principal Engineer
Cell:(306)261-8846
Future Proofing the North from Whitehorse, Yukon
FutureproofMyBuilding.com

2180 2nd Ave
Whitehorse, YT Y1A 5N6
Tel: 306.261.8846
www.FutureProofMyBuilding.com

Client: City of Dawson

Public Works Building

Recommissioning and Engineering Assessment Report

Prepared by:

Shane Wolffe P.Eng, LEED AP BD+C, CEA
APEY Member No. 2428

Issued to Brodie Klemm

City of Dawson Project Manager

ProjectManager@cityofdawson.ca (867)993-7405

Draft V3 Issued for Review May 10, 2021

Executive Summary

This report is a record of recommissioning and assessment activities of the City of Dawson Public Works Building located in Dawson City, Yukon. It explains components of the facility that were investigated during this project and provides guidance to building operators and project managers with regards to how to proceed with energy saving and greenhouse gas reducing projects. This project was initiated to aid proponents in bidding and provide a detailed scope of work as well as to comment on proposed ECMs from the Energy Audit Report.

Section 5 of this report defines the options available to the City of Dawson and should be fully considered prior to moving forward with implementing ECMs that may later have minor usage.

Proponents to the Request for Proposals should read this report and become familiar with it to assist with preparing their submission. Section 5 lays out the action items/criteria of the project that are being completed and bid on. The proponents are instructed to reference each item in section 5 individually as each item will be individually assessed according to the item reference number. This is intended to assist proponents with organizing their submissions and for the owner with regards to scoring proposals.[1]

At the request of the building owner this project focused on the future state of the building rather than its current state. Recommissioning activities took place during the winter.

Operators should familiarize themselves with recommissioning and energy auditing reports to assist with operating the building. Project managers should make themselves familiar with energy auditing and recommissioning reports prior to contracting services or making alterations to a building that has been recommissioned or energy audited to make the best usage of their time and resources. Energy Audit reports are a surface level investigation while recommissioning projects dig into the details of how a building is operating.

Operators should endeavour to continuously commission equipment through the life of a building.

Top recommendations to be implement as part of this project include:

1. Implement ECM-1 Seals and Sweeps
2. Implement ECM-4 LED Lighting Upgrades without occupancy sensors or dimmer switches
3. Implement ECM-3 Furnace Upgrade
4. Implement ECM-6 Insulation Upgrade to roof
5. Contact Chief Isaac concerning a shared biomass district heating system for multiple City and Chief Isaac buildings in the area to reduce biomass system costs and complexity.

ECMs not recommended are:

1. Airius fans not recommended (install regular fan(s))
2. Air Curtains not recommended
3. Insulation upgrade to walls not recommended

[1] This report has a different layout than I expected because of the multiple options available to the City. Once the City selects which criteria to utilize, I will remove the components that are not applicable from section 5.

The City of Dawson will need to consider the implications of implementing "ECM-5 Unit Heater Upgrade" as this equipment will have minimal usage in the future if a biomass system is implemented. If the unit heaters are upgraded as per ECM-5, they will likely last for a long time but may be taking up budget that could be used on the biomass system.

Table of Contents

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Disclaimer

Buildings are dynamic systems that are constantly changing according to operator inputs and environmental conditions. The observations, findings and operational recommendations within this report may change based on the actions taken by various parties involved with the facility. Terms such as "likely", "potentially", "approximately" etc. are used throughout the document because changes to a single system may greatly impact other systems within the facility rendering findings and predictions as recorded inaccurate.

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Future Proof My Building Consulting Ltd. cannot be held liable for the accuracy of predictions, measurements and findings as recorded in this document.

1 - Introduction

Future Proof My Building Consulting Ltd. (FPMBC) was contracted by the City of Dawson to carry out recommissioning activities at the Dawson Public Works Building in Dawson, YT to identify sources of excessive energy usage in the facility and provide recommendations for the correction of mechanical, electrical and control systems that can save energy in the facility and reduce greenhouse gas (GHG) emissions. The project is intended to help clarify and facilitate the successful implementation of energy conservation measures (ECMs) noted in the Energy Audit Report issued by 3D Energy Limited on April 16, 2020. The inspection appears to have been conducted in January or February of 2019.

Site visits by FPMBC were carried out on December 14 and 18th to assess equipment and the building in general and test controls, mechanical and electrical systems within the building. During the week of site visits to Dawson facilities, outdoor air temperatures were between -22°C and -34°C.

This report highlights issues identified and opportunities to save energy within the facility and shall help inform proponents of issues that must be addressed as part of energy efficiency upgrades to the building. Consultation with building operators, engineers, technicians, design consultants and contractors will likely be necessary to address the issues and opportunities identified within this report. This report in whole or in part can be issued to the appropriate parties to request resolutions, provide guidance with detailed designs, provide answers to inquiries or for the sake of providing clarification.

1.1 - Definitions, Acronyms etc.

ESC – Energy Solutions Centre

FPMBC – Future Proof My Building Consulting Ltd.

AHU – Air Handling Unit

AH – Air Handler also referred to as RTU and AHU

BMS - Building Management System – the computer/software that displays the graphics and allows a building operator to control components within the building. The BMS is essentially a SCADA system that displays trends, graphics and monitors the control system to visually describe the state of equipment within a building.

City – Referring to the City of Dawson

CU – Cooling Unit

Cx – short for commissioning

DMP/DMPR – Damper – a device that opens and closes to allow air flow or restrict airflow.

EAD – Exhaust Air Dampers – dampers that exhaust return air to the exterior

EF – Exhaust Fan – a fan that removes exhaust air from a zone

FC or FCU – Fan Coil Unit

HAND – Industry term for "Manual" mode or "ON"

HOA – Hand/OFF/AUTO – a switch that puts equipment in HAND (manual ON), OFF or Automatic as determined by the control system

HtgVlv – Heating Valve – A valve that opens in order to allow hot water to flow through it into a heating coil or radiating device.

HWST - Hot water supply temperature. The temperature of the water that is provided to the building by the boilers.

HWRT – Hot water return temperature. The temperature of the water that returns to the boilers after being used by equipment in the building.

IPP – Independent Power Producers Program – A program administered by the Energy Solutions Centre that allows for selling renewable energy to the grid.

MAD – Mixed Air Dampers – dampers that mix return air with outdoor air

MCC – Motor Control Centre – A switch that allows for turning large equipment such as fans and pumps ON/OFF in HAND/AUTO.

Night Setback – An algorithm that holds a zone at a temperature several degrees below the regular occupancy temperature. A night setback during heating season is typically 17°C or 18°C. Also called an "unoccupied mode." In the Yukon, summer temperatures do not typically require a setback temperature due to cool nights.

OAD – Outside Air Dampers – dampers that open to allow fresh air into an AHU.

OAT – Outside Air Temperature

PID – Proportional Integral Derivative – A mathematically derived equation that controls the behaviour of equipment. A good PID loop is a program that makes equipment find a steady state of operation without oscillating between overshooting and undershooting the desired output.

RCx – short for recommissioning. Recommissioning is a re-optimization process for existing buildings. It ensures building equipment and systems are operating optimally to meet current occupant needs. It provides a rigorous investigation approach to identify problems and integration issues.
The RCx primary focus is on identifying "low cost/no cost" operational improvements given the building's current usage to obtain comfort and energy savings. [2]

[2] https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/canmetenergy/pdf/fichier.php/codectec/En/2008-167/NRCan_RCx_Guide.pdf

Reset Schedule – an algorithm within the control system that automatically modulates the output temperatures of a boiler according to the OAT. A good reset schedule should be operator adjustable so that the operator can adjust the boiler water temperature at a given OAT according to the dynamics of a building. Warmer OATs allow for cooler boiler water and colder OATs require hotter boiler water to meet the demands of a building. In buildings without a reset schedule, the same temperature water is used whether it's -40°C or 15°C.

RTU – Roof Top Unit – supplies large amounts of tempered air to a building.

SAF – Supply Air Fan – The fan within the air handling unit that pushes air through the zone/ductwork/system as it pulls return air back and mixes it with outside air.

SAT – Supply Air Temperature – typically from an air handling unit

SATSP – Supply Air Temperature Setpoint - the temperature that the AHU should be providing

SHGC - Solar Heat Gain Coefficient – a measure of how well solar gains are transmitted through glass to allow heat to be captured by the glass. SHGC = 1 means that all light frequencies pass through and cause heating. SHGC = 0 means that all visible light is reflected. No window will ever reach SHGC of 1 or 0.

Shoulder Season – typically fall and spring in which heating is required at night or on cloudy days and cooling is required during the heat of the day. The shoulder season is typically when HVAC systems can overheat or cool a building and use excessive amounts of energy unnecessarily. In Yukon the shoulder season can also refer to summer operating conditions.

SWT – Supply Water Temperature – the temperature of water that is being delivered from the boilers to heating equipment

TStat – Thermostat – A device that measures temperature in a zone.

Trends – Trends are graphs of the status of a point as measured or set by a control system. Having the status of points displayed graphically allows an operator or energy manager to understand how well equipment is operating. This assists with determining options that can save energy in buildings and allows for experimentation with regards to scheduling etc.

UPS – Uninterrupted Power Supply – A battery bank that is attached to electrical equipment to prevent the equipment from shutting down or experiencing power failure/power quality issues.

VAV – Variable Air Volume box – A device that mixes and tempers air for delivery to a zone at a setpoint temperature

VFD – Variable Frequency Drive – A device that changes the frequency of power that is delivered to a motor in order to control the speed of the motor. Running a motor with a VFD provides significant efficiencies with regards to electrical energy used if the motor isn't running at full speed. VFDs can also introduce harmonics and slightly alter the power factor of a circuit.

1.2 - General Notes regarding building history and findings[3]

The Dawson Public Works building is a 354m^2 one and a half story maintenance shop with offices upstairs located in Dawson, Yukon. The facility was constructed circa 2000.

The facility has two main workshop bays, a washroom, storage rooms, and a half story (second floor) with office spaces. The main entrance to the building in on the west side with a secondary entrance on the south side of the building. There are also three large overhead doors, one on the south side and two on the north side.

Based on the heating oil consumption records for 2017-2019, the facility uses an annual average of 14,073L of fuel oil per year at $1.02/L. That is an annual fuel cost of $14,354.46. The cost of a gigajoule of energy produced from burning oil in an 85% efficient furnace @$1.02/L is $31.32/GJ. The cost of heat provided by biomass is approximately $10/GJ[4] at $150/ton of dry chips. The biomass system currently operating in Dawson is paying the sawmill $28/GJ to provide chips to the Yukon Government operated facility[5].

The state of the oil tank is unknown at this time but should be considered as part of the replacement equipment if it is original.

Based on the electricity consumption records for 2017-2019, the facility uses an annual average of 25,993 kWh of electricity per year with a peak demand of 14.1 kW. This usage puts the facility in Block 4 of the new Yukon Energy rate schedule (2020) with a cost of $0.20/kWh and a demand charge of $10.85/kW.

The heating and plumbing equipment in the facility currently consists of:

- Heating oil indirect-fired forced-air convective Furnace (F) which mixes return air with fresh outdoor air, then filters, conditions, and supplies the heated air to upstairs offices.
- Ceiling mounted heating oil unit heaters (UH) which heat the bay and storage areas.
- Electric resistance personal space heater (SH).
- Electric storage type Domestic Hot Water (DHW) heater.

Currently the Public Works building is primarily heated from the combustion of oil using aged equipment. To significantly reduce the GHGs consumed by the building, implementing biomass heating in the Public Works Building as well as at the Admin Building/Firehall is recommended. The Energy Audit does not recommend upgrading the Public Works facility to utilize biomass heating along with the

[3] Many of the statistics from this report have been referenced from the Energy Audit report.
[4] The cost of biomass heating depends upon the moisture content of chips and cost of supplied wood per ton.
[5] The chip quality and dryness will directly affect the performance and efficiency of the biomass system and thus it is recommended to procure dry, seasoned chips. If Chief Isaac or Tr'ondëk Hwëchin have a stake in the biomass system, they will likely participate in the acquisition of wood chips at a more competitive rate while investing in infrastructure to improve chip quality.

Firehall/Admin Building, however given the GHG saving potential, remoteness of Dawson City and operational cost savings, biomass heating should be strongly considered despite initial costs of implementation[6].

There are multiple potential options for implementing biomass heating in the building. Section 3 of this report will discuss potential options for constructing a biomass district heating plant that can be utilized by the City of Dawson as well as potentially Chief Isaac.

2.0 – Heating Equipment

Item 5.1, 5.2,

Heating within the Public Works building is currently accomplished by heating air and distributing that hot air within the building. Since this building regularly has the bay doors open and closed at least once a day to move equipment in and out, this is an extremely inefficient means of heating the building. A better strategy is to heat a mass, such as fluid, and allow the heated mass to radiate its heat to the surroundings. In doing this, heat is less prone to escaping when a bay door or employee entrance is opened. By circulating this fluid to areas in which it is useful, this strategy is even more effective.

Oil heating is currently the primary source of heating within the Public Works building. According to Brodie Klem "*The PW building has the tanks stored within the building and probably could also be replaced but had no noted deficiencies during our last facility condition assessment (apart from having no secondary containment).*"

The City of Dawson should decide if oil will continue to be the backup source of heat once a biomass system is installed. If the oil tank will need to be replaced soon, it may be advisable to change over all equipment within the Public Works building to propane now since propane equipment is more efficient, allows for better temperature modulation, creates less GHGs, and has less risk and environmental concern attached to it. The cost alone to replace an oil tank and infrastructure with propane infrastructure may be offset by the cost of cleanup from an oil spill or leaking tank.

In terms of economics, propane typically outperforms oil in terms of cost per heat delivered and has the benefit of reduced GHG emissions. The cost of propane to the City of Dawson was quoted at $0.9141/L on April 27, 2021 which is 208% higher than the $0.44/L that the City of Whitehorse paid in 2019. This equates to a cost of $37.59/GJ of heat delivered when utilized in a 95% efficiency boiler. The cost of a gigajoule of energy delivered from burning oil @ $1.05/L in an 85% efficient furnace (maximum efficiency) is $32.24/GJ.

Regarding expected propane consumption if a biomass boiler is added, the following can be inferred. The Public Works Building used an annual average of 14,073L (539GJ) of heating oil from 2017 to 2019. The Energy Audit assumes that the furnace and unit heaters within the building operate significantly below the measured ~86% efficiency of the furnace and assumed 85% efficiency of the unit heaters

[6] Note that funding to implement GHG saving technologies is widely available at the moment and should be leveraged as much as possible to reduce ongoing operational expenses.

which has been achieved thanks to yearly maintenance. Approximately 458GJ of the 539GJ of delivered energy was used for heating by the oil boilers. **458GJ worth of propane used in a 95% efficient boiler(s) is 18,900L per year** if no other energy conservation measures are taken. Since the building will use significantly less energy from ECMs and be approximately 80% heated by biomass, it is reasonable to assume between 1890L to 7,560L of propane per year (10% to 40% of current energy demand) once biomass is installed and other ECMs are implemented. The 40% figure is in case the biomass is down for a period in the winter. 1890L @ $0.9141 = $1,728/year to 7,560L @ $0.9141 = $6,910. The high end of propane usage is pure propane 18,900L @ $0.9141 = $17,276 per year.

A significant drawback of propane in Dawson's extreme climate is that it has the potential to stop flowing when outdoor air temperatures are colder than -42°C. There is equipment that is designed to mitigate the chances of propane coagulating such as a tank warming electric blanket. A greater issue may be a lack of infrastructure in place and the availability of being able to receive reliable propane deliveries. All of these should be considered prior to making the decision to change to propane.

According to the Superior Propane website[7], 500Gal (2000L) and 1000Gal (4000L) tanks are available. The number of deliveries the City intends in a year will determine the tanks chosen vs. cost per tank. For fewer deliveries and potentially a better cost per liter, select larger tanks. If there is a delivery charge it should be considered as part of the ongoing costs since a delivery to Dawson will likely be expensive and thus the City will want to limit deliveries as much as possible. It is likely that the high cost per liter factors delivery into the cost.

The decision to remain with oil as a backup heat source to biomass should be made prior to moving forward with any equipment upgrades or renovations. If oil remains as a backup heat source, the decision to implement backup oil boilers to the biomass heating system may be advisable, dependent upon the equipment options selected.

This report will assume that oil will remain the primary backup heat source to biomass.

2.1 – Furnace

Item 5.3

The heating oil furnace is located in the maintenance room and provides conditioned air for heating to the second-floor offices via in-floor registers. The furnace is activated by a simple programmable thermostat that is located in the Super Intendent's office. According to Table 4 of the Energy Audit report, the estimated total ventilation rate according to ASHRAE 62.1 is 48L/s (95cfm) with minimum outdoor air is 36L/s (76cfm).

According to the nameplate sticker, the furnace has a Capacity of 29.6kW (101,000BTUH) with an original seasonal efficiency of 83% and an estimated seasonal efficiency of 60%. According to the maintenance sticker, the furnace is currently performing at 86%. This furnace is near the end of its useful life and should be replaced.

[7] https://www.superiorpropane.com/tank-sizes

Figure : A compilation of images of the furnace. Left Image: Front view showing the motor and controls. Right Image: Side view of the furnace showing return air ducting with outside air ducting connected. Inset: Thermostats that control the furnace located in the superintendent office.

2.1.1 – Furnace Replacement Options – Furnace Upgrade

ECM-3 Furnace Upgrade within the Energy Audit report recommends the installation of a near-condensing furnace with an AFUE of 95%. This option is likely the lowest capital cost option, however it still utilizes oil as the only fuel source and gets no real efficiency boost because of the actual performance of the furnace being maintained. According to the service sticker on the furnace dated April 1, 2020 the furnace is performing with an efficiency of 86%. If oil remains as the only fuel source, the GHG reductions of this option are essentially nil. The only real reductions from this option will be based on occupancy if a smart thermostat is utilized. This option will provide minimal to no reduction of oil consumption within the building.

ECM-2 from the Energy Audit recommends installing a Smart Thermostat to control this zone to replace the existing programmable thermostat. The cost to install the Smart Thermostat with occupancy sensors is nearly $600. While this will reduce the amount that the zone is heated, it will likely take quite a while for the Smart Thermostat to pay back. The City may wish to continue to use the existing programmable

thermostat or replace it with a Smart Thermostat. The effectiveness of the Smart Thermostat is directly related to how well the programmable thermostat is programmed regarding an occupancy schedule. A Smart Thermostat will take the guess work out of managing the thermostat for holidays or times when staff are away.

This ECM has minimal chance for efficiency improvement despite being the lowest capital cost option to implement. This option is only recommended if a biomass system isn't installed. The office zone is a small component of the overall building load, and thus an expensive installation of the other options may be a deterrent to them. A complex and expensive control system is not required for this option. The City may wish to consider implementing a higher efficiency propane furnace if the building were to change over to propane, however if a propane boiler(s) is added to the building, this option is not recommended.

2.1.2 – Furnace Replacement Options – Furnace Upgrade with biomass coil

An option that allows for the usage of biomass heating for the majority of the year involves installing the near-condensing furnace from ECM-3 along with a heating coil installed in the supply air plenum of the furnace along with a supply air temperature sensor and controlled valve.

With this option, the furnace would be installed with the blower motor set to activate when the furnace calls for heat. Upon a call for heat, the control valve will open and the blower motor will engage to remove heat from the biomass-heated coil for distribution to the second floor. If the supply air temperature sensor registers a minimum air temperature of ~30°C, the furnace burner will stay off[8]. If the biomass system is at capacity and unable to meet the supply air temperature setpoint, the furnace burner will be activated to provide additional heat. This option allows for backup oil heating as required but depends largely on the biomass system providing heat.

This option is preferable if oil continues to be the backup source of heating within the Public Works Building because it allows for biomass heating at most times with the oil furnace as backup when required. The backup furnace uses oil heating efficiently, so energy will be saved from the existing furnace with biomass operating or not. Selecting the proper furnace and commissioning the furnace correctly will be important as some models may require special configuration to activate the blower motor without also activating the oil burners. Programming the controller to monitor the supply air temperature sensor and activate the burner if below a specific setpoint will be necessary to make this option function.

This option requires a complex control system which will add to the cost of implementing this option above option 2.1.1. Given the small load of this zone, the increased costs of installing a more complex control system make this option less appealing than 2.1.1 in terms of cost despite the GHG savings that this option would provide.

[8] Thermal imaging investigation found that the distribution temperature of the furnace is currently 35˚C to 40˚C.

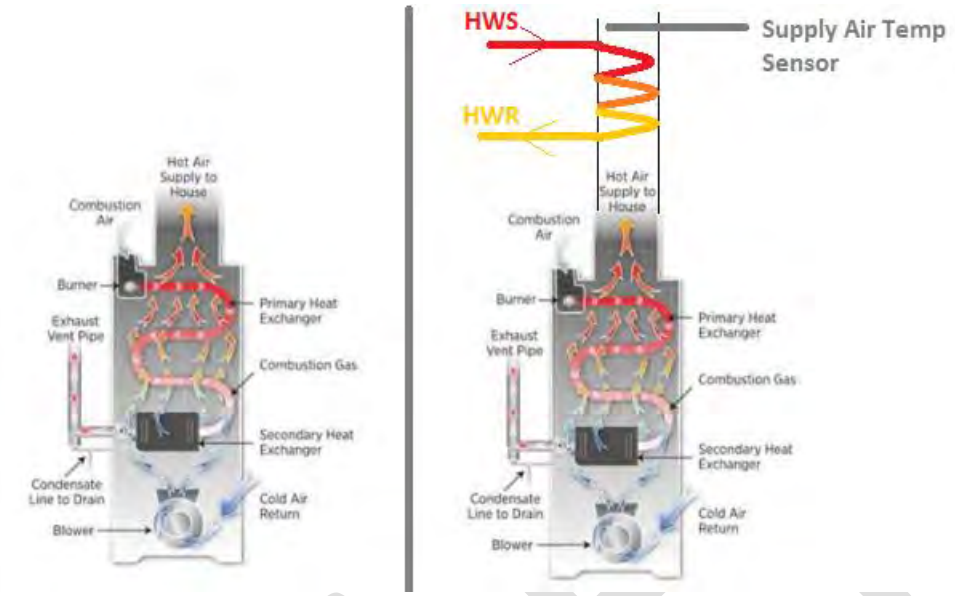


Figure : Left: The working principles of a near-condensing furnace are shown (2.1.1). Right: The near-condensing furnace is paired with a hot water coil that is fed from a biomass heating plant (2.1.2). A more advanced control system will be required to operate 2.1.2.

2.1.3 – Furnace Replacement Options – HRV with biomass coil and backup boiler

Another option that provides up to 85% heat recovery and potentially higher, involves the replacement of the furnace with a heat recovery ventilator (HRV) or a LifeBreath Furnace. This scenario is very similar to 2.1.2, however the HRV would be sized to provide the required ventilation rate to the upstairs offices. This option would best be accompanied by a building envelope upgrade to the roof as per section 4.7 to reduce the heating load.[9]

The supply air duct after the HRV would have a heating coil similar to the furnace in 2.1.2 that would have a monitored supply air temperature. The coil would need to be sized in order to provide as close to the furnace heating capacity as possible in cooperation with radiant heating (if implemented). Installing an HRV in the furnace room is expected to take up much less space within the room then a furnace because ducting could be reduced in size. This would provide more room for storage, which the room is already used for.

Alternatively, if recommendation 3.1.3 is implemented using a hot water circulation system, a LifeBreath Furnace[10] can be implemented to utilize hot water from biomass or an oil boiler.

[9] A wall upgrade will provide minimal energy benefit for the capital cost involved and is not recommended, however a substantial upgrade to the roof insulation is recommended.
[10] This model of LifeBreath Furnace can meet half of the current heating provided by the existing furnace (29.6kW = 8 ton) and airflow provided by the existing furnace: https://www.lifebreath.com/product/clean-air-furnace-6/ If the heat load is reduced by improving the roof and radiant ceiling tiles are used, this device is an option.

If the exhaust from the HRV can be vented to the workshop, then even higher efficiency is possible. Since an HRV would pull exhaust air from an office kitchen and likely the hallway, there is minimal concern for contamination and codes should allow for it to be exhausted within a workshop, however this will require a code review as part of detailed design. If the HRV pulls exhaust air from the bathroom, the exhaust must be vented to the outdoors.

The offices may require a secondary source of heating such as radiant heating from the biomass system or small electric baseboards. If biomass heating is installed to heat the vehicle bay, extending the biomass lines to provide radiant heat via ceiling tiles will require minimal disruption to the space and will allow for ventilation equipment to be shut down at night while allowing the space to continue to be heated.[11] Alternatively, radiant floor or wall heating may be implemented. Installing radiant heating will come at additional costs which makes this option less desirable from a first cost perspective but has reduced operational costs and allows for more efficient use of the biomass heating system.

If this option is implemented, it will also be important to have a backup boiler of some kind in case the biomass system fails outright or cannot meet the demand during extreme conditions. If only the office requires a backup boiler, a small electric boiler capable of providing the current heating capacity of up to 29.6kW[12] of heating would suffice. Panel A within the furnace room is a 240V 225A panel with spare slots for easy install.

If hot water-based unit heaters are implemented instead of a Modine Oil-Fired Unit Heater from ECM-5 as discussed in Section 3.1.3 then a larger oil-based (or propane if backup heat sources are changed) backup boiler will be necessary[13]. Note also that if the existing unit heaters remain in place as backup, the vehicle bay may also implement fan coil heaters along with radiant heating as discussed in section 3.1.2.

This option would improve efficiency but at an added capital cost. If this option utilizes the LifeBreath furnace and radiant panels, it is likely less complex to implement than 2.1.2. To implement this option an advanced control system, radiant heating and a backup boiler will be required. If a backup boiler is installed, this option has good potential as it has the highest efficiency of the furnace options of section 2.1.

2.2 – Unit Heaters

Currently the vehicle bay is heated by two large oil-fired unit heaters that have a heating capacity of 67.4kW each. These units are located in the middle of the facility and provide heat near the ceiling by heating the air and blowing it towards the ground. According to Table 4 of the Energy Audit, these unit heaters are expected to provide a minimum ventilation rate of 108L/s for Bay Area 1 and 142L/s for Bay Area 2.

[11] A more advanced control system will be required to accomplish this than a simple thermostat.
[12] This will be smaller if a roof insulation upgrade is implemented and radiant heating is utilized upstairs.
[13] As discussed in 3.1.3, the boilers from the Fire Hall/Admin Building could potentially be used as backup to the biomass system.

Unit heater 1 is facing the south bay door and unit heater 2 is facing the north bay doors. The thermostat that controls unit heater 1 is located across from the furnace room. The thermostat for unit heater 2 is on the column near the north wall.

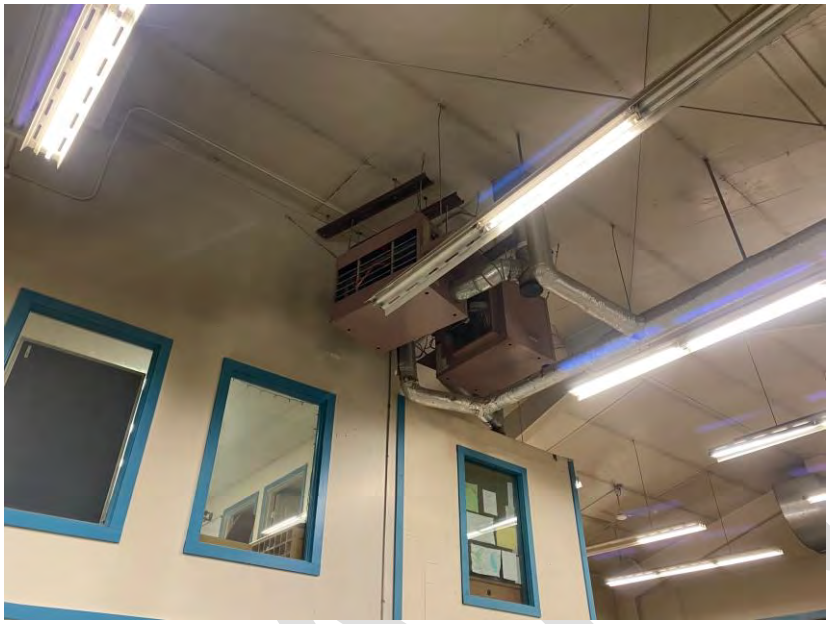


Figure : The unit heaters that heat the vehicle bay are located at roof level and thus much of the heat that they produce is lost through the roof without reaching the floor level where the heat is required. Left unit is UH-1, right unit is UH-2.

Heating the air, especially air near the roof is inefficient in this application because the heated air is easily lost when a bay door opens and because the roof has minimal insulation values at this time. Heating a mass that can radiate heat to objects within the workshop/vehicle bay is a much more efficient means of maintaining heat within the space because more heat remains even when the bay doors open. This is discussed in more detail in section 3.1.1.

2.2.1 – ECM-5 Near Condensing Unit Heaters

Item 5.5

The unit heaters within the Public Works building are nearing their end of life and must be replaced in some capacity for the vehicle bay to remain usable in the winter over the long term. According to the cost breakdown document provided by Brodie Klem, replacing the existing unit heaters with more efficient units is expected to cost $7,774. This option is likely the easiest to implement as there is no detailed design involved. For the sake of simplicity, this option is recommended at this time unless money from this funding can be utilized to implement heating elements of a future biomass project and backup boiler system.

If biomass heating is to be installed in the future, and costs on that installation are intended to be reduced and combined with this project, then options 3.1.2 and 3.1.3 should be considered because the

costs of installing hot water-based unit heaters is less than installing the Reznor Unit Heaters from ECM-5. That option however requires the installation of a backup boiler(s) and will require a detailed mechanical design. Given the stage that this project is at, it is likely best to implement ECM-5 as planned and implement 3.1.2 when a district heating system using biomass is planned.

If a district heating system using biomass as per 3.1.2 is installed, the oil-based unit heaters can act as backup by simply having their thermostats set to a setpoint 5°C to 10°C less than the setpoint of the biomass system.

3 – Biomass heating

At this time, fire smarting is being completed around West Dawson and this wood is being burned on site and wasted. This wood would be better utilized as a heating source for buildings within Dawson City.

Since there is a lot of capacity to provide wood chips in Dawson City due to the large biomass boiler already in place, a biomass boiler may be considered for installation as primary heat source for the Public Works Building, Firehall/City Hall and for potentially multiple Chief Isaac/Tr'ondëk Hwëch'in owned properties in the vicinity.

During the site visit, FPMBC investigated City property to determine where a biomass boiler could best be located. Due to the importance of access and egress from the Firehall, the most plausible option on City property is to possibly convert the existing woodshop into a biomass boiler facility. Even this option has complications however with regards to efficient chip deliveries regarding access and egress and thus the neighboring Chief Isaac property was considered.

FPMBC spoke with Ms. Gina Nagano who is the Former Chair of Chief Isaac group of companies. She indicated that Chief Isaac would be keen to discuss utilizing biomass at their office that is next door to the Firehall/Admin Building as well as in the Tr'ondëk Hwëch'in daycare which is across the street (behind the admin building). If the City has Chief Isaac as a partner, it should reduce the cost and complexity of implementing biomass for the Admin and Public Works Buildings. To size a biomass installation properly for such an application, it will be important to know the heat loads of Chief Isaac buildings and the wood shop if this building is also to be heated using biomass.

To create a biomass district/cluster heating system for use between Chief Isaac/Tr'ondëk Hwëch'in and the City, it will be important for the City of Dawson to have some type of heat purchase agreement, MOU or maintenance agreement if a biomass plant is to be constructed on Chief Isaac property for sharing between Chief Isaac/Tr'ondëk Hwëch'in and the City of Dawson at the Admin Building and Public Works building.

The only other option that appears possible is to construct a small biomass building in some of the parking spaces near the road on the north side of the Fire Hall/Admin building. This is an option if this building and chip delivery does not interfere with fire truck operation. Given the limited options for constructing a biomass facility on City property as well as the cost benefits of partnering with the First Nation, constructing it on the adjacent Chief Isaac property holds promise.

Figure : The area in front of the Firehall must remain clear so that fire trucks can easily exit and enter the hall. This leaves little space for implementing a biomass facility on City property. The exception may be to remove several parking spaces along the fence on the north side of the building (directly in front of the Museum entrance). The adjacent property owned by Chief Isaac holds promise for housing a biomass district heating plant for multiple buildings in the area.

The City of Dawson may wish to simply purchase heat from Chief Isaac/Tr'ondëk Hwëch'in, or they may take an ownership through a partnership of some kind. In terms of acquiring funding and reducing project costs, a partnership with Chief Isaac/Tr'ondëk Hwëch'in is likely the best option for the City.

In terms of operational costs, the cost of a gigajoule of energy produced from burning oil @ $1.02/L in an 85% efficient furnace is $31.32/GJ. The cost of heat provided by biomass is approximately $10/GJ[1] at $150/ton for dry wood chips. Lower quality (wetter) wood chips will increase the cost per GJ of heat and will increase the amount of maintenance that will be required to operate the biomass boiler(s). The cost of heat currently being paid for biomass heat in Dawson City is $28/GJ[14].

[1] The cost of biomass heating depends mostly upon the moisture content of chips and cost of supplied wood per ton. There will also be small losses through the distribution system.

[14] See Appendix 2 regarding costs provided to the City of Dawson. These costs will likely decrease with improved chip quality due to increased demand and infrastructure, participation from Chief Isaac/ Tr'ondëk Hwëchin and greater uptake of biomass in the Dawson area. Having a reliable demand for wood chips will help to improve the quality and supply.

Figure : A google map of the City Fire Hall/Admin Building, City Public Works Building, City Woodshop, Chief Isaac Office, Tr'ondëk Hwëch'in Daycare and Chief Isaac wood working shop. The most likely location for a biomass facility is highlighted in red. The buildings that have potential for biomass heating have orange and yellow lines running to them. A detailed design would be required to accomplish this work. An energy assessment of other buildings to be connected to the biomass must be conducted prior to detailed design to ensure that they are using energy efficiently and to prevent oversizing the biomass system.

By implementing biomass heating in the Public Works building, the replacement or remaining unit heaters will function as backup heating[15] in the event that it is required when the biomass boiler is unable to meet demand or if the biomass system fails. Implementing biomass heating in this location would greatly reduce greenhouse gases, reduce the cost of heating fuel[16], provide local employment to Dawson citizens, and significantly increase the life expectancy of the new or existing oil unit heaters.

[15] Some heating equipment may need to be removed due to it no longer meeting building codes.

[16] This option is particularly useful for reducing the high costs of and will help reduce greenhouse gases generated from burning oil. Wood chips are also significantly cheaper as a fuel source ($10/GJ @ $150/tonne in Haines Junction and Whitehorse market) than oil ($31.32/GJ @ $1.02/L consumed by 85% equipment) and electricity ($55.56 @ $0.20/kWh pure electric heating) while providing employment to locals and Tr'ondëk Hwëch'in citizens. The biomass facility in Dawson is currently paying $28/GJ for wood chips. It is likely that these chips are not as well seasoned or of as high quality as in Haines Junction. This cost is predicted to drop with improved infrastructure, experience and demand.

Note that the life expectancy of the replacement unit heaters (Reznor) is 13 years if they are the primary heating source. This should be much longer if they are only used intermittently.

A trench will need to be created to run insulated hot water lines (supply and return) from the biomass building to the boiler room of the Firehall/Admin Building. The lines would tie into the building and connect with the existing hot water circulation system. The tie in point would be prior to the return water temperature sensor of the system.

The biomass lines will likely run through the Fire Hall to the south side of the building to connect to the Public Works building. A small area will need to be excavated next to the building to run the biomass lines (~ 2-inch insulated piping) between the two buildings. A detailed design of such a facility and connection to Firehall would be required. The hot water biomass lines could potentially run through the firehall and trench to the Public Works building, or a more expensive option would be to trench the hot water lines directly to the Public Works building.

Since the Public Works building is kept at a low temperature regularly, the building itself could potentially serve as a "heat dump" to the biomass plant at times when the plant is producing more heat than the rest of the buildings can utilize. Since biomass boilers are typically undersized to meet approximately 70%-80% of the district heating load in order to run continuously all winter, dumping heat into the Public Works building may be a way to size the system for meeting higher than 80% of the heating load. If this was done, it would likely involve the biomass boiler system controls also controlling the biomass components within the Public Works building.

3.1 – Biomass Heating Options

Currently the vehicle bay is heated by two large oil-fired unit heaters that have a heating capacity of 67.4kW each. These units are located in the middle of the facility and provide heat near the ceiling by heating the air. Since heat rises, a good percentage of this heat does not reach the ground floor and escapes via the minimally insulated roof or when a bay door is opened. According to the Energy Audit, the roof currently has an insulation value of RSI 4.047 (R- 22.98).

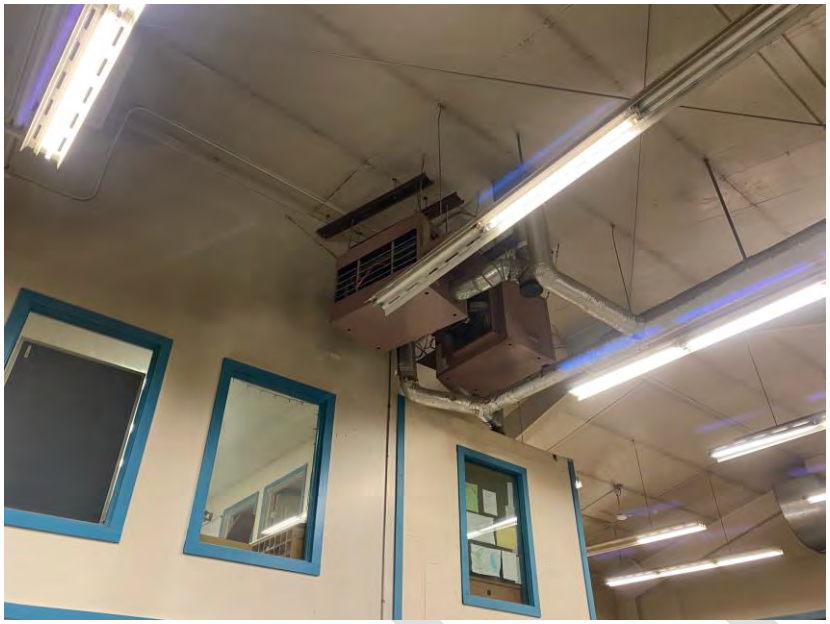


Figure : The unit heaters that heat the vehicle bay are located at roof level and thus much of the heat that they produce is lost to the roof without reaching the floor level where the heat is required.

Heating the air, especially air near the roof is inefficient in this application because the heated air is easily lost when a bay door opens. Heating a mass that can radiate heat to objects within the workshop/vehicle bay is a much more efficient means of maintaining heat within the space because the heat remains even when the bay doors open.

There are multiple ways in which biomass heating can be implemented within the Public Works Building. Each option will involve running hot water lines to equipment within the facility. Below is a breakdown of potential options to consider.

3.1.1 – Install Ground Level Radiant Heating

Item 5.7

Ideally heat should be distributed as close to the working area as possible. One possible solution is to run radiant hot water lines (supply and return) through wall fin radiators or panels located near ground level. To accomplish this, the shelving units along the walls that would need to be moved slightly away from the wall. Having the source of heat behind the shelves may not be desirable as it appears that multiple vehicle fluids are stored on the shelves. These fluids and other equipment on the shelves will absorb the heat from any radiant equipment installed behind the shelves. This along with the shelves being relocated and the labor involved in moving these shelves may be deterrents to implementing this solution at ground level.

Alternatively, a radiant heat pipe or wall finned heaters may be installed just above the shelving units along the wall. Both options would utilize the biomass-heated water as a thermal mass that would

radiate heat to the nearby equipment and space. Heating equipment and the vehicle bay in this way will allow for more heat to remain in the space whenever the bay door is opened and utilize less electricity to deliver the heat. The system could be controlled by a simple thermostat which would control a Normally Open valve to allow flow through the system.

Ideally, the thermostat for any biomass heating within the Public Works Building would be tied into the biomass control system and would allow the system to "dump" excess heat into the Public Works building as needed to optimize operation of the biomass plant.

When the radiant wall equipment is installed, ideally an insulative layer will be added to the exterior wall directly behind the radiant equipment so that heat from the equipment does not short circuit to the outdoors. Screwing a plywood strip to the wall studs, gluing a 2" – 3" rigid insulation strip to the plywood, and screwing another plywood strip to the other side of the rigid would create a solid, insulated surface to attach radiant equipment to. Since the exterior wall is not well insulated, preventing heat from conducting from the radiant equipment to the outdoors will be important.

The main benefit of this option along with option 3.1.2 is that this system will function independently from the oil-based system and thus the existing unit heaters can remain in the space to provide backup heating to this system. Since the life of the existing oil-based heaters is unknown, using this biomass-based system as primary heating may allow for them to remain in operation for some time. Alternatively, the City may wish to replace the existing unit heaters with the devices indicated in ECM-5 for the cost of $7,774 as budgeted and allow those devices to remain as backup for a very long time. The other option is 3.1.3 which will require a detailed design to implement in the short term.

Since the City may not be able to implement biomass heating within the next year, replacing the old unit heaters with fully funded ones is likely the best option unless 3.1.3 is implemented.

Figure : Radiant heating lines near ground level behind the shelving units are shown in red.

Alternatively, a thermostatically controlled radiant pipe or wall fin system may be installed above the shelving units as illustrated in grey and red. By using hot water as a mass to heat air (orange), only a pump is required to circulate this heat which saves electrical energy and maintains heat within the building. The heat pipe or wall finned heater should be reflected downward towards the shop floor. Installing a ceiling fan will push the air downward and allow for better convection.

3.1.2 – Radiant Heat and Unit Heaters

Item 5.7

In addition to, or alternative to installing radiant heating using biomass heated hot water, unit heaters could be added to increase the heat distribution within the building. This would be done if insufficient heat can be transferred to the space using only radiant heating. By adding unit heaters, more heat can

be dumped into the Public Works building and potentially allow the biomass boiler system to operate with higher efficiency while preventing the usage of oil heating in the shop area.

As with 3.1.1, implementing this solution would allow for the existing unit heaters to remain in place or for new oil-based unit heaters to provide backup heat. With this option implemented it is unlikely that the oil unit heaters will be required unless there is an issue with the biomass system or during extreme weather. The existing thermostats within the building could still be utilized for this equipment. This would involve setting the setpoint to be at least 5°C less than the setpoint of the biomass system.

Since this building is typically utilized at a low temperature, it can work well as a buffer that allows heat from the biomass system to be redirected to other buildings within the system as needed or as heat storage/dump as required. Utilizing the building in this way would require the biomass-based equipment to be controlled from/interface with the biomass control system.

Figure : Radiant wall heating from the biomass system could be run extensively within the public works building in combination with unit heaters that utilize the hot water loop. The unit heaters would ideally be controlled via a secondary thermostat that allows them to boost heat within the space as required when the radiant lines cannot keep up. Insulated hot water lines are shown in grey. Note that the hot water lines from this system could be tied into to provide heat to the second floor via radiant ceiling panels for option 2.1.3.

3.1.3 – Install water-based unit heaters with backup boiler

Item 5.8, Item 5.9

The system in 3.1.2 above could be installed by replacing the old oil unit heaters with hot water unit heaters. In this scenario, the new hydronic unit heaters could remain in the location of the oil-based unit heaters, be placed according to figure __ above, or as designed.

To accomplish this, oil (or potentially propane) boilers capable of meeting the combined load of the existing unit heaters (67.4kW * 2 = 134.8kW) would be required to be installed[17]. In doing this, the building would be heated with hot water and could begin utilizing radiant heating once the equipment is installed. This option would reduce the amount of equipment that would eventually be installed within the building but may be an issue from a funding perspective as a detailed design would be required. This report would be an important resource to anyone who would complete a detailed design.

Of important note, the boilers within the Fire Hall/Admin Building have a gross output of 483MBH (141.6kW) each according to their nameplate stickers[18]. A single boiler operating would cover the load of the bay which will be less than 134.8kW once other measures are taken. The Energy Audit lists the condition of these boilers as "good" and they may have many years of functionality remaining in them. If these boilers are to be replaced within the Fire Hall/Admin Building, they could potentially be installed as backup boilers to a hydronic system that is primarily heated with biomass. Installing one of these boilers in the furnace room and storing the other is an option that could be implemented if the work between the Firehall/Admin Building and Public Works Building is coordinated. The existing unit heaters could remain in service until hydronic unit heaters and radiant equipment is installed and connected to the backup boiler. This could be set to function immediately or wait until the system is connected to the biomass system.

Alternatively, there is a portable trailer located next to the Fire Hall that is owned by the City. The trailer contains an electrical generator that is rated at 53.6KVA on a single phase and 100KVA on three phases. The trailer also contains a 646MBH (189.3kW) boiler. If this boiler still works, it could be connected to the future biomass system to provide backup heating to the public works building and potentially the workshop or another part of the district heating system. The operational condition of this equipment is unknown, but apparently this trailer was constructed to provide emergency power and heating to a facility.

The advantage of this hydronic option is that hot water unit heaters are significantly cheaper than oil burning unit heaters. This option also allows for the HRV design for the upstairs as discussed in 2.1.3. This option is more expensive than 3.1.1 and 3.1.2 at this time because a detailed design and boiler installation will be required, however if the Firehall boilers are installed in this location or connected to a new hydronic system via the trailer, the cost may be very similar if not less than replacing the oil unit heaters with other oil unit heaters and then installing a separate hydronic system for biomass. If biomass for this building was considered and funded as part of the Energy Audit scope, this option would likely be in the same ballpark in terms of costs.

If biomass is to be installed for the Admin Building and Public Works building in the future, and the boilers from the Fire Hall/Admin Building are being changed out, this option should be considered now

[17] Upgrading the roof insulation as per recommendation ___ will reduce the heat load of the shop. Installing radiant heating will also allow for smaller unit heaters.
[18] The Energy Audit indicates that they have a heat capacity of 169.14kW which contradicts the nameplate sticker.

to save the $7,774 expense of replacing the old oil unit heaters with new oil unit heaters which are unlikely to be used often.

4 – Building Envelope and related ECMs

FPMBC was provided with a word file providing ECMs that were being considered along with funding information for comment. Below is the section of that document relevant to this project with comments for each item in a separate section.

#2. Dawson Public Works (Gerties)	
Door Seals & Sweeps (ECM 1)	$1,708
Interior Lighting Upgrades + EXIT signs to LED (ECM 4)	$6,457
Furnace Upgrade (ECM 3)	$4,171
Unit Heater Upgrade (ECM 5)	$7,774
Airius Air Pear (ceiling fan replacement) (ECM 7*)	$1,335
3 x Air Curtain (ECM 8*)	$51,756
Control Optimization / Recommissioning? (new ECM 9*)	$10,950
Insulation Upgrade (ECM 6) Audit estimate	$45,120
Magnetite storm windows ($27.24 - $35.30/sqft)	$2,200
Public Works bldg. sub-total #2	**$131,471**

Figure : Table of proposed ECMs for funding.

4.1 – Door Seals and Sweeps - ECM-1

Item 5.10

Door seals and sweeps improvement is a low-cost ECM that will reduce the heat loss through the bay doors by preventing heat migration from the interior to the exterior. Installing these sweeps is recommended.

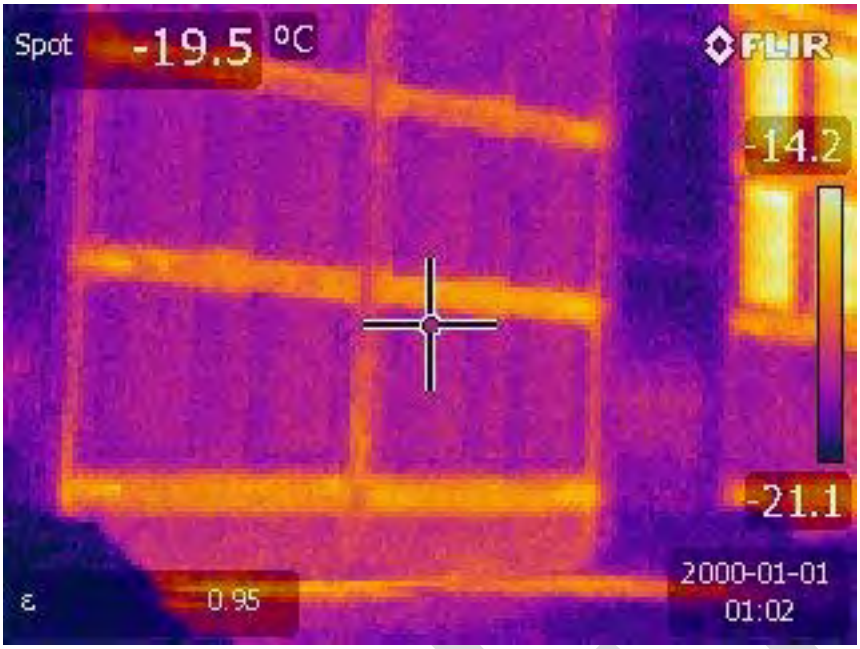


Figure : The north bay door. It appears that heat is escaping from this bay door because of a poor seal. It is possible but unlikely that the door had recently opened leaving a heat imprint. It is unknown when the door was opened prior to taking this image.

4.1.1 – Install "Arctic Entry" to upstairs

Item 5.11

Next to the stairway to the upper offices is an open section of wall that is connected to the vehicle bay. Whenever the north bay door is opened, this cold air rushes into the vehicle bay but is also allowed to blow up the stairs into the offices. This open area also allows vehicle exhaust or other odors produced in the workshop to migrate up to the offices.

Framing this area and installing a regular or transparent door would reduce cold air and fumes from the vehicle bay from entering the second-floor office space while also allowing direct access to the shop via the offices.

This area is currently heated by air circulating in the shop. The base of the stairs may get cold and require a radiant panel once the biomass system is installed, if this is pursued.

Figure : The open corridor to the upstairs that connects to the vehicle bay can be framed with a door installed to prevent cold air and fumes from migrating upstairs.

4.1.2 – Insulate the bay doors and metal exit doors to reduce heat loss

Item 5.20

This option was not indicated in the Energy Audit report, however after completing a thermal imaging inspection, a lot of heat loss was observed through the bay doors and metal exit doors. A cost-effective option to reduce this heat loss is to insulate the bay doors.

A product option to consider: https://www.curtain-and-divider.com/roll-up-dock-door-curtains/

Pre-cut insulated panels for bay doors are another option: https://www.homedepot.com/p/Cellofoam-Garage-Door-Insulation-Kit-8-Pieces-Garage-Door-Insulation-Kit-8-pcs/203630159

Likely the most cost-effective option is to simply cut some 1.5" – 2" rigid to size so that the pieces don't impede door movement at the hinges and adhere them to the panel portion of the bay doors using foam adhesive. The foam pieces should be combined with this reflective door cover https://www.smartgarage.ca/insulated-roll-up-garage-doors/ or an aluminum or fire resistant, thermally reflective film cover to provide the longest life expectancy and energy efficient benefits.

This same strategy can be utilized to reduce heat loss through metal exit doors. It is important to adhere the rigid to a clean and dry door and ensure that the rigid is covered with aluminum or a fire-resistant material that can handle the abuse that a door typically endures.

4.2 –Interior Lighting Upgrades and EXIT signs to LED - ECM-4

Item 5.12

The Energy Audit report recommends upgrading all lighting to LED. It also recommends the installation of dimmer switches and timers. Given the dark mornings and late afternoons in the Dawson winter (October to March), the lights within the building will likely be on as long as the zones are occupied due to low natural lighting levels. Also, occupancy sensors are not recommended in offices that have an occupant working at a desk for long periods because they shut lights off when there is no movement.

From March until October, lighting within the offices can be manually implemented if the occupant doesn't find sufficient natural lighting available via windows. It is likely that dimmer switches and occupancy sensors will add to the project costs while adding minimal energy benefit, and they will likely not be well utilized. The exception is installing an occupancy switch in the washroom.

Replacing all existing lighting with LED is recommended, but occupancy sensors and dimmer switchers are not likely worth the extra cost and are left to the discretion of the City. When replacing outdoor lighting, it is recommended that the replacement lighting is Dark Sky compliant to reduce light pollution levels.

4.3 – Furnace Upgrade ECM-3

Item 5.4, Item 5.3

Section 2 of this report focuses on the options available for furnace upgrades. Given the small load of the upstairs zone and the minimal cost to upgrade the furnace, it is recommended that the furnace upgrade proceed as planned as per section 2.1.1 to reduce the project complication and cost unless a propane boiler is added to the building as backup to the biomass. If this occurs, the option from 2.1.3 is recommended.

Implementing "ECM-2 Smart Thermostat" is up to the discretion of the City. Since the existing thermostat is programmed to reduce temperatures during unoccupied periods, ECM-2 is not likely to produce much energy savings unless the upstairs offices are rarely occupied during occupied hours and occupants are willing to wait a couple of minutes to bring the temperature up from approximately 18°C to 22°C when they enter the upstairs.

4.4 – Unit Heater Upgrade - ECM-5

Item 5.5

Upgrading the unit heaters is discussed in section 2.2 and 3.1. The simplest solution at this point is to upgrade the existing unit heaters as per ECM-5, however this installs equipment which will rarely be

utilized once biomass is installed and thus the City should consider the information in Section 3.1 prior to moving forward with ECM-5.

4.5 – Airius Air Pear (ceiling fan replacement) – ECM-7

Item 5.13

The Airius fans are intended to move warm air from the ceiling space to the floor for the cost of $1,335. The Airius website[19] claims that a savings of up to 23.2% is possible from a 33-foot-tall ceiling with a delta T of 10.8°F. This would be accomplished by moving the air from near the ceiling to ground level. This is the same function as a common ceiling fan. Since the ceiling height is low, a common fan costing less than $200 should have no problem distributing the air in the same way. The motor efficiency from the Airius to a common fan will be play into the savings possible, however the motor efficiency difference is expected to be minimal and thus the payback period for implementing the Airius fan is very long.

This product appears to be more applicable for higher roofs as the amount of pressure required to direct the airflow down to ground level would be much higher. Having an overly strong air current in such a low ceiling space would blow dust and debris around making working in the shop difficult. A minimal fan pressure is required to move air from the ceiling to the floor in this application.

Also, installing radiant heating as per Section 3.1 as well as insulating the roof as per 4.7 are intended to help reduce stratification within the space, minimizing the need for expensive fans.

Installing the Airius fans instead of a common ceiling fan is not recommended.

4.6 - Air Curtains – ECM – 8

Item 5.14

The installation of air curtains is intended to prevent cold air from infiltrating the vehicle bay and removing heated air from the space. The reason that air curtains seem like a good idea is because the building is currently heated with air from unit heaters. This heated air is prone to escaping multiple times per day, whenever the bay doors are opened.

If air curtains are installed a portion of heated air will still escape and there are factors to consider regarding air curtains. These devices will increase electrical energy usage while blowing dust, snow and debris from the maintenance equipment as they enter and exit the building. This will likely create dust clouds and contamination within the Public Works building which will make it more difficult to work within the building. Notice on the air curtain website[20] how all the warehouses are clean.

Installing the three air curtains has a budget of $51,756. This is a very expensive ECM with minimal payback and potential drawbacks considering that the annual fuel cost is on average $11,791 according to the Energy Audit report. It is advisable to spend that money instead on building a system that

[19] https://www.airiusfans.com/
[20] http://www.aircurtain.ca/

maintains heat within the building more efficiently (using as much radiant heating and thermal mass as possible) as discussed in section 3.1 and on insulating the roof to reduce the amount of heat that is lost 24/7/~300.

4.7 – Insulation Upgrade – ECM – 6

Item 5.15, Item 5.16

As shown in the accompanying "Dawson Public Works Thermal Imaging Report" and as discussed in section 2.7.2 of the Energy Audit, the roof of the Public Works building is poorly insulated and prone to significant heat loss. Since the heating equipment is also located near the roof, much of the heat produced in the vehicle bay sits near the roof and escapes via the roof causing ice damning and high energy consumption. According to the Energy Audit Table 11, the roof of the Public Works building only has an RSI of 4.047 (R-22.98). Ideally a roof in the Yukon should not perform below R-40 for a large commercial building.

According to Table 33 in the Energy Audit, the proposed improvement to the roof is only an additional 50mm (~2 inches) of additional Polystyrene (rigid) for an added RSI increase of 1.724 (R - 9.79). Given the cost to remove the metal siding and minimal energy savings of adding 2" of rigid, this renovation only makes sense if more than 2" of rigid is added. This is possible because the roof is believed to be made of polystyrene[21] which allows for additional insulation to be added without worry of creating a second vapor barrier.

Improvements to the roof insulation of at least 4" to 6" of additional rigid is recommended. Adding 4" would increase the roof insulation to ~ R- 44. Adding 5.5" of rigid would increase the roof insulation to ~ R- 60. This could be accomplished by installing 2 x 6 cross members parallel and attached to the existing roof trusses to hold the new rigid insulation and attach metal roofing or plywood for shingles. These members would be installed at the edge of each piece of rigid and would be cut to have approximately a ¼" gap between the insulation layer and plywood or metal roofing. If solar is intended for this facility, adding a ¾" plywood layer over the insulation layer is a good idea because it will allow for more strength while providing attachment points for anchoring a solar system.

Improving the insulation values on the roof are significantly less labour intensive than improvements to the building envelope because the building envelop is much larger and has electrical conduit, lights, windows, doors etc. to work around.

As shown in the Thermal Imaging report, adding a 2" layer of insulation to the underside of the roof (plywood) above the offices will increase the thermal performance and reduce heat loss within the office spaces. If 4" is added to the roof via the exterior, and 2" is added to the roof above the office spaces from the interior, there will be a significant energy reduction via reduced heat loss.

Table 34 of the Energy Audit report also recommends adding a 50mm layer of polystyrene to the wall assembly. Adding additional insulation to the wall assembly will effectively create a secondary vapor

[21] According to the Energy Audit report.

barrier and is highly undesirable. Adding only 2" of rigid to the wall assembly is significantly more complex than adding insulation to the roof and has minimal energy benefit. Thus, a wall assembly insulation upgrade is not recommended unless the City wishes to also upgrade the exterior aesthetics of the Public Works building as part of the insulation installation.

Note that any insulation improvements will reduce the heat loads and thus the sizing of biomass heating equipment and even oil burning equipment can potentially be reduced.

4.8 – Magnetite Storm Windows – ECM - 11

Item 5.17

The Magnetite windows appear to be a good option to replacing the windows and will help to reduce the heat loss via the glass. These panels have a high cost of $2,200 and will have a minimal energy payback since they are assumed to be implemented in the upstairs offices which are a low energy use zone compared to the vehicle bay. If the occupants presently find the windows to be drafty and uncomfortable, then this option is recommended.

Since cooling in the building will be accomplished via opening windows during summer, care will need to be taken to ensure that the Magnetite panels for operable windows are stored safely so that they do not crack or get scratched when removed from the windows during summer months.

In the accompanying thermal imaging report, only one window was observed to have heat loss around the frame. This window should be insulated around the frame by removing the window trim and using expanding foam.

5 – Recommendations for the City of Dawson to consider

The City should decide which recommendations they wish to pursue and discuss this with the Energy Solutions Centre.

5.1 – Assess the condition of the oil tank to determine if it is due for replacement

Reference: Section 2

The oil tank for this facility is stored within the building and is likely due for replacement in the near future. This tank has no secondary containment and the state of it is currently unknown.

Recommend have the oil tank(s) assessed regarding replacement prior to deciding to continue with oil. Plan to replace the oil storage tanks along with oil-based heating equipment if oil remains as a primary fuel source and the tank is due for replacement. Have this expense included with project costs as it is a necessary expense. Note that using oil as backup heating to biomass is required if the option discussed in section 3.1.3 utilizes the boilers that are being replaced from the Fire Hall/Admin Building.

Response (Project Manager, Energy Solutions Centre):

Signed: _____ Date: _____

5.2 - Determine if oil will remain as a fuel source or if propane shall be used prior to selecting heating equipment

Reference: Section 2

The Energy Audit report assumes that oil shall remain as a heat source in the building despite several advantages of implementing propane. A significant drawback of propane in Dawson's extreme climate is that it has the potential to stop flowing when outdoor air temperatures are colder than -42°C. Tank heating equipment such as an electric heating blanket exists that can prevent this from happening. A greater issue may be a lack of infrastructure in place and the availability of being able to receive reliable propane deliveries. All of these should be considered prior to making the decision to change to propane.

The decision to remain with oil as a backup heat source to biomass should be made prior to moving forward with any equipment upgrades or renovations. Note that using oil as backup heating to biomass is required if the option discussed in section 3.1.3 utilizes the boilers that are being replaced from the Fire Hall/Admin Building.

Recommend cost out utilizing propane and changing over infrastructure to propane versus the costs of replacing the oil tank, oil insurance costs etc. prior to moving forward with oil burning equipment upgrades. This step is not required but recommended as you may find significant cost savings from switching as part of this project. Be sure to include propane warming equipment in the estimates.

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.3 – Decide regarding implementation of ECM-2 Smart Thermostat

Reference: Section 4.3, Section 2.1

ECM-2 from the Energy Audit recommends installing a Smart Thermostat to control this zone to replace the existing programmable thermostat. The cost to install the Smart Thermostat with occupancy sensors is nearly $600. While this will reduce the amount that the zone is heated, it will likely take quite a while for the Smart Thermostat to pay back. The City may wish to continue to use the existing programmable thermostat or replace it with a Smart Thermostat.

Recommend continue to utilize the programmable thermostat. Ensure that unoccupied settings are approximately 15°C or less during times when the offices are not in use.

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.4 – Upgrade furnace as per ECM-3

Reference: Section 2.1, Section 4.3

Since this zone is a small component of the overall building load, ECM-3 is recommended as it will have the lowest capital cost to implement. A complex and expensive control system is not required for this option. The City may wish to consider implementing a higher efficiency propane furnace if the building changes over to propane.

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.5 – Implement ECM-5 unless there is desire to implement 3.1.3

Reference: Section 2.2.1, Section 3.1, Section 4.4

According to the cost breakdown document provided by Brodie Klem, replacing the existing unit heaters with more efficient units is expected to cost $7,774. This option is likely the easiest to implement as there is no detailed design involved. For the sake of simplicity, this option is recommended at this time unless money from this funding can be utilized to implement the heating components that would work with a future biomass project and backup boilers.

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.6 – Contact Chief Isaac group to discuss a biomass facility for the Fire Hall/Admin Building, Public Works Building, Wood Shop and Chief Isaac buildings

Reference: Section 3

Chief Isaac would be keen to discuss utilizing biomass at their office that is next door to the Firehall/Admin Building, at their adjacent wood shop, as well as in their daycare which is across the street (behind the admin building). If the City has Chief Isaac as a partner, it should reduce the cost and complexity of implementing biomass for the Admin and Public Works Buildings.

To size a biomass installation properly for such an application it will be important to know the heat loads of Chief Isaac buildings and the wood shop if this building is also to be heated using biomass. FPMBC would be keen to help assess the wood shop as well as the Chief Isaac buildings.

Recommend reach out to Gina Nagano, Chair of Chief Isaac group of companies to discuss an agreement for heat purchase, MOU or joint venture regarding a biomass district heating system. Her phone number is 867-334-7609 and email is gina.nagano@gmail.com.
Response (Project Manager, CAO):

Signed: _____ Date: _____

5.7 – Install Radiant Heating in the Vehicle Bays to utilize biomass heating and potentially backup boiler heat

Reference: Section 3.1.1, Section 3.2

Recommend install radiant heating extensively within the vehicle bay to allow for better heat delivery and heat retention within the vehicle bay. The most practical way to accomplish this is illustrated in figure __ in Section 3.2 by locating the radiant heating above the shelving units and doors. Installing an insulated panel between the radiant equipment and exterior walls is recommended to prevent heat from short circuiting to the outdoors.

If the biomass heating equipment functions separately from the oil unit heaters, then the setpoint of the oil unit heaters should be set to a minimum temperature for the space (~5°C) so that they only activate if the biomass system fails or cannot keep up with heating demand. Alternatively all heating equipment within the vehicle bay can be connected to the biomass controls once they are implemented.

Response (Project Manager, Energy Solutions Centre, CAO):

Signed: _____ Date: _____

5.8 – If a hydronic heating system is implemented, consider using the old Fire Hall boilers as backup to biomass

Reference: Section 3.1.3

The boilers within the Fire Hall/Admin Building have a gross output of 483MBH (141.6kW) each according to their nameplate stickers[22]. A single boiler operating would cover the load of the bay which will be less than 134.8kW once other measures are taken. The Energy Audit lists the condition of these

[22] The Energy Audit indicates that they have a heat capacity of 169.14kW which contradicts the nameplate sticker.

boilers as "good" and they may have many years of functionality remaining in them. If these boilers are to be replaced within the Fire Hall/Admin Building, they could potentially be installed as backup boilers to a hydronic system that is primarily heated with biomass. This would greatly reduce the costs of implementing a hydronic heating system and would save money on the overall upgrades by not installing multiple heating systems.

Installing one of these boilers in the furnace room and storing the other is an option that could be implemented if the work between the Firehall/Admin Building and Public Works Building is coordinated. The existing unit heaters could remain in service until hydronic unit heaters and radiant equipment is installed and connected to the backup boiler. This could be set to function immediately or wait until the system is connected to the biomass system.

Recommend investigate this option if a biomass system is to be implemented. FPMBC can potentially complete this work or recommend a consultant with experience in this area[23].

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.9 – Determine the operational state of the boiler and generator in the City owned portable trailer for potential use as backup heating and power to the biomass system

Reference: Section 3.1.3

There is a portable trailer located next to the Fire Hall that is owned by the City. The trailer contains an electrical generator that is rated at 53.6KVA on a single phase and 100KVA on three phases. The trailer also contains a 646MBH (189.3kW) boiler. If this boiler still works, it could be connected to the future biomass system to provide backup heating to the public works building and potentially the workshop or another part of the district heating system. The electrical generator could also be hooked up to the biomass system to provide backup power in the event of a prolonged outage. The operational condition of this equipment is unknown, but apparently this trailer was constructed to provide emergency power and heating to a facility.

Recommend check records and/or test this equipment to determine if it can be used with the future biomass district heating system to reduce the project cost for the City.

Response (Project Manager, Energy Solutions Centre, CAO):

[23] If FPMBC wins an RFP that was recently submitting I will be hiring a mechanical engineer who could do the design and costing analysis.

Signed: _____ Date: _____

5.10 – Door Seals and Sweeps ECM-1

Reference: Section 4.1

Door seals and sweeps improvement is a low-cost ECM that will reduce the heat loss through the bay doors by preventing heat migration from the interior to the exterior. Installing these sweeps is recommended.

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.11 – Install an "Arctic Entrance" to prevent cold air and fumes from migrating upstairs

Reference: Section 4.1.1

Recommend frame the open area that connects the shop to the stairwell. Framing this area and installing a regular or transparent door would reduce cold air and fumes from the vehicle bay from entering the second-floor office space while also allowing direct access to the shop via the offices. The base of the stairs may get cold and require a radiant panel once the biomass system is installed if this is pursued.

The costing for this item may be separate or included with ECM-1.

Response (Project Manager, Energy Solutions Centre):

Signed: _____ Date: _____

5.12 – ECM-4 Upgrade to LED lighting

Reference: Section 4.2

Recommend install an occupancy sensor in the washroom and upgrade all lighting to LED. Recommend

replacement outdoor lighting is Dark Sky compliant to reduce light pollution levels.

Response (Project Manager, Energy Solutions Centre):

Signed: _____ Date: _____

5.13 – Install a ceiling fan to reduce stratification

Reference: Section 4.5

The Airius fans are intended to move warm air from the ceiling space to the floor for the cost of $1,335. This is the same function as a common ceiling fan. A minimal fan pressure is required to move air from the ceiling to the floor in this application because the roof is not that high. Installing the Airius fans instead of common ceiling fans is not recommended to reduce the ECM cost.

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.14 – Air Curtains not recommended

Reference: Section 4.6

The installation of air curtains is intended to prevent cold air from infiltrating the vehicle bay and removing heated air from the space. If air curtains are installed a portion of heated air will still escape and there are factors to consider regarding air curtains. These devices will increase electrical energy usage while blowing dust, snow and debris from the maintenance equipment as they enter and exit the building. This will likely create dust clouds and contamination within the Public Works building which will make it more difficult to work within the building.

Installing the three air curtains has a budget of $51,756. This is a very expensive ECM with minimal payback and potential drawbacks considering that the annual fuel cost is on average $11,791 according to the Energy Audit report.

Installing the air curtains is at the discretion of the City but is not recommended.

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.15 – Upgrade roof insulation

Reference: Section 4.7

Improvements to the roof insulation of at least 4" to 5.5" of additional rigid is recommended. If solar is intended for this facility, adding a ¾" plywood layer over the insulation layer is a good idea because it will allow for more strength while providing attachment points for anchoring a solar system.

Improving the insulation values on the roof are significantly less labour intensive than improvements to the building envelope because the building envelop is much larger and has electrical conduit, lights, windows, doors etc. to work around.

Adding a 2" layer of insulation to the underside of the roof above the offices is recommended. It will increase the thermal performance and reduce heat loss within the office spaces. This work could be done with City staff to save costs.

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.16 – Envelope insulation upgrade not recommended

Reference: Section 4.7

Adding rigid to the wall assembly is significantly more complex than adding insulation to the roof and 2" has minimal energy benefit. Thus, a wall assembly insulation upgrade is not recommended unless the City wishes to also upgrade the exterior aesthetics of the Public Works building as part of the insulation installation.

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.17 – Magnetite window covers

Reference: Section 4.8

The Magnetite windows appear to be a good option to replacing the windows and will help to reduce the heat loss via the glass. These panels have a high cost of $2,200 and will have a minimal energy payback since they are assumed to be implemented in the upstairs offices which are a low energy use zone compared to the vehicle bay. If the occupants presently find the windows to be drafty and uncomfortable, then this option is recommended.

Recommend insulate the frame around the problem window identified in the Thermal Imaging report.

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.18 – Commission the biomass system as well as backup oil-based equipment once all projects are complete

Ensuring that the new biomass equipment functions optimally and in cooperation with the oil-based equipment will be important to ensure long term energy savings. This should be done by a third party with control systems expertise if the control system for the biomass system interfaces with the buildings in a complex manner.

Response (Project Manager, CAO):

Signed: _____ Date: _____

5.19 - Implement "Energy Star Portfolio Manager" or other application to track facility energy usage

The City of Whitehorse uses a web-based application called "Energy Tracker" to catalogue and keep track of its various buildings and the energy usage of these buildings. The City of Dawson would likely benefit from implementing this or a similar application such as "Energy Star Portfolio Manager" because the electrical, oil and propane bills for each facility managed by the City would be entered into the application as they arrive and then can be easily tracked. Since the expenses will be reduced for buildings that undergo improvements, it is wise to track and compare these expenses to previous years.

By implementing "Energy Star Portfolio Manager" or a similar program, it will be easier for staff to observe/verify energy saving measures that are implemented in buildings and throughout the community over time and would lead to higher productivity with regards to tracking the costs of facilities.

The Energy Branch is in the process of setting up an Energy Benchmarking initiative that utilizes "Energy Star Portfolio Manager" for buildings such as this. It is recommended that the City of Dawson add the Public Works building to the list of buildings the Energy Branch will contact for this initiative.

Response (Project Manager, Energy Solutions Centre):

Signed: _____ Date: _____

5.20: Install insulation panels or insulative blanket on bay doors and metal exit doors

Reference: Section 4.1.2

Recommend implement one of the options provided regarding insulating the bay doors and metal exit doors. This will have a much lower capital cost and higher energy savings than upgrading the building envelope.

Response (Project Manager, CAO, Energy Solutions Centre):

Signed: _____ Date: _____

Appendix A: Recommissioning Email

From: Project Manager <ProjectManager@cityofdawson.ca>
Sent: March 11, 2021 11:46 AM
To: Shane Wolffe <shane@futureproofmybuilding.com>
Subject: RE: Recommissioning Reports
Hi Shane

Just to re-iterate the paragraph below, we would like your report to have a significant focus on the ECMs that are outlined in the table attached as these are directly what our TPA is based upon.

Any suggestions you have on the implementation of these ECM's, alternative options, design considerations, cautions, past successes in other communities etc are all of great interest

Cheers

Brodie

Has the City moved forward with implementing or procuring ECMs (energy conservation measures) from the Energy Audit Reports? Do you want my recommendations to include these ECMs or simply to comment on them? If so I will simply copy and paste the information into the Recommendations Section. The City can then decide which recommendations they wish to pursue.

Our funding agreement with YG is completely based on the remaining recommendations from the report that we have deemed appropriate as well as some extra measures that I have been researching. All funding estimates have also been taken from the audit report. Please see the attached table and please comment on these ECMs as this is what YG has agreed to fund at this time.

Our BM staff have begun with the switching of fluorescent tubes to LED substitutes across both facilities. We have been waiting to receive your report before moving on anything else

From: Project Manager
Sent: Wednesday, March 10, 2021 4:49 PM
To: 'Shane Wolffe' <shane@futureproofmybuilding.com>
Cc: CAO Dawson <cao@cityofdawson.ca>
Subject: RE: Recommissioning Reports
Hi Shane

Comments in red

From: Shane Wolffe <shane@futureproofmybuilding.com>
Sent: Tuesday, March 9, 2021 7:42 PM
To: Project Manager <ProjectManager@cityofdawson.ca>
Cc: CAO Dawson <cao@cityofdawson.ca>
Subject: RE: Recommissioning Reports
Hi Brodie,

I'm working on the report and I have a few questions that I have added to this email as I have been progressing. Please respond to each question individually in RED so that I can keep track of answers. If you have comments please also indicate them in red.

First of all, I spoke with Gina Nagano who is the Chair of Chief Isaac group of companies. She indicated that Chief Isaac would be keen to discuss utilizing biomass at their facility that is next door to the Admin Building as well as in their daycare which is across the street (behind the admin building). If the City has Chief Isaac as a partner it should reduce the cost and complexity of implementing biomass for the Admin and Public Works Buildings. To size a biomass installation properly for such an application it will be important to know the heat loads of these buildings as well and for the City of Dawson to have some type of heat purchase agreement, MOU or maintenance agreement if a biomass plant is to be constructed on Chief Isaac property for sharing between Chief Isaac and the City of Dawson at the Admin Building and Public Works building. Given the limited options for constructing a biomass facility on City property, constructing it on the adjacent Chief Isaac property holds promise. You may want to grease some wheels with the City to see what their appetite for this type of arrangement is. In the report I will indicate other potential locations for the biomass facility. Note also that the City may wish to simply purchase heat from Chief Isaac or they may take an ownership through a partnership of some kind. I am quite certain that a partnership with them is the best option for the City in terms of finding funding and reducing project costs. In terms of operational costs, the cost of a gigajoule of energy produced from burning oil @ $1.02/L in an 85% efficient furnace is $31.32/GJ. The cost of heat provided by biomass is approximately $10/GJ[1] at $150/ton. Biomass heating costs about 1/3 as much as burning oil and the price of oil is likely to climb, plus the biomass can be sourced locally. I definitely like the idea

[1] The cost of biomass heating depends upon the moisture content of chips and cost of supplied wood per ton.

but assume it will be outside the scope of the Community IEEP funding. This will likely have to be a completely separate project.

The Energy Audit report ECM-2 indicates using a Smart Thermostat which is adequate to control a regular furnace but will not likely work for some of the biomass heated options I am proposing. This is a fairly simple means of control that is lower cost than an advanced control system but has limited functionality. If the City goes with more than a furnace, I don't see this as an option. This ECM has been omitted from our funding agreement. From what I understand (and please correct me if I am wrong) the City would like to be able to remotely monitor their buildings and equipment? A more advanced control system is required to do this but it will come at a higher cost than what is recommended in the Energy Audit. Since the Public Works and Admin Building are next to each other, are both intended to utilize biomass heating and will be tendered at approximately the same time, it makes sense that both buildings would utilize the same control system. This should reduce the costs of installation and will allow the City to monitor the buildings remotely while improving their energy efficiency via better controllability. Please let me know if this is the desired outcome? I will comment on the recommendations from the Energy Audit report with regards to this as I am providing a couple of options in the report. Remote monitoring is not really as much as a priority as a general upgrade to the controllability of our HVAC systems across the two buildings that allow for an Occupied/Unoccupied settings. This is currently managed via programmable thermostat setbacks in the PW building and via manually shutting down the system by BM staff for the Admin building. A modular/scalable system that can be added to if/when a biomass system is introduced to heat both buildings would be advantageous (such as a Canadian version of Autani)

Has the City moved forward with implementing or procuring ECMs (energy conservation measures) from the Energy Audit Reports? Do you want my recommendations to include these ECMs or simply to comment on them? If so I will simply copy and paste the information into the Recommendations Section. The City can then decide which recommendations they wish to pursue.

Our funding agreement with YG is completely based on the remaining recommendations from the report that we have deemed appropriate as well as some extra measures that I have been researching. All funding estimates have also been taken from the audit report. Please see the attached table and please comment on these ECMs as this is what YG has agreed to fund at this time.

Our BM staff have begun with the switching of fluorescent tubes to LED substitutes across both facilities. We have been waiting to receive your report before moving on anything else

What does the City pay for a liter of fuel oil? The Energy Audit indicates $1.02/L but this is less than the City of Whitehorse pays so I am a bit skeptical.

The City is on 'Contract Pricing' with North 60 that is quite dynamic and changes monthly. I have pulled the following from our invoices for filling the tank at the Arena for 2020:

JAN – 1.09040
FEB – 1.09040

MAR – 0.97240
APR - 0.71340
MAY – 0.65040
OCT – 0.72940
NOV – 0.80140
DEC – 0.84640
Carbon tax of appox 9.5% is added to this pricing.

Note that Arena is closed and doesn't require heat through the summer

How old are the oil tanks used at the Public Works building and Admin Building? The Energy Audits do not consider replacing oil as a heating source with propane despite the GHG reductions possible as well as the environmental costs of using oil (remediation, replacement tank costs, spill costs etc.). If the oil tanks are nearing their end of useful life, it gives more power to the argument of implementing biomass and eventually replacing the oil infrastructure with propane (if the tanks still have a few years of useful life left). Also if the tank at the Public Works building is nearing end of life and an oil furnace and replacement oil based unit heaters are installed, then the City must continue to use oil until the new equipment wears out. If there is a desire to change to propane, the decision to do so should be made now! Propane boilers to backup the biomass are preferable because they have much better temperature modulation and higher efficiency.

Oil tanks at the Admin building are at the end of useful life and will be upgraded along with the boilers. The PW building has the tanks stored within the building and probably could also be replaced but had no noted deficiencies during our last facility condition assessment (apart from having no secondary containment)

I was under the impression that propane was not a viable heat source here due to the propane turning gelatinous and consequently boilers failing during the coldest months. I am also unsure of the infrastructure in place and the availability of being able to receive reliable propane deliveries.

Thanks,

Shane Wolffe P.Eng, LEED AP BD+C, CEA, Level 1 Thermographer
Principal Engineer
Cell:(306)261-8846
Future Proofing the North from Whitehorse, Yukon

Appendix B: Propane and Biomass Costs Email

From: Project Manager <ProjectManager@cityofdawson.ca>
Sent: May 7, 2021 4:33 PM
To: Shane Wolffe <shane@futureproofmybuilding.com>
Subject: RE: City of Dawson Recommissioning Reports V2 with Propane costs and updates

Yes, there is a bit of friction between the 2 for sure in regards to how efficiently/inefficiently the boiler is run.

Talking to Louise today, they supplied what they thought would be 10,000GJ of wood for the biomass but it only produced 3000-4000GJ

From: Shane Wolffe <shane@futureproofmybuilding.com>
Sent: Friday, May 7, 2021 4:24 PM
To: Project Manager <ProjectManager@cityofdawson.ca>
Subject: RE: City of Dawson Recommissioning Reports V2 with Propane costs and updates

Just to clarify…. so the saw mill simply provides chips and YG monitors the heat use of the system and pays accordingly?

From: Project Manager <ProjectManager@cityofdawson.ca>
Sent: May 7, 2021 4:21 PM
To: Shane Wolffe <shane@futureproofmybuilding.com>
Subject: RE: City of Dawson Recommissioning Reports V2 with Propane costs and updates

Yes it is for heat purchase

YG still runs the biomass since the City never took ownership of the Waste Water Treatment Plant that it is attached to

From: Shane Wolffe <shane@futureproofmybuilding.com>
Sent: Friday, May 7, 2021 4:14 PM
To: Project Manager <ProjectManager@cityofdawson.ca>
Subject: RE: City of Dawson Recommissioning Reports V2 with Propane costs and updates

Hi Brodie,

Did they mention how they are measuring the cost per GJ? Does YG have a heat purchase agreement with them? That's what I am assuming based on being paid per GJ rather than per ton of wood.

This quote will have the same meaning to the City of Dawson if you have a heat purchase agreement as opposed to a wood purchase agreement. Whoever owns and maintains the boilers will be an important consideration regarding that. I would assume that if the boilers are owned and operated by an entity other than the City or Chief Isaac/Tr'ondëk Hwëch'in then they will charge a premium to own and operate those boilers which explains the significantly higher cost of heat than I indicated in the report.

Do you know how much they are charging per ton of wood if the City of Dawson runs the biomass system? According to the information I was given, the City of Whitehorse and Village of Haines Junction are paying $150/ton of wood which equates to ~$10/GJ. Using simple math, that means that the City of Dawson would be paying $420/ton of chips, which is significantly more. That definitely affects the economics of utilizing biomass for heating unless the City is also paying for a 3rd party to own and operate the boiler system.

I can put that quote into the report, however please confirm if that quote is related to a heat purchase agreement or a wood purchase agreement.

Thanks and have a great weekend.

Shane

From: Project Manager <ProjectManager@cityofdawson.ca>
Sent: May 7, 2021 11:26 AM
To: Shane Wolffe <shane@futureproofmybuilding.com>
Subject: RE: City of Dawson Recommissioning Reports V2 with Propane costs and updates

Hi Shane

Just got back from a visit to the lumber mill that supplies the YG biomass system in town

Their current contract that was recently renewed has them being paid $28/GJ

Can you please update your report(s) to reflect this actual cost

Thanks

Brodie

From: Shane Wolffe <shane@futureproofmybuilding.com>
Sent: Thursday, April 29, 2021 6:35 PM
To: Project Manager <ProjectManager@cityofdawson.ca>
Subject: City of Dawson Recommissioning Reports V2 with Propane costs and updates

Hi Brodie,

Please find attached version 2 of the draft reports for the Admin Building and Public Works building. As requested, I have updated the reports with the propane costs based on the estimate you received on April 27. I also found that replacing the furnace in the Public Works building with another furnace of equal efficiency makes no real sense.

We can discuss on the phone tomorrow.

Let me know if you have questions or concerns.

Thanks,

Shane Wolffe P.Eng, LEED AP BD+C, CEA, Level 1 Thermographer
Principal Engineer
Cell:(306)261-8846
Future Proofing the North from Whitehorse, Yukon
FutureproofMyBuilding.com

Report to Council

[X] For Council Decision [ ] For Council Direction [ ] For Council Information

[ ] In Camera

SUBJECT:	Lot 28 Dredge Pond Subdivision Approval Extension (#19-150)	
PREPARED BY:	Stephanie Pawluk, CDO	**ATTACHMENTS:** 1. 2020 Subdivision Approval
DATE:	July 9, 2021	
RELEVANT BYLAWS / POLICY / LEGISLATION: Municipal Act Subdivision Bylaw Official Community Plan Zoning Bylaw		

RECOMMENDATION

It is respectfully recommended that Council grant a 12 month renewal of the subdivision authority to subdivide Lot 28 Dredge Pond Subdivision, as per the approved plan of subdivision, subject to the following conditions:

1.1. The applicant shall, on approval of the subdivision plan by the City of Dawson, take all necessary steps to enable the registrar under the Land Titles Act to register the plan of subdivision.

1.2. The period of time for which the plan of subdivision approval is effective within which the plan of subdivision must be submitted to the land titles office must not exceed 12 months from the date of approval.

1.3. Development Permit #21-079 is approved and the applicant builds a compliant residential dwelling on the subdivided lot as per the specifications of Development Permit #21-079 within 12 months of the date of approval.

ISSUE

Council approved Subdivision Application #19-150 for Lot 28, Dredge Pond Subdivision on August 18th, 2020 via resolution 20-13-06.

C20-13-06 Moved by Councillor Kendrick, seconded by Councillor Ayoub that Council:

1. Rescind resolution 20-09-07.
2. Grant subdivision authority to subdivide Lot 28 Dredge Pond Subdivision, as per the amended plan of subdivision, subject to the following conditions:
   - 2.1 The applicant shall, on approval of the subdivision plan by the City of Dawson, take all necessary steps to enable the registrar under the Land Titles Act to register the plan of subdivision.
   - 2.2 The period of time for which the plan of subdivision approval is effective within which the plan of subdivision must be submitted to the land titles office must not exceed 12 months from the date of approval.
   - 2.3 The applicant builds a compliant residential dwelling on the subdivided lot as per the specifications of Development Permit #20-005 within 12 months of the date of approval.

Motion Carried 5-0

The subdivision plan that was approved via resolution 20-13-06 is shown in Figure 1.

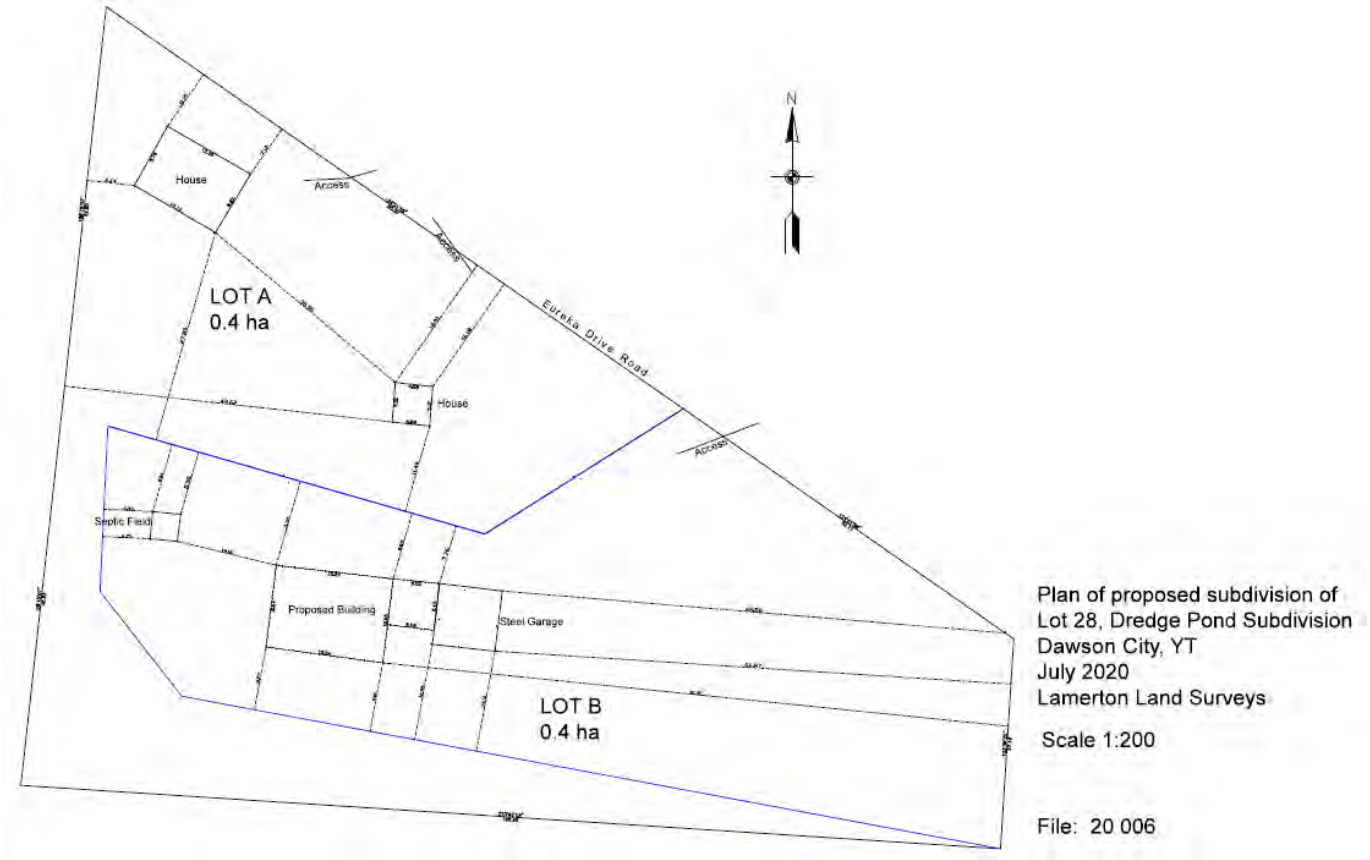


Figure 1: Approved subdivision plan.

The applicant has been unable to fulfill condition 2.3 of the 2020 subdivision approval. The applicant has pointed to building constraints that have arisen as a result of Covid-19 manufacturing and supply chain disruptions. As such, the applicant has requested this extension of subdivision approval for a further 12 months in order to meet that condition, as per S. 319(2) of the Municipal Act. It is possible to apply for an extension given that the approval has not yet lapsed. The applicant has also applied for a new development permit to fulfill the building requirement (previously development permit #20-005, now #21-079). Upon a site visit of July 9, 2021, it was concluded that the building is underway but not yet clad to weather. In order to complete the development, a new permit had to be applied for given that permit #20-005 has expired and the extension date has been surpassed.

BACKGROUND

In 2020, Council approved the first subdivision application for the property; however, the applicant had to submit an amended subdivision application upon the realization that the original approved subdivision plan was unfeasible due to the geographic terrain of the lot. This infeasibility was not realized until after the original approval of the subdivision when the proponent contracted a professional survey. Figure 2 shows an aerial image of the lot. An extreme slope and tailing pond renders much of the site undevelopable (circled in Figure 3). Additionally, the location of the existing septic tank (circled in Figure 3) forces the lot line to jag dramatically north in order to keep the septic tank with the southern proposed lot (lot B). The location of the septic tank was largely determined by Environmental Health requirements and the lot's topography; therefore, the septic tank was not located there as a result of a lack of foresight for a future subdivision, but as a result of the geographic constraints of the lot.

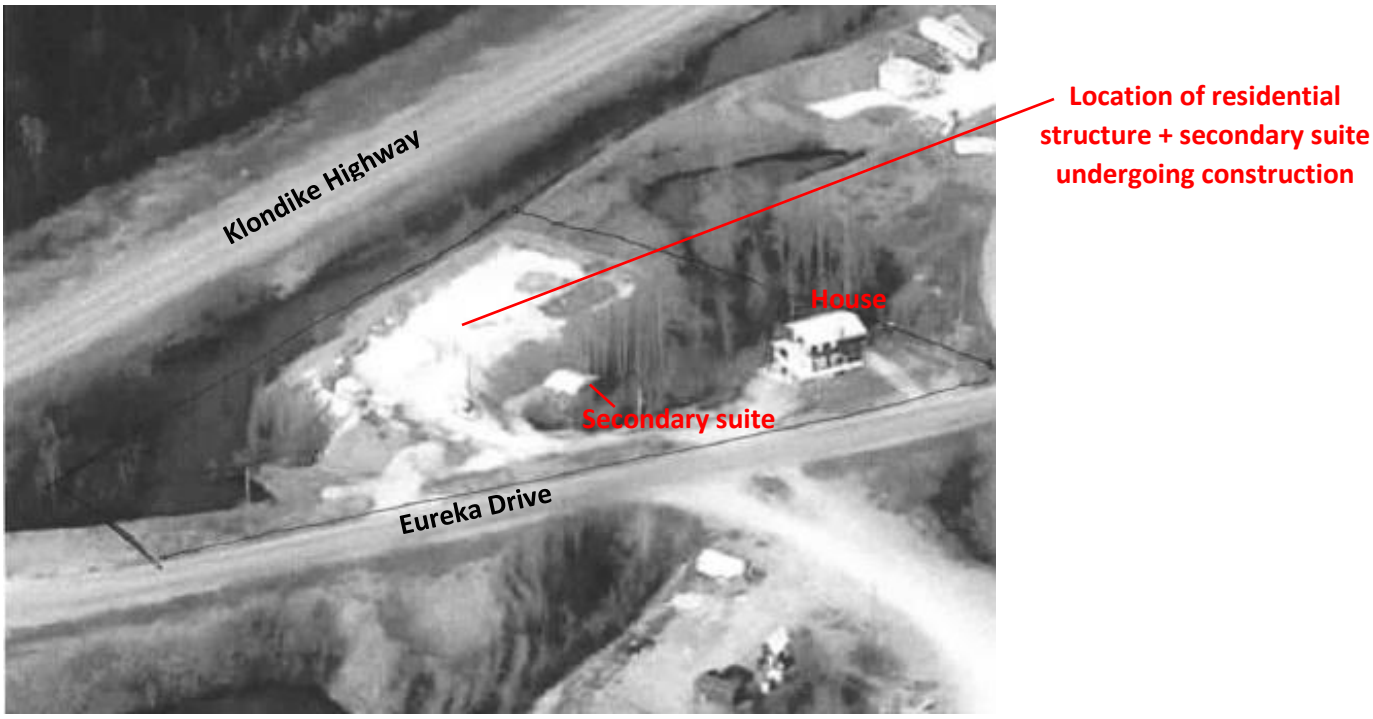


Figure 2: Aerial image showing the geographic features and existing development on the lot, with the current lot lines.

Figure 3: Constraints rendering sections of this lot undevelopable. The red circle shows the steep slope and tailing pond next to the Klondike Highway. The yellow circle shows the approximate location of the septic tank.

The two main reasons for the location of this subdividing lot line:

1. To keep the septic tank with the southern lot, and
2. To meet the minimum parcel size requirement of 0.4 ha, as per the ZBL.

Council accepted these geographic constraints as justification to approving the atypical lot layout and approved the amended subdivision plan on August 18th, 2020 via resolution 20-13-06. This is a request for an extension of this approval.

ANALYSIS

Discussion

The applicant submitted all approved Environmental Health Permits with the initial subdivision application.

Proposed Lot A:

Environmental Health approved a Sewage Disposal System (Permit #3945) on February 10, 2014 for the main residence. The garden suite only has a composting toilet and the original Pit Privy approval from 2006 is still valid for this residence.

Proposed Lot B:

Environmental Health approved a Sewage Disposal System (Permit#6101) on August 1, 2019 for a three-bedroom residence.

Municipal Act

The Municipal Act s. 314 details the requirements for any proposed plan of subdivision to have direct access to the highway to the satisfaction of the approving authority. Access to a highway is achieved for both parcels using existing access points to Eureka Drive.

S. 319 stipulates that a subdivision approval may be valid for a period of up to twelve months. If the applicant has not provided proof that the conditions of approval have been met, under the Act approval is void. Should this renewal be granted, no further renewals may be granted in the future.

Subdivision Bylaw

Subdivision Control Bylaw S3.01 states that every subdivision of land must be made in accordance with the Municipal Act, the Official Community Plan, the Zoning Bylaw, and the Subdivision Control Bylaw. The Analysis/Discussion section of this report is intended to discuss the proposal's conformity with the provisions outlined in the relevant legislation, policies, and plans.

Official Community Plan

The existing titled property is currently designated as CR– Country Residential. Uses associated with this designation primarily include low-density residential uses that do not rely on being connected to municipal water and sewer. Therefore, the subdivided lot would be required to retain the same designation. Any new use or development on the proposed lots would be required to conform to the OCP designation.

Zoning Bylaw

The subject property is currently designated as Country Residential (R3). The Zoning Bylaw is intended to implement the goals of the OCP. Therefore, the R3 designation is intended to permit low-density single detached housing in a rural setting. The existing and approved future use and structures on both lots are compatible with the permitted use of the land.

In the original zoning assessment for the original approved subdivision plan, it was noted that the proposed Lot B currently contains only accessory structures. To remedy this issue, the applicant submitted plans to

construct a residential dwelling on this lot. A development permit (#20-005) was approved and issued on June 10th, 2020 to construct a residential dwelling unit and secondary suite. It is a condition of approval that the applicant build a compliant residential dwelling on the proposed Lot B in order to meet the requirements of the R3 zone. As discussed above, a new permit is currently underway to facilitate the continued construction of this structure.

The zoning assessment conducted on the amended subdivision plan shows that the proposed lots are compliant with the Zoning Bylaw.

OPTIONS

1. Grant renewal of subdivision approval as per S. 319(2) of the Municipal Act.

2. Deny renewal request, which will prohibit subdivision and prevent the applicant from applying for a new subdivision application for six months, as per S. 321 of the Municipal Act.

APPROVAL		
NAME:	Cory Bellmore, CAO	**SIGNATURE:** 
DATE:	July 9, 2021	

THE CITY OF DAWSON

P.O BOX 308, DAWSON CITY, YUKON Y0B 1G0
PH: (867) 993-7400, FAX: (867) 993-7434

August 20th, 2020

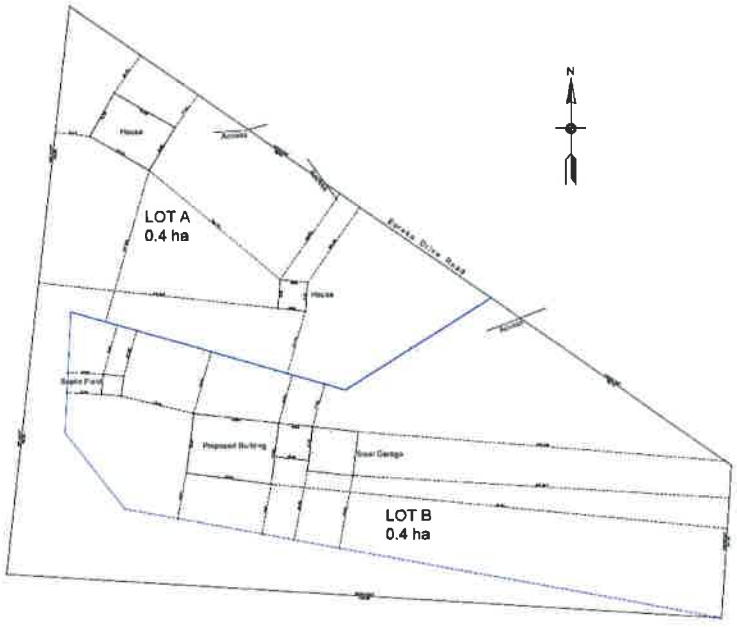
Chad Beveridge
Box 1121
Dawson City, YT
Y0B 1G0

Re: NOTICE OF APPROVED SUBDIVISION APPLICATION #19-150

Dear Chad Beveridge,

I am pleased to inform you that your amendment to Subdivision Application #19-150 was approved on August 20th, 2020.
This Permit gives you authorization to subdivide your property located at Lot 28, Dredge Pond Subdivision, to the specifications detailed in the amended plans you submitted, subject to the following conditions:

1. The applicant shall, on approval of the subdivision plan by the City of Dawson, take all necessary steps to enable the registrar under the Land Titles Act to register the plan of subdivision.
2. The applicant builds a compliant residential dwelling on the subdivided lot as per the specifications of Development Permit #20-005 within 12 months of the date of approval.



Please note that as per the Municipal Act Chapter 154 S. 322(3), "*the period of time for which the plan of subdivision approval is effective and within which the plan of subdivision must be submitted to the land titles office must not exceed 12 months from the date of approval of the application unless the applicant and the approving authority agree to a further 12 month period*".

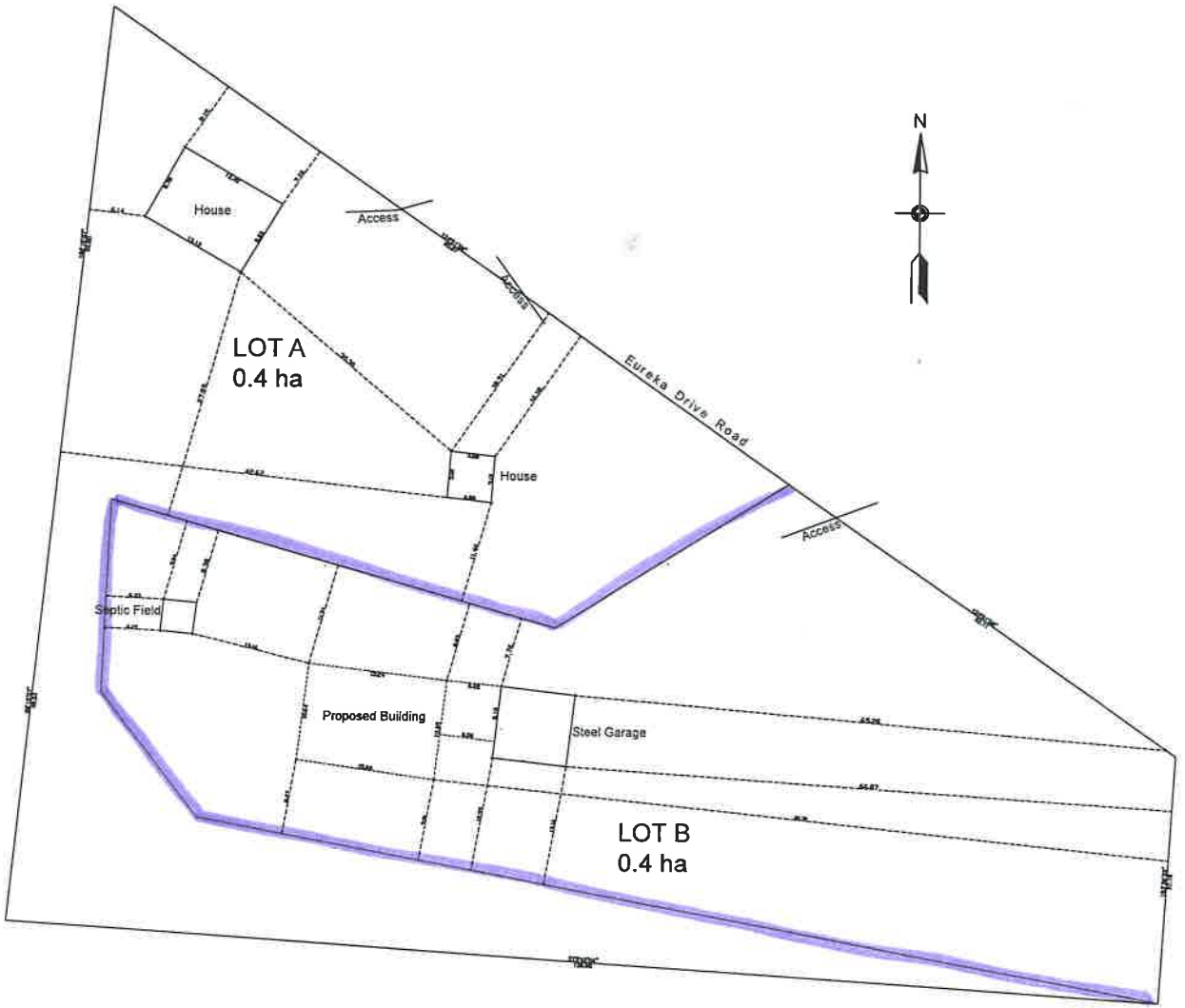
Therefore, you are required to provide documentation to the City of Dawson by no later than August 19th, 2021 that your plan of subdivision, including all appropriate caveats or easements as per the conditions listed above, has been fully registered with the Land Titles Office. Failure to comply with this provision renders your approval void.

If you have any further questions, please feel free to contact me using the information listed below.

Sincerely,

Stephanie Pawluk
Community Development and Planning Officer
Box 308, Dawson City YT Y0B1G0
cdo@cityofdawson.ca
867-993-7400 ext. 414

JUL 3 0 2020



Plan of proposed subdivision of
Lot 28, Dredge Pond Subdivision
Dawson City, YT
July 2020
Lamerton Land Surveys

Scale 1:200

File: 20 006

unit of measurement: metres

Lot A

THE CITY OF DAWSON

P.O BOX 308, DAWSON CITY, YUKON Y0B 1G0
PH: (867) 993-7400, FAX: (867) 993-7434

Zoning Assessment

File Number: 19-150 **Date:** Aug 3, 2020

Zone: R3 **Assessment Completed By:** S Pawluk

1. Application Type

☐ OCP Amendment	☐ Variance
☐ Zoning Amendment	☐ Development
☑ Subdivision	☐ Other

2. Official Community Plan Designation: CR - Country Residential
Does the proposed development meet OCP requirements? ✓ yes __ no
If no, OCP amendment is required.

3. Zoning By-Law Designation: R3- Country Residential
Does the proposed development meet ZBL requirements? ✓ yes __ no
If no, ZBL amendment is required.

4. Heritage Management Plan Designation: Klondike Valley
Does the proposed development require HAC review? __ yes ✓ no __
If yes, fill out Heritage Assessment form.

5. Zone Specific Regulations:

Provision	Permitted	Proposed	Compliant	Variance Required
Permitted Use	single detached residential dwelling	" "	(Y) / N	
Minimum Parcel Size	0.40 ha	0.40 ha	(Y) / N	
Maximum Parcel Size	1.62 ha	0.40 ha	(Y) / N	
Minimum Parcel Width	—	—	Y / N	
Minimum Setback (Front)	15 ft	23.3 ft	(Y) / N	
Minimum Setback (Side)	15 ft	20.1	(Y) / N	
Minimum Setback (Side)	15 ft	>100 ft	(Y) / N	
Minimum Setback (Rear)	15 ft	91.5 ft	(Y) / N	

THE CITY OF DAWSON

P.O BOX 308, DAWSON CITY, YUKON Y0B 1G0
PH: (867) 993-7400, FAX: (867) 993-7434

Minimum Floor Area	900 ft²	1346 ft²	(Y) / N	
Maximum Height (Principal)	35 ft	22 ft	(Y) / N	
Maximum Height (Accessory)	20 ft	16 ft	(Y) / N	
Maximum Parcel Coverage	—	—	Y / N	
Maximum Floor Area Ratio (FAR)	—	—	Y / N	
Minimum Off-Street Parking Spaces	2	2	(Y) / N	
Minimum Setback (Between Principal and Accessory)	10 ft	99.4 ft	(Y) / N	
Zone Specific: _____			Y / N	
Zone Specific: _____			Y / N	

6. Notes:

Lot B

THE CITY OF DAWSON

P.O BOX 308, DAWSON CITY, YUKON Y0B 1G0
PH: (867) 993-7400, FAX: (867) 993-7434

Zoning Assessment

File Number: 19-150 **Date:** Aug 3, 2020

Zone: R3 **Assessment Completed By:** SPawluk

1. Application Type

☐ OCP Amendment	☐ Variance
☐ Zoning Amendment	☐ Development
☑ Subdivision	☐ Other _____

2. Official Community Plan Designation: CR - Country Residential
Does the proposed development meet OCP requirements? ✓yes __no
If no, OCP amendment is required.

3. Zoning By-Law Designation: R3 - Country Residential
Does the proposed development meet ZBL requirements? ✓yes __no
If no, ZBL amendment is required.

4. Heritage Management Plan Designation: Klondike Highway
Does the proposed development require HAC review? ✓yes __no __
If yes, fill out Heritage Assessment form.

5. Zone Specific Regulations:

Provision	Permitted	Proposed	Compliant	Variance Required
Permitted Use	✓	residential dwelling & secondary suite.	(Y) / N	
Minimum Parcel Size	0.40 ha	0.40 ha	(Y) / N	
Maximum Parcel Size	1.62 ha	0.40 ha	(Y) / N	
Minimum Parcel Width	—	—	Y / N	
Minimum Setback (Front)	15 ft	29 ft	(Y) / N	
Minimum Setback (Side)	15 ft	~43 ft	(Y) / N	
Minimum Setback (Side)	15 ft	71.3 ft	(Y) / N	
Minimum Setback (Rear)	15 ft	27.1 ft	(Y) / N	

THE CITY OF DAWSON

P.O BOX 308, DAWSON CITY, YUKON Y0B 1G0
PH: (867) 993-7400, FAX: (867) 993-7434

		house / secondary suite		
Minimum Floor Area	900 ft²	2160 ft² / 400 ft²	(Y) / N	
Maximum Height (Principal)	35 ft	22 ft	(Y) / N	
Maximum Height (Accessory)	20 ft	No accessory - just garage (part of principal building. 19 ft	(Y) / N	
Maximum Parcel Coverage	–	–	Y / N	
Maximum Floor Area Ratio (FAR)	–	–	Y / N	
Minimum Off-Street Parking Spaces	2	2	(Y) / N	
Minimum Setback (Between Principal and Accessory)	10 ft	garage = no setback necessary as it's part of the principal building	(Y) / N	
Zone Specific: _____			Y / N	
Zone Specific: _____			Y / N	

6. Notes:

Report to Council

[X] For Council Decision [ ] For Council Direction [ ] For Council Information

[ ] In Camera

SUBJECT:	Lot 28 Dredge Pond Subdivision Application (#19-150)	
PREPARED BY:	Stephanie Pawluk, CDO	**ATTACHMENTS:** 1. Application & Supporting Documentation
DATE:	August 3, 2020	
RELEVANT BYLAWS / POLICY / LEGISLATION: Municipal Act Subdivision Bylaw Official Community Plan Zoning Bylaw		

RECOMMENDATION

It is respectfully recommended that Council:

1. Rescind resolution 20-09-07.
2. Grant subdivision authority to subdivide Lot 28 Dredge Pond Subdivision, as per the amended plan of subdivision, subject to the following conditions:
   2.1. The applicant shall, on approval of the subdivision plan by the City of Dawson, take all necessary steps to enable the registrar under the Land Titles Act to register the plan of subdivision.
   2.2. The period of time for which the plan of subdivision approval is effective within which the plan of subdivision must be submitted to the land titles office must not exceed 12 months from the date of approval.
   2.3. The applicant builds a compliant residential dwelling on the subdivided lot as per the specifications of Development Permit #20-005 within 12 months of the date of approval.

ISSUE

Council approved Subdivision Application #19-150 for Lot 28, Dredge Pond Subdivision on June 9th, 2020 via resolution 20-09-07.

C20-09-07 Moved by Councillor Shore, seconded by Councillor Ayoub that council grant subdivision authority to subdivide Lot 28, Dredge Pond Subdivision, subject to the conditions 1.1 to 1.3 of the request for decision document.
Motion Carried 5-0

The subdivision plan that was approved via resolution 20-09-07 is shown in Figure 1.

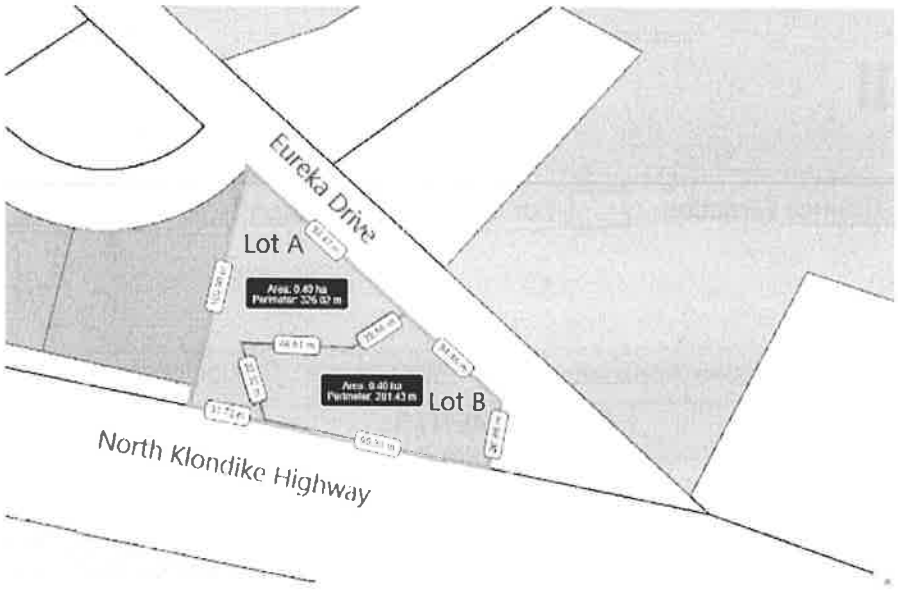


Figure 1: Original approved subdivision plan.

One of the conditions of the approval of this subdivision was that "the applicant submits a plan of subdivision completed by a certified lands surveyor drawn in conformity with the approval." The applicant submitted a plan of subdivision completed by a certified lands surveyor on July 6th, 2020. Upon review of this plan of survey, Administration determined that the plan was not drawn in conformity with the approved subdivision plan.

Upon consultation with the proponent, it was determined that the approved subdivision plan was unfeasible due to the geographic terrain of the lot. This infeasibility was not realized until after the approval of the subdivision when the proponent contracted a professional survey. Figure 2 shows an aerial image of the lot. An extreme slope and tailing pond renders much of the site undevelopable (circled in Figure 3). Additionally, the location of the existing septic tank (circled in Figure 3) forces the lot line to jag dramatically north in order to keep the septic tank with the southern proposed lot (lot B). The location of the septic tank was largely determined by Environmental Health requirements and the lot's topography; therefore, the septic tank was not located there as a result of a lack of foresight for a future subdivision, but as a result of the geographic constraints of the lot.

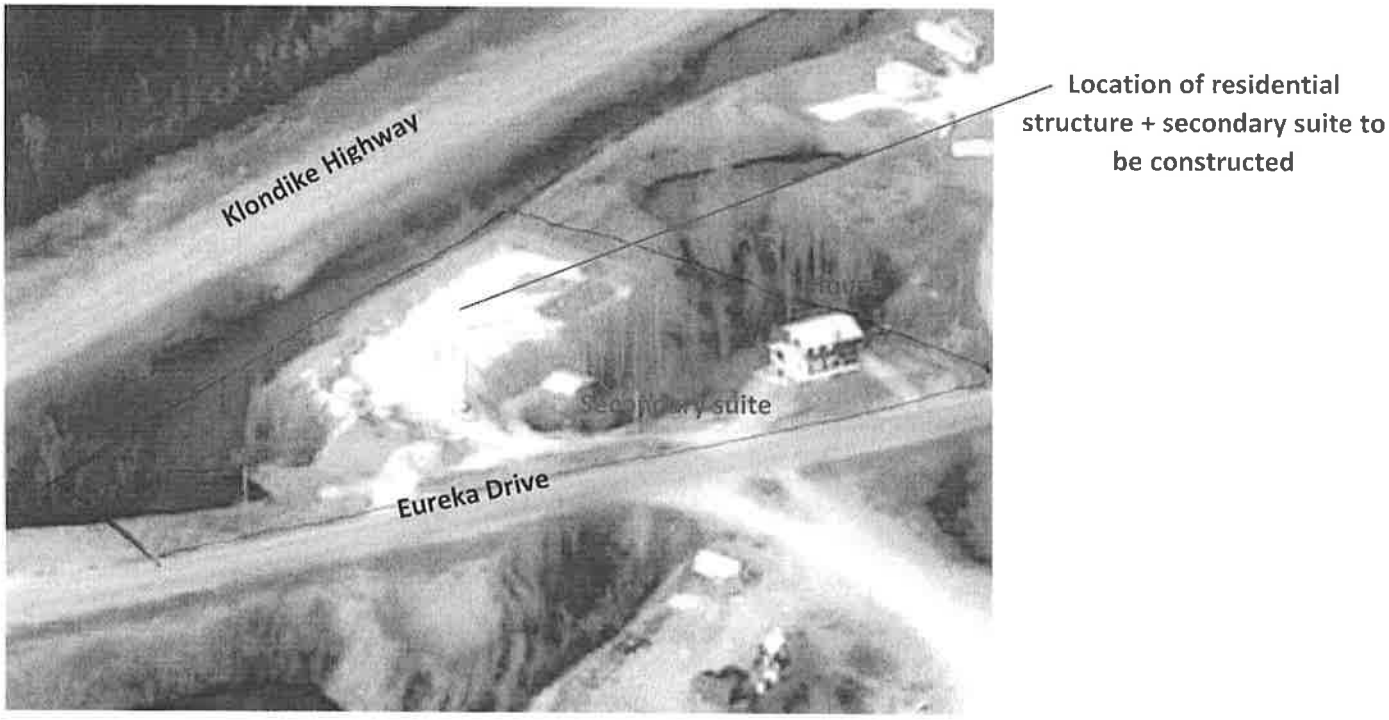


Figure 2: Aerial image showing the geographic features and existing development on the lot, with the current lot lines.

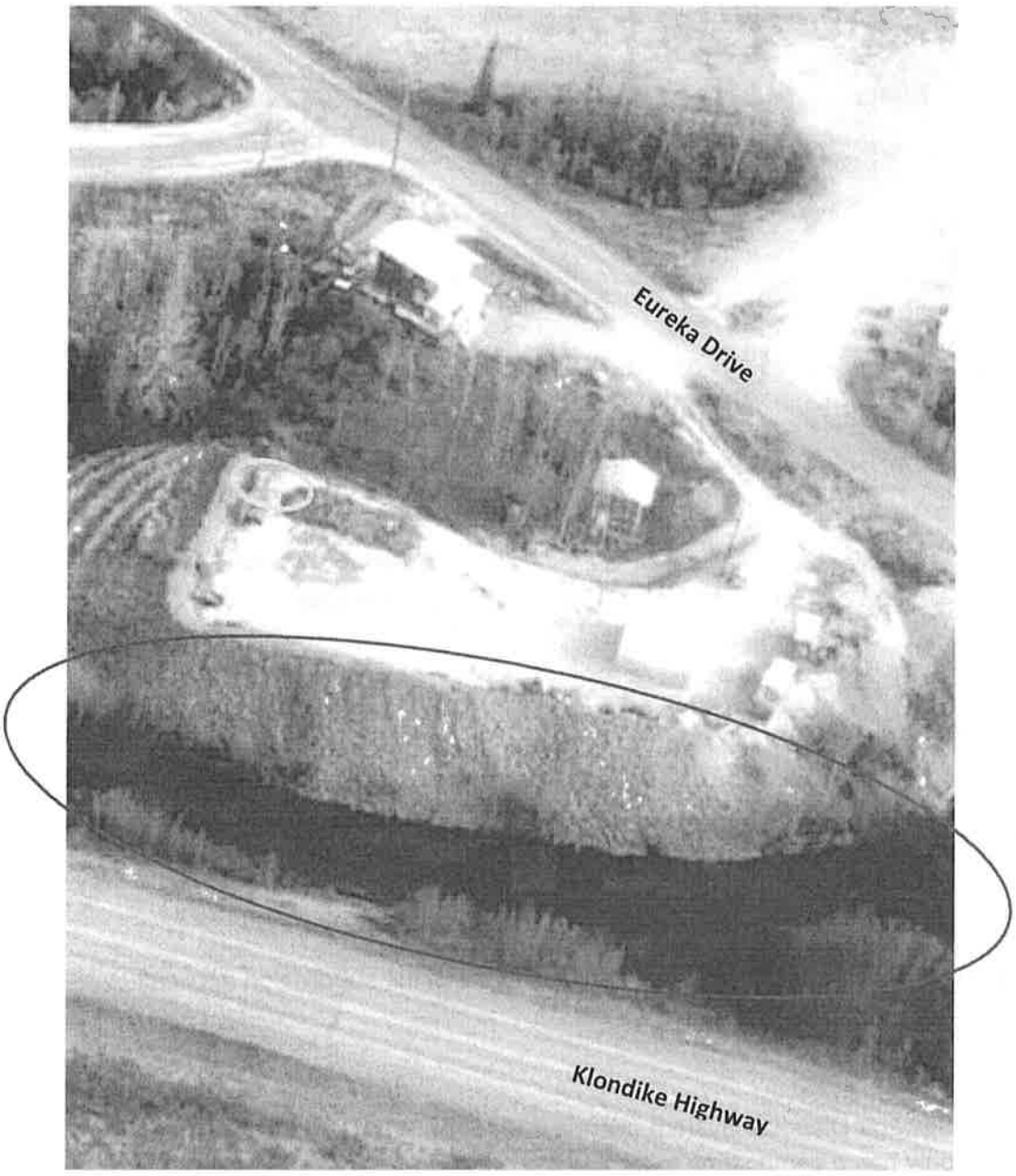


Figure 3: Constraints rendering sections of this lot undevelopable. The red circle shows the steep slope and tailing pond next to the Klondike Highway. The yellow circle shows the approximate location of the septic tank.

The intent of the application remains the same: to subdivide the Country Residential lot into two lots. The change is the proposed subdividing lot line. There are two main reasons for the location of the proposed subdividing lot line:

1. To keep the septic tank with the southern lot, and
2. To meet the minimum parcel size requirement of 0.4 ha, as per the ZBL.

This amendment to the subdividing lot line is shown in Figure 3. This is the proposed subdivision plan (also attached in the application package).

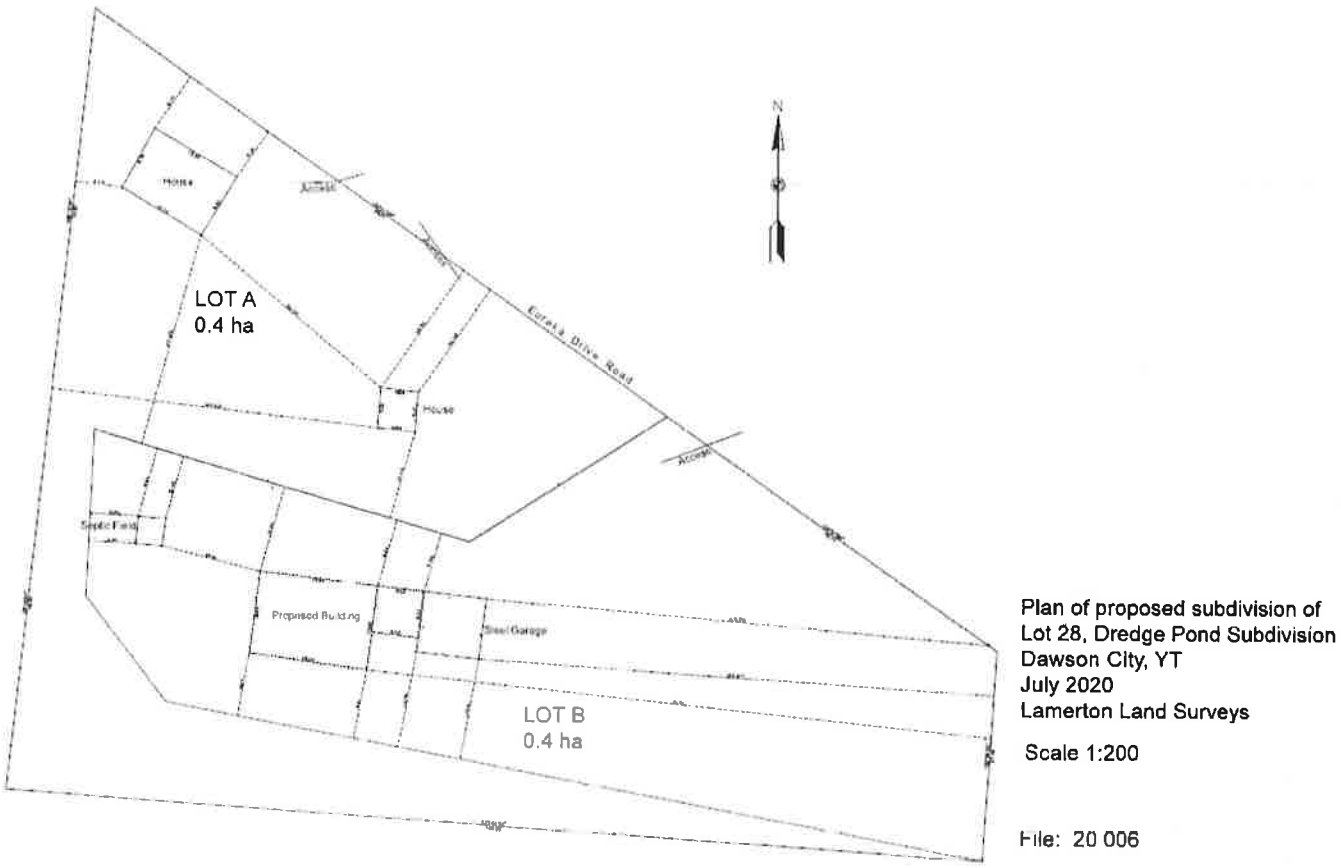


Figure 4: Proposed, amended subdivision plan.

ANALYSIS / DISCUSSION / ALIGNMENT TO OCP & STRATEGIC PRIORITIES

Discussion

The applicant submitted all approved Environmental Health Permits with the initial subdivision application (see attached).

Proposed Lot A:

Environmental Health approved a Sewage Disposal System (Permit #3945) on February 10, 2014 for the main residence. The garden suite only has a composting toilet and the original Pit Privy approval from 2006 is still valid for this residence.

Proposed Lot B:

Environmental Health approved a Sewage Disposal System (Permit#6101) on August 1, 2019 for a three-bedroom residence.

Municipal Act

The Municipal Act s. 314 details the requirements for any proposed plan of subdivision to have direct access to the highway to the satisfaction of the approving authority. Access to a highway is achieved for both parcels using existing access points to Eureka Drive.

S. 319 stipulates that a subdivision approval may be valid for a period of up to twelve months. If the applicant has not provided proof that the conditions of approval have been met, under the Act approval is void. The applicant can request an extension of a further twelve months, which may be granted in whole or in part, at the discretion of the approval authority.

Subdivision Bylaw

Subdivision Control Bylaw S3.01 states that every subdivision of land must be made in accordance with the Municipal Act, the Official Community Plan, the Zoning Bylaw, and the Subdivision Control Bylaw. The Analysis/Discussion section of this report is intended to discuss the proposal's conformity with the provisions outlined in the relevant legislation, policies, and plans.

Official Community Plan

The existing titled property is currently designated as CR– Country Residential. Uses associated with this designation primarily include low-density residential uses that do not rely on being connected to municipal water and sewer. Therefore, the subdivided lot would be required to retain the same designation. Any new use or development on the proposed lots would be required to conform to the OCP designation.

Zoning Bylaw

The subject property is currently designated as Country Residential (R3). The Zoning ByLaw is intended to implement the goals of the OCP. Therefore, the R3 designation is intended to permit low-density single detached housing in a rural setting. The existing and approved future use and structures on both lots are compatible with the permitted use of the land.

In the original zoning assessment for the original approved subdivision plan, it was noted that the proposed Lot B currently contains only accessory structures. To remedy this issue, the applicant submitted plans to construct a residential dwelling on this lot. A development permit (#20-005) was approved and issued on June 10th, 2020 to construct a residential dwelling unit and secondary suite. It is a condition of approval that the applicant build a compliant residential dwelling on the proposed Lot B in order to meet the requirements of the R3 zone.

The zoning assessment conducted on the amended subdivision plan shows that the proposed lots are compliant with the Zoning Bylaw.

OPTIONS

1. Grant subdivision approval.

2. Deny subdivision approval and forward the applicant to the Board of Variance to apply for a lot size variance, as per the plan shown in Figure 5.

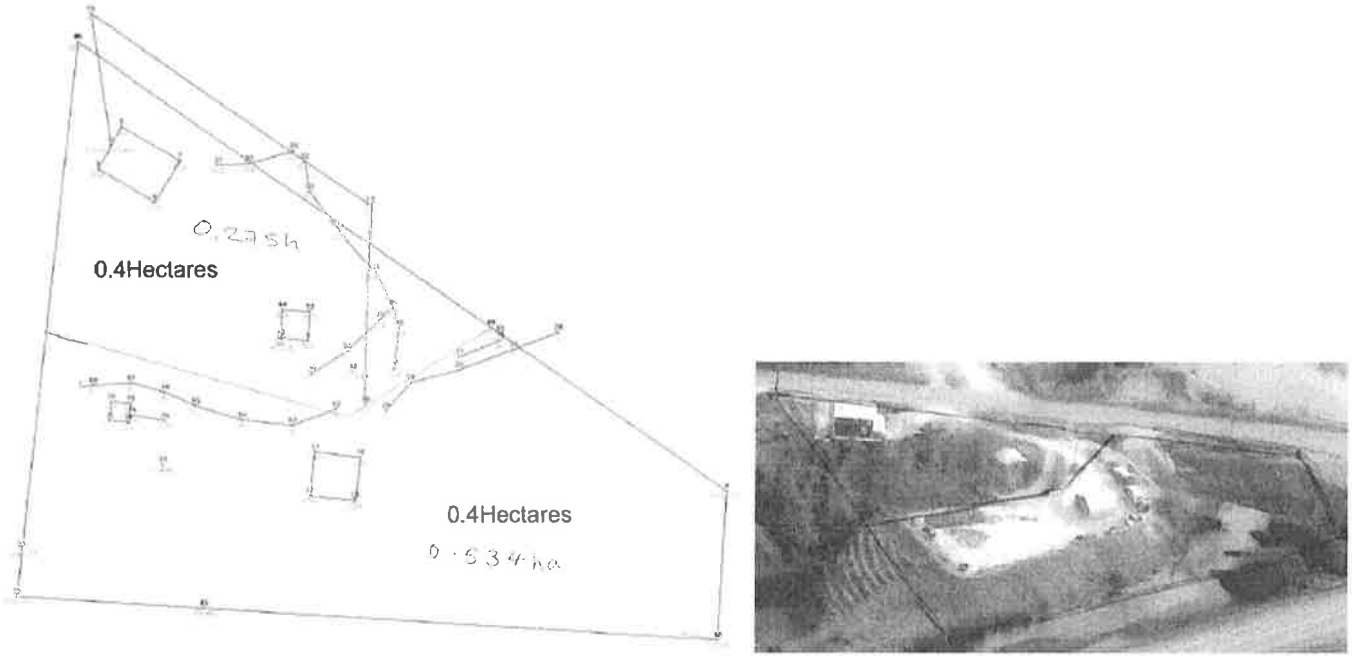


Figure 5: Plan of subdivision to be submitted to the Board of Variance, as a next step, should this proposed subdivision not be granted approval.

CONCLUSION

While it is not considered best practice to allow jagged lot lines that result in undevelopable land for the purpose of meeting the minimum parcel size requirement, there are numerous examples of lots that have been subdivided in this manner in the City of Dawson, that have set precedent. As a result of the geographic constraints of this lot, the applicant has legitimate grounds for a variance, should this proposed subdivision be denied. It is preferable to allow this proposed subdivision as opposed to a variance for a smaller lot size to accommodate a clean subdividing lot line (see Figure 4), because the approval of said variance could set precedent for other Country Residential lots to be subdivided into parcels below the minimum size requirement, which is adverse to the Zoning Bylaw. For this reason, this proposed subdivision is recommended.

APPROVAL			
NAME:	Cory Bellmore, CAO	**SIGNATURE:**	C Bellmore
DATE:	August 5, 2020		

Report to Council

[ ] For Council Decision [X] For Council Direction [ ] For Council Information

[ ] In Camera

AGENDA ITEM:	Tr'ondëk Hwëch'in Council Requests Re. Development of Men's Shelter	
PREPARED BY:	Stephanie Pawluk, CDO	**ATTACHMENTS:** • January 27th, 2021 Joint Council Meeting Briefing Note • July 9th Letter RE: City of Dawson support for Tr'ondek Hwech'in Jeze Zho Men's Shelter • July 9th Letter RE: Exemption of Tr'ondek Hwech'in Jeze Zho Men's Shelter from the Gold Rush Era Heritage Guidelines.
DATE:		
RELEVANT BYLAWS / POLICY / LEGISLATION: Development Incentives Policy #2019-02 Zoning Bylaw #2019-18 Heritage Bylaw #2019-04 Heritage Management Plan Design Guidelines for Historic Dawson		

RECOMMENDATION

That Council provide direction to Administration on the requests for exemption from heritage guidelines and City support of the development of a new Men's Shelter.

ISSUE / PURPOSE

Administration has received two requests from Tr'ondëk Hwëch'in regarding exemption from heritage guidelines and City support of the development of a new Men's Shelter (the Jeze Zho Men's Shelter) to be constructed at 1217 2nd Avenue.

BACKGOUND SUMMARY

A discussion regarding the City's Gold Rush heritage design guidelines and associated evaluation process, the Hertiage Advisory Committee (HAC), and the request for a Tr'ondëk Hwëch'in voting committee member on the HAC was had at a joint Council meeting on January 27th, 2021.

Claudia Heath of Aremis Consulting, who is working on the Men's Shelter project, presented at Heritage Advisory Committee meeting #21-06 on March 18th, 2021 on Indigenous Design Guidelines. The following is an excerpt from the minutes of this meeting:

- "Claudia is the project manager for several TH projects including a new men's shelter, elders complex and future heritage complex on 2nd avenue. Wants this to be an informal discussion but in the near future, TH and its citizens wish to be able to see cultural expressions in the facades and buildings that are First Nation Culture.
- It's been made clear in the discussions at different levels with Chief and Council, with heritage department, with elders council and citizens. Nobody wants to question setbacks or things that pertain to housing safety, or building inspection items. Instead, the main question is how can TH

express the cultural heritage in the TH buildings? Something that currently is impossible unless it is granted by exception, but it is felt that it shouldn't really be an exception.

- For example, the new men's shelter. This is going to be a 10 unit men's shelter that is open to all citizens of the Yukon, not just to Dawson residents. Initial concept designs showing how it would look as per the guidelines were shown to chief and council. Immediately, the Chief said 'that is not our building', it doesn't reflect TH culture or the healing that takes place in the building. At that point, from now on, the infrastructure they build, should reflect the culture and heritage of TH which is WELL before the Goldrush era.
- These discussions will be held with Mayor and Council. Claudia believes that having two sets of expressions would not be at war with each other and instead would be complementary to each other. This would therefore ENHANCE the cultural landscape of Dawson City.
- HAC asked if TH were hoping to develop guidelines for their buildings or ad hoc based on each project? Claudia advised that they are currently gathering feedback as to what does TH cultural expression mean. Will be different from dimensions, might be something speaking to materials but more philosophical, it has to interact with environment a certain way. They are looking at how to quantify but it is difficult.
- Claudia also advised they are looking at the option of TH having an equivalent committee who were able to communicate to HAC and qualifies as per TH heritage and culture. Acknowledged that any TH citizen can sit on the committee, but right now but there's no real use because they still have to go by the guidelines and there's no freedom for TH expression.
- Claudia indicated that these guidelines could eventually be used for other buildings such as businesses or YG buildings. If organisations wish to honour indigenous principles and culture of TH, they should be able to say 'we like to design as per this'. This is not something TH are pursuing right now but eventually it could be done. Presently, it's just TH, the men's shelter and in future the heritage complex on Front Street and Second Street Elders complex."

A development permit for the Men's Shelter was receieved mid June 2021. Following Administrative discussions, the two attached letters were received on July 9th. One letter outlines the request for City support of the Men's Shelter in the following ways:

1. Waiving of Load Capacity Charges as in kind contributions for construction.
2. Waiving of Water and Sewer connection charges as in kind contribution contributions for construction.
3. Waiving of Planning and development application fees as in kind contributions for construction.
4. Waiving of parking stall requirements as in kind contributions for construction.
5. Making a one time cash contribution to the construction.
6. Making the equivalent of the Development Incentive Program regarding tax relief for 7 or more years available to Tr'ondek Hwech'in, as the building meets the criteria.

The other letter requests the exemption of the Men's Shelter building from the City's design guidelines. It is understood that this includes exemption from Heritage Advisory Committee review of the plans.

ANALYSIS / DISCUSSION

All of these requests require Council decision, as Administration does not have the authority to make these decisions given the requirements set out in the applicable Policies and Bylaws.

Three of the City support requests arise from the incentives available for supportive housing development in the Development Incentives Policy #2019-02 (DIP). S. 4.1 of the Policy outlines the incentives available for supportive housing, which includes:

- 10 years Standard Tax Grant
- Waiver of Load Capacity Charge
- Waiver of Development Fees

S. 3.1.g. states: “Government agencies, at all levels of government, will not be eligible for the Development Incentives under this policy. First Nation development corporations are eligible.” Given that the applicant is a government, the applicant in ineligible for the supportive housing incentives, as per the Policy. As such, a development incentives application has not been applied for.

Administrtion believes that this development meets the intent of the policy, just not the proponent. It was not anticipated when the policy was created that a government entity would carryout this type of development. Administrtion recommends allowing Tr’ondëk Hwëch’in to be an eligible applicant for this particular development.

Request		Administrative Comments
1.	Waiving of Load Capacity Charges as in kind contributions for construction.	This arises from the DIP for supportive housing. The issue is that the applicant is a government, which the Policy explicitly does not allow for. Given that this request does not fall within the policy, it is a Council decision on waiving this requirement.
2.	Waiving of Water and Sewer connection charges as in kind contribution contributions for construction.	This request would require a waiver of the Fees and Charges Bylaw #2021-03. The fee outlined in the bylaw is $415 per water outlet.
3.	Waiving of Planning and development application fees as in kind contributions for construction.	This arises from the DIP for supportive housing. The issue is that the applicant is a government, which the Policy explicitly does not allow for. Given that this request does not fall within the policy, it is a Council decision on waiving this requirement.
4.	Waiving of parking stall requirements as in kind contributions for construction.	This request would require a waiver of the parking requirements in the Zoning Bylaw, as identified in section 9. The most up to date site plan currently shows no onsite parking, but it is currently assessed that the ZBL would require 6 onsite parking stalls. The Taylopr Architecture Group pointed out in a report that “Because of he demographic using the facility, majority of the users will not have vehicles and will not require parking.”
5.	Making a one time cash contribution to the construction.	There is no specific value in this request and no budget line for this type of request.
6.	Making the equivalent of the Development Incentive Program regrading tax relief for 7 or more years available to Tr'ondek Hwech'in, as the building meets the criteria.	This arises from the DIP for supportive housing. The issue is that the applicant is a government, which the Policy explicitly does not allow for. Given that this request does not fall within the policy, it is a Council decision on waiving this requirement.

Administration is currently proceeding with the processing of the development permit application, including invoicing the permit application fees and forwarding the plans to the Heritage Advisory Committee for review, until directed otherwise.

OPTIONS

1. Council makes a decision for each request and includes the decisions in a resolution.

2. Council forwards the decision(s) to Committee of the Whole for further discussion and/or requests further information.

APPROVAL		
NAME:	Cory Bellmore, CAO	**SIGNATURE:** 
DATE:	July 10, 2021	

BRIEFING NOTE

PREPARED FOR: Tr'ondëk Hwëch'in and City of Dawson Councils
DATE: January 27, 2021
AUTHOR(S): Charles Pugh, Executive Director and Debbie Nagano, Heritage Director
DEPARTMENT(S): Executive, Governance and Operations Department, Heritage Department
CONTENT:

1. Briefing Note – HAC Committee Membership and Historical Context Evaluation Criteria
2. City of Dawson Heritage Bylaw 2019-04
3. Design Guidelines for Historic Dawson Parks Canada

DELEGATE(S):

HAC Committee Membership and Historical Context Evaluation Criteria

KEY ISSUES:

Tr'ondëk Hwëch'in has a rich cultural heritage including Han cultural features that could be incorporated in building design, this is not considered in construction designs approved in the City of Dawson.

There is not a designated voting committee seat available to Tr'ondëk Hwëch'in with a mandate to speak to traditional Han cultural features that could be incorporated in building design.

BACKGROUND:

The Heritage Advisory Committee allows for a non-voting committee member to be appointed from Tr'ondëk Hwëch'in, it also allows similar advisors from Parks Canada and the Yukon Government. However there is not a designated seat for Tr'ondëk Hwëch'in among the voting three to five committee members who are appointed by City of Dawson Council.

The Heritage Advosry Committee makes recommendations for acceptable building designs in City of Dawson. These recommendations are guided by the City of Dawson Heritage Bylaw which relies greatly on the Design Guidelines for Historic Dawson which does not include consideration to Han cultural considerations. See as follows:

“the 11.02 Historic resources permit will be assessed and approved by the Development Officer, with recommendations from HAC, in accordance with the following, as applicable:
(a) Development & Heritage Guide;
(b) Design Guidelines for Historic Dawson;
(c) Standards and Guidelines for the Conservation of Historic Places in Canada;
(d) Heritage Management Plan;
(e) Zoning Bylaw; and
(f) Statement of significance and character defining elements.”

Ensuring consideration to Han cultural considerations would be congruent with the work of the joint Tr’ondëk Hwëch’in and City of Dawson Reconcilitation group

CONCLUSION / RECOMMENDATION:

A Tr’ondëk Hwëch’in voting committee member could participate fully in all aspects of committee decision making and provide an active voice on Han cultural considerations.

Expanding the list of review areas to include Han cultural considerations would make this consideration in design an integral component for future decision making.

NEXT STEPS:

The City of Dawson Heritage Bylaw 2019-04 is amended, a) to create a seat for a voting Tr’ondëk Hwëch’in committee member and b) to include Han cultural considerations in the list of review criteria.

July 9, 2021

The Chief Administrative Officer
City of Dawson. P O Box 308 Dawson City, YT. Y0B1G0

Dear Cory Bellmore,

RE: City of Dawson support for Tr'ondek Hwech'in Jeze Zho Men's Shelter on 1217 2nd Avenue.

Tr'ondek Hwech'in is developing a Men's Shelter that will greatly enhance the emergency shelter service that TH has been offering in the community. We have made substantial progress in the development of the new facility, and recently submitted a development permit application to the City of Dawson.

50% of those served by the current shelter service over the last 3 years are non TH citizens. The new shelter will have ten units. There will be two emergency rooms for those with immediate needs, six transitional units, and two highly supported units that will allow long term supported living. In addition to providing accommodation, we will continue to provide services such as support with housing, resumes or job applications, daily hot meals, harm reduction services and referrals to other support agencies and outreach services.

We plan to start construction this year, and have it available for use by the winter of 2022. We are requesting the City of Dawson to partner with us and contribute or support the development and operation of the facility in the following ways:

1. Waiving of Load Capacity Charges as in kind contributions for construction.
2. Waiving of Water and Sewer connection charges as in kind contribution contributions for construction.
3. Waiving of Planning and development application fees as in kind contributions for construction.
4. Waiving of parking stall requirements as in kind contributions for construction.
5. Making a one time cash contribution to the construction.
6. Making the equivalent of the Development Incentive Program regrading tax relief for 7 or more years available to Tr'ondek Hwech'in, as the building meets the criteria.

Tr'ondek Hwech'in is a Self Governing First Nation, but we do not have revenues or a drawn down mandate for providing this service. We are working with partners and stakeholders with

PO Box 599 · Dawson City, YT · Y0B 1G0
Email peter.marangu@trondek.ca
Phone 867·993·7100 Ext. 162

an interest in the community to make the project possible, and look forward to the added support of the City of Dawson.

Sincerely,

Peter Marangu

Housing and Infrastructure Director

PO Box 599 · Dawson City, YT · Y0B 1G0
Email peter.marangu@trondek.ca
Phone 867·993·7100 Ext. 162

July 9, 2021

The Chief Administrative Officer
City of Dawson. P O Box 308 Dawson City, YT. Y0B1G0

Dear Cory Bellmore,

RE: Exemption of Tr'ondek Hwech'in Jeze Zho Men's Shelter on 1217 2nd Avenue from the Gold Rush Era Heritage Guidelines.

Tr'ondek Hwech'in is developing a Men's Shelter that will greatly enhance the emergency shelter service that TH has been offering in the community. Most recently, we have applied for a development permit (DP# 21-068) for the multi-unit residential construction.

Our understanding is that before development permits are approved, the city will ensure adherence to bylaws that allow a safe and pleasant community. We are happy to address any concerns about setbacks, drainage, fire safety etc.

In addition, all Dawson residents are expected to present their plans to the Heritage Advisory Committee. The Heritage Advisory Committee has a mandate to support the 2008 Dawson City Heritage Management Plan that provides the following recommendations for the Downtown Heritage Management Area.

> *Treatment of new infill construction: Buildings should replicate (reconstruct) the external design of the building that stood on that particular site during the Gold Rush era (ca. 1896-1910), when there is sound historic evidence as to the appearance of the former building. In certain instances, an alternative source for replication may be selected.*
>
> *When there is insufficient historic evidence concerning the appearance of the former building to enable good replication, then new infill construction will adopt the 'Dawson Style' (explained below with the Residential Heritage Management Area and in Section 6.2)*

The guidelines currently do not encourage or accept the expression of Tr'ondek Hwech'in culture and heritage through our buildings. This community building will provide shelter, healing, sanctuary, community, strength and support to those most in need and should be warm and welcoming.

PO Box 599 · Dawson City, YT · Y0B 1G0
Email peter.marangu@trondek.ca
Phone 867·993·7100 Ext. 162

We are requesting that the plans of the building be exempted from the requirements of Gold Rush Era construction. Further, we are also look forward to participating with the City of Dawson in future heritage and cultural plans and initiatives.

Sincerely,

Peter Marangu

Housing and Infrastructure Director

PO Box 599 · Dawson City, YT · Y0B 1G0
Email peter.marangu@trondek.ca
Phone 867·993·7100 Ext. 162

THE CITY OF DAWSON

Civic Addressing Amendment No. 2 Bylaw

Bylaw No. 2021-05

WHEREAS Section 265(j) of the *Municipal Act*, RSY 2002, C. 154 and amendments thereto from time to time, provides that council may pass bylaws respecting naming of highways within the municipal boundaries; and

WHEREAS it is deemed desirable and expedient to amend the Civic Addressing Bylaw #15-01; now

THEREFORE, pursuant to the provisions of the *Municipal Act* of the Yukon, the council of the City of Dawson, in open meeting assembled, **ENACT AS FOLLOWS**:

PART I - INTERPRETATION

1.00 Short Title

1.01 This bylaw may be cited as the ***Civic Addressing Amendment No. 2 Bylaw.***

2.00 Purpose

2.01 The purpose of this bylaw is to amend bylaw #15-01 being the *Civic Addressing Bylaw*.

PART II – APPLICATION

3.00 Amendment

3.01 That Schedule B, Road Names Map (City Wide) is hereby amended as follows:

The road (surveyed as Road R-2) between Joe Henry Road and the North Klondike Highway shall be named “Hähkè Steve Taylor Road”.

PART III – FORCE AND EFFECT

4.00 Severability

4.01 If any section, subsection, sentence, clause or phrase of this bylaw is for any reason held to be invalid by the decision of a court of competent jurisdiction, the invalid portion shall be severed and the part that is invalid shall not affect the validity of the remainder unless the court makes an order to the contrary.

CAO _____ Presiding Officer _____

5.00 Enactment

5.01 This bylaw shall come into force on the day of the passing by Council of the third and final reading.

6.00 Bylaw Readings

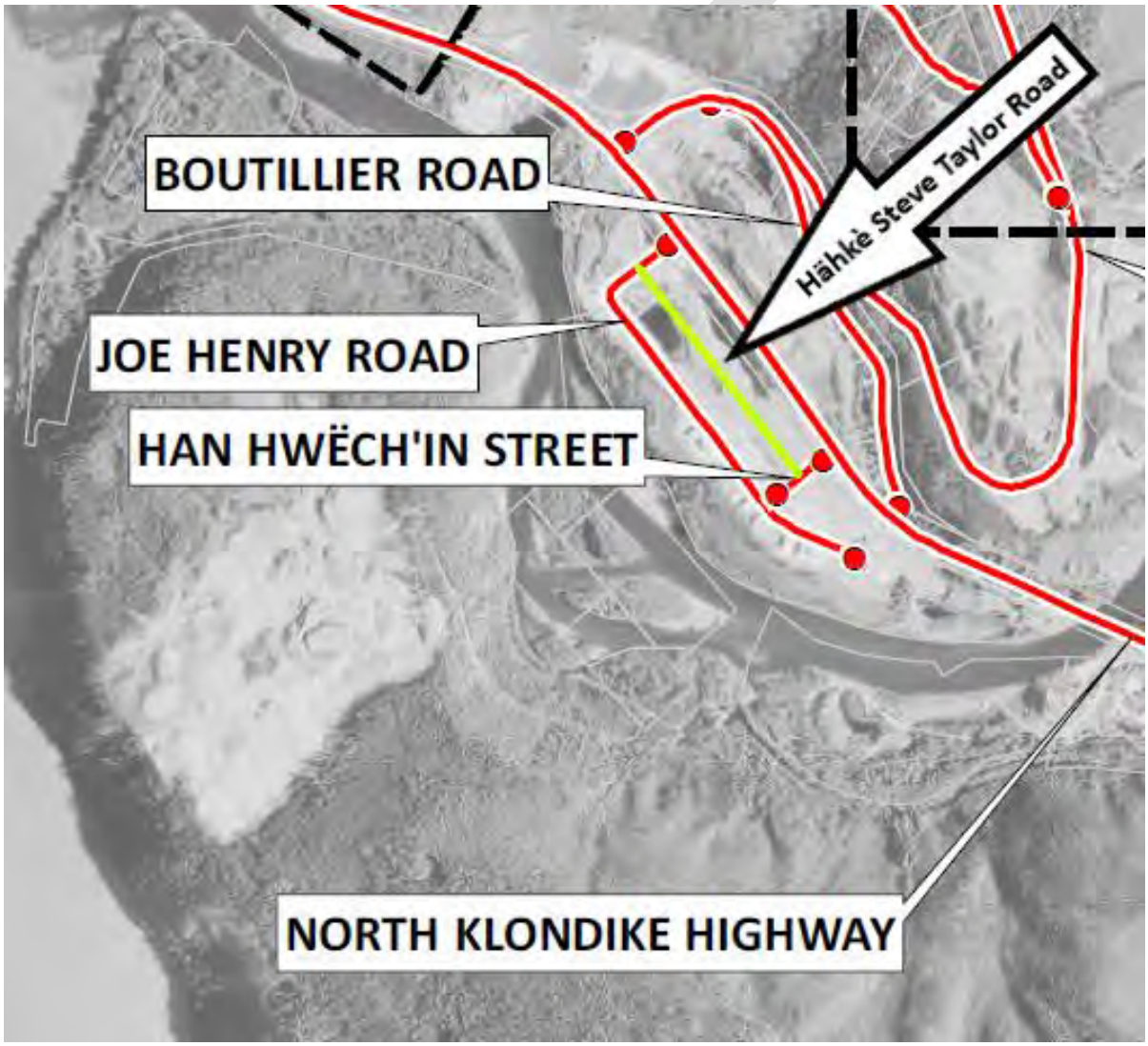
Readings	Date of Reading
FIRST	**April 28, 2021**
SECOND	**May 18, 2021**
PUBLIC HEARING	**July 6, 2021**
THIRD and FINAL	

Wayne Potoroka, Mayor
Presiding Officer

Cory Bellmore, CAO
Chief Administrative Officer

7.00 Appendices

Appendix A – Amendment to Schedule B Road Names Map (City Wide)



THE CITY OF DAWSON

2021 Municipal Election Bylaw

Bylaw No. 2021-06

WHEREAS section 53 of the *Municipal Act*, RSY 2002, c. 154, and amendments thereto, provides that council may by bylaw regulate the conduct of an election; and

WHEREAS section 60 (1)(a) of the *Municipal Act*, RSY 2002, c. 154, and amendments thereto, provides that council may dispense with the requirement of a list of electors for an election; and

WHEREAS section 61 (1)(b) of the Municipal Act, RSY 2002, c. 154, and amendments thereto, provides that council may by bylaw provide for a system of registration of person entitled to vote at an election which shall include the prescribed oath required to be signed by each person applying to vote; now

THEREFORE, pursuant to the provisions of the *Municipal Act* of the Yukon, the council of the City of Dawson, in open meeting assembled, **ENACT AS FOLLOWS**:

PART I - INTERPRETATION

1.00 Short Title

1.01 This bylaw may be cited as the ***2021 Municipal Election Bylaw***.

2.00 Purpose

2.01 The purpose of this bylaw is to regulate the conduct of the 2021 municipal election.

CAO _____ Presiding Officer _____

Table of Contents

Return to Table of Contents

3.00 Definitions

3.01 In this Bylaw:

(a) Unless expressly provided for elsewhere within this bylaw the provisions of the *Interpretations Act (RSY 2002, c. 125)* shall apply;

(b) "CAO" means the Chief Administrative Officer for the City of Dawson;

(c) "city" means the City of Dawson;

(d) "council" means the council of the City of Dawson.

PART II – APPLICATION

4.00 Election Officials

4.01 Pursuant to section 56(1) of the *Municipal Act*, Mr. Charles Brunner is hereby appointed as Returning Officer and is hereby responsible for the administration of the 2021 municipal election.

4.02 Pursuant to section 56 (1)(e) of the *Municipal Act*, the Returning Officer is hereby delegated the power to appoint Deputy Returning Officers.

4.03 For the purposes of fulfilling the requirements of the Part 3 of the *Municipal Act*, the CAO or their designate shall serve as the Designated Municipal Officer.

4.04 Election officials shall, during their employment, refrain from any active or public support or criticism of any candidate.

5.00 Nominations

5.01 Nomination Day is Thursday, September 23, 2021.

5.02 Nomination proceedings shall take place in the City Council Chambers located on the upper floor of the City Administration Building located at 1336 Front Street.

5.03 The Returning Officer shall receive nominations no later than 12 noon on Thursday, September 23, 2021.

5.04 Nominations may be presented to the Designated Municipal Officer, or Returning Officer, or via fax.

5.05 All faxed nominations shall be clearly marked “ELECTION NOMINATION” and be sent to the attention of the Returning Officer or Designated Municipal Officer.

5.06 In all cases, it shall be the responsibility of the person presenting the nomination to ensure that the nomination is complete and presented prior to the deadline pursuant to this bylaw.

6.00 Places and Hours of Polls

6.01 The advanced polling place and the regular polling place shall be established at the Art and Margaret Fry Recreation Centre.

6.02 The advanced poll shall be held Thursday, October 14, 2021, and the hours of the poll shall be from 8 a.m. to 8 p.m.

6.03 Pursuant to section 53(d) of the *Municipal Act*, council does hereby establish a mobile polling station for the express purpose of attending health care and extended health care facilities within the City of Dawson or at residences of electors’ incapable of attending a poll due to physical incapacity.

6.04 The mobile poll shall be conducted on Thursday, October 14, 2021.

6.05 The Returning Officer is hereby delegated the authority to determine the hours and manner of operation of the mobile poll within the constraints of the *Municipal Act* requirements for conducting an election.

6.06 The regular poll shall be held Thursday, October 21, 2021, and the hours shall be from 8 a.m. to 8 p.m.

7.00 Registration of Voters

7.01 Pursuant to section 60(1) of the *Municipal Act*, the city hereby dispenses with the requirement to produce a list of electors for the 2021 municipal election.

7.02 Pursuant to section 60(1)(b) and 61(1)(b) of the *Municipal Act,* the city does hereby establish the following procedures and forms to govern the conduct of the 2021 municipal election:

(a) All individuals meeting the eligibility criteria contained in section 48 of the *Municipal Act* and wishing to cast a ballot shall be required to register by swearing or affirming the Oath of Elector Eligibility, contained in Appendix A of this bylaw, in the presence of a Deputy Returning Officer.

(b) Once the Voting Register has been completed, the Deputy Returning Officer shall present the elector with ballot(s).

8.00 NOTICE TO ELECTORS

8.01 The Designated Municipal Officer shall supply to the Returning Officer signage to be displayed at all polling stations which shall inform voters of the following:

(a) The offences contained in section 160 of the *Municipal Act*; and

(b) The penalties associated with the offences contained in section 160 of the *Municipal Act*; and

(c) A statement that, pursuant to this bylaw, the name of any individual challenged by a Deputy Returning Officer, a candidate or candidate's agent, or by an elector, who swears an oath of eligibility and votes in the election shall be forwarded to the appropriate authorities for investigation and possible prosecution.

9.00 Challenged Electors

9.01 Within 7 days of receipt of election records from the Returning Officer, the Designated Municipal Officer shall examine the Voting Register for the purpose of identifying any elector who was challenged at the poll.

9.02 The Designated Municipal Officer shall, within 5 days of examining the Voting Register, forward copies of the Voting Registrations of all challenged electors to the appropriate authorities for investigation and prosecution.

10.00 Fees

10.01 The following rates shall be paid to persons, other than full time officers or employees of the city, acting as election officials:

Returning Officer	as per contract $5250
Deputy Returning Officer	$25.00 per hour
Polling Clerk	$20.00 per hour

PART III – FORCE AND EFFECT

11.00 Appendices

11.01 Appendix “A” attached to and referred to in this bylaw forms part of this bylaw and is to be read in conjunction with this bylaw.

12.00 Severability

12.01 If any section, subsection, sentence, clause or phrase of this bylaw is for any reason held to be invalid by the decision of a court of competent jurisdiction, the invalid portion shall be severed and the part that is invalid shall not affect the validity of the remainder unless the court makes an order to the contrary.

13.00 Enactment

13.01 This bylaw shall come into force on the day of the passing by council of the third and final reading.

14.00 Bylaw Readings

Readings	Date of Reading
FIRST	**May 18, 2021**
SECOND	
THIRD and FINAL	

Wayne Potoroka, Mayor
Presiding Officer

Cory Bellmore, CAO
Chief Administrative Officer

PART IV – APPENDIX (APPENDICES)

APPENDIX "A"

VOTING REGISTER
Municipal Act – Section 60
City of Dawson Bylaw #2021-06

Local Jurisdiction: City of Dawson
Election Date: October 21, 2021
Voting Station: _____

Oath of Elector Eligibility

I,_____, of _____
(Name of Elector) (Street Address of Residence)

Do hereby swear / affirm that I am eligible to vote in the above mentioned election because:

- I have not voted previously in this election;
- I am 18 years of age or older;
- I am a Canadian Citizen; and
- I have resided within the boundaries of the City of Dawson for the 12 consecutive months preceding Election Day

_____

Signature of Elector

_____

Signature of Deputy Returning Officer

Deputy Returning Officer

Voter Number:_____

Ballots Issued to Elector (Check [x] all that apply)

[ ] MAYOR
[ ] COUNCILLORS

OBJECTION TO PERSON VOTING	Name of Candidate / Candidate Agent Making Objection	Deputy's Initials
	Reason for Objection:	
INCAPACITATED ELECTOR	Ballot of Incapacitated Elector was marked by another person: Check [ ]	
	Reason:	

Report to Council

[X] For Council Decision [ ] For Council Direction [ ] For Council Information

[ ] In Camera

AGENDA ITEM:	**21-019 Harrington's Store – Municipal Historic Site Designation**	
PREPARED BY:	Stephanie Pawluk, CDO	**ATTACHMENTS:** 1. Bylaw #2021-07
DATE:	July 9, 2021	
RELEVANT BYLAWS / POLICY / LEGISLATION: Official Community Plan Zoning Bylaw Heritage Bylaw Heritage Management Plan Historic Resources Act		

RECOMMENDATION

It is respectfully recommended that Council give Second and Third Reading to Bylaw #2021-07.

ISSUE / PURPOSE

A nomination was submitted by Parks Canada for the designation of Harrington's Store (Lot 20 Block J Ladue Estate) as a Municipal Historic Site.

BACKGOUND SUMMARY

As per S. 8 of *Heritage Bylaw 2019-04*, Council, may by petition by any person or group of persons, designate any site as a Municipal historic Site if it determines that the site 'is an important illustration of the historic development of the Klondike Valley, or the natural historic of the peoples and cultures of the Klondike Valley Cultural Landscape'.

Bylaw #2021-07 passed First Reading unanimously on May 18, 2021 and successfully passed a Public Hearing on June 1, 2021. The Building Condition Report and Yukon Heritage Resources Board Evaluation Criteria was presented on May 11, 2021.

Heritage Bylaw 2019-04 outlines the required steps for designation of a Municipal Historic Site once a nomination has been received. The steps for Municipal Historic Site designation is as follows:

1. Nomination received by Administration
2. Heritage Advisory Committee convene to review the nomination
3. Committee of the Whole convene to review the nomination
4. 1st Reading of the Bylaw
5. Public Hearing
6. 2nd and 3rd Reading of the Bylaw

ANALYSIS / DISCUSSION

The suitability for Harrington's Store becoming a Municipal Historic Site was assessed using the Yukon Heritage Resources Board evaluation criteria for designation of historic sites. For more details on what each ranking means, please see the Evaluation Criteria in the attachments. The majority of this analysis can be

found within the original application as HAC accepted this as written, noting that it was comprehensive and required little additional comment.

Age

Excellent

Comments

Harrington's Store was built in 1899 or 1900 as a single story building and converted into a two-storey building in 1902.

The first property title was issued to Mrs. John McDonald on September 15, 1899, by the Ladue Townsite Company. W. A. Harrington rented the building and ran a grocery store there from 1902-1903 and 1906-1917. In 1906 the building title was transferred to Andrew Rystogi, a real estate and financial agent, and Gustave Ortman. Rystogi later bought out Ortman. Billy Biggs purchased the property in 1950. Most likely after his death in 1955 the building was purchased by Fred Caley. Canada acquired the building most likely in 1968. However, the certificate of title was not obtained until November 1972.

Harrington's Store is associated with the development of Dawson City as a supply, service and distribution centre during and following the Gold Rush. It is also associated with the city's development as a territorial capital. Another association is with Fred Caley who owned the building before selling it and other buildings to Parks Canada. Fred Caley owned and saved some prominent heritage buildings in Dawson and associated cultural resources for example the collection of Dawson Daily News editions, contained in the building with the same name.

Harrington's store is a well-known Gold Rush landmark and supports Dawson's historic fabric through its associations: its evocation of the time and place of the Klondike Gold Rush; the concentration of frontier structures, which confirm the town's early nature, diversity, northern isolation, and links to mining activity during the 1896-1910 period.

Composition

Very Good

Comments

Harrington's Store is valued for its aesthetic design, materials and craftsmanship.

The building is of a wood frame construction, but what makes the building stand out is the Italianate architectural treatment, particularly the boxed cornice and panelled frieze, the square-sided oriel window placed at the salient angle, the richly ornamented double front door, and the painted cove shiplap siding. The second floor rooms are accessed by a flight of stairs rising to a single door on the Princess Street elevation. Awnings along both principal elevations and the dressed show windows, contribute to the Gold Rush character of the streetscape. The Italianate architectural treatment and wood-frame construction complements the adjacent commercial buildings.

Integrity

Very Good

Comments

Harrington's Store underwent many changes over the past century. There is no information about the builder and there are no original drawings. Most of what is known about the building's evolution is derived from archival photographic evidence.

The earliest known image in which Harrington's is readily recognizable is from 1904, in the period when Harrington ran his grocery store from another location. There are many notable differences in this image from the Harrington's of today, including the following:

- Text on the south window (Princess Street elevation)
- Additional door and smaller window on northern half of the Third Avenue elevation
- Dark paint on the window and door frames and column beneath the oriel window.

Another photograph of the Harrington's Store building dates from 1935 when it would have been used by Biggs as a bicycle repair shop. From this image it is clear that between 1904 and 1935 the additional door on Third Avenue was removed and that there were changes to the window sizes and muntin on the lower level. This photo also illustrates that there was a single-storey annex behind the building along the Princess Street property line. It is not clear when this feature was added. No photos of the rear of the building have been found so there is no imagery depicting the rear stairs to access the second floor.

In 1944 there was most likely serious flood damage to the building. An image from 1944 shows flood waters that inundated the Third Avenue and Princess Street Intersection but does not show Harrington's store.

Photos of Harrington's Store from 1960 and 1961 show a derelict building with its lower floor boarded up. These images show that between 1935 and 1960, the windows on the lower level appear to have been changed again. In addition, nearly all glazing in the upper storey windows is broken, along with some of the muntins. The pillar supporting the oriel window was also removed. By the late 1960s, Harrington's was in very poor condition.

Between 1968 and 1972, the building was stabilized and the following changes took place:

- Removal of all existing siding and window units at the south and east elevations up to the height of the second floor;
- Replacement with plain horizontal boarding and a single recycled six-light fixed sash on south and east elevations;
- Demolition of the original shed roofed annex at the west elevation;
- Replacement of original foundation;
- Replacement of ground floor framing and flooring;
- Demolition of most internal partitioning.

In the late 1970s, Parks Canada created a master plan for the Klondike National Historic Sites. Within this document Harrington's is considered as part of the Princess Street cluster, which was intended for intensive development and interpretation. Accordingly, Parks Canada embarked on a restoration for Harrington's Store. In 1977, the Restoration team produced plans for a "Simulated Façade". This partial restoration does not follow the current practices in the Standards and Guidelines for Historic Places in Canada which call for the return to a well-documented single point in time. Instead, the plans were an amalgam of features from the period spanning from 1904-1935.

The 1977 plans called for the following interventions:

- New sidewalk to match existing
- New clapboard to match existing
- Removal of window frames on 1st floor
- Simulated windows the east and south elevations
- Temporary removal of oil tank, signage frame and ladder of west wall and decorative roof supports of north wall, and their replacement after painting
- Repair or remake window sashes from existing models
- Replace all glazing

- Scrape flaking paint and repaint using pale colour for clapboard, plank wall, window sashes, sills and jambs; using dark colour for facings near doors, windows and corners, drip caps and mouldings. Suggested colours: cream and bronze.

Most, if not all, of these changes took place.

In 1979 Dawson was struck by another disastrous flood but there were no major impacts to Harrington's Store. Those present at the time recall that Harrington's Store did not shift during the flood and that the building was cleaned to remove sediment and then put back into use. In the 1980s, the interior of the Harrington's lower level was retrofitted and turned into a public exhibit space featuring the history of Dawson and the Gold Rush. In 1987, a new commercial building was constructed immediately adjacent to the north side of Harrington's – the commercial building's downspout directs rain and melt water towards Harrington's foundation cribbing.

In 1989, Harrington's Store was designated as Recognized Federal Heritage Building. Also in that year, plans were produced to replace the foundation and surrounding boardwalk. However, Parks Canada was unable to implement these changes. A heritage recording of Harrington's Store was produced in 2012 by Public Works and Government Services Canada. No significant changes have been made to Harrington's Store since the FHBRO evaluation.

Context

Excellent

Comments

The manner in which Harrington's Store maintains an unchanged relationship to its site, reinforces the Gold Rush character of its commercial streetscape setting and is a well-known building in Dawson, as evidenced by:

- Its ongoing historic relationship to the corner of Third Avenue and Princess Street, given the proximity of the building to the lot lines and boardwalk;
- The awnings along both principal elevations and the dressed show windows, which contribute to the Gold Rush character of the streetscape;
- The Italianate architectural treatment and wood-frame construction which complements the adjacent commercial buildings;
- Its familiarity within the community, given its use as a drop-in centre, temporary visitor reception centre, and exhibition hall;
- Its visibility given its prominent location at a major Dawson intersection;
- Its location kitty-corner to Billy Biggs, and both building's connection to their former owner Fred Caley

Official Community Plan

Section 9 of the Official Community Plan contemplates Heritage Preservation. This proposal is in line with the identified long-term goal: "*Dawson's gold rush history is showcased by preserving key historical resources where possible."*

Zoning Bylaw

The Zoning By-Law contemplates heritage management only in areas that are impacted by the Heritage Management Plan character areas. The nominated site is situated in the Downtown Core of the character areas identified and thus would be subject to Heritage Advisory Committee review. The current property meets the setback requirements of ZBL 2018-19 thus exterior structural alteration would likely be possible.

One concern raised by HAC is the empty space at the rear of the building, and whether as part of the designation, this 'air space' be preserved from any future development. Administration advised that while keeping the parcel space empty may be desirable, as the property is in the Historic Townsite, any proposed addition would have to be reviewed by the Committee and the integrity of the building would remain intact.

Heritage Management Plan

The nominated property is situated in the Downtown area of the Heritage Management Plan. This area best depicts the commercial core of Dawson during the Gold Rush and Billy Bigg's would be considered one of the unique remaining Gold-Rush-era buildings. One of the recommendations for the Downtown Management Area is that all buildings and structures should be protected by designation under the provisions of the *Yukon Historic Resources Act*. Further, any future conservation work on Billy Bigg's would be required to follow the *Design Guidelines for Historic Dawson* and, should the building be subject to irreparable damage, reconstruction would be mandatory.

Heritage Resources Act

S. 37(1) of the *Historic Resources Act* gives municipal Councils the authority to designate by bylaw a municipal historic site. Eligible sites are those which have significant historic significance as contemplated in S. 15(1) of the *Act*, as follows:

A site may be designated as a historic site when Council is satisfied that the site is,

Whether in itself or because of historic resources or human remains discovered or believed to be at the site, an important illustration of

a) the historic or pre-historic development of the Yukon or a specific locality in the Yukon, or of the peoples of the Yukon or locality and their respective cultures; or

b) the natural history of the Yukon or a specific locality in the Yukon,

and has sufficient historic significance to be so designated.

Therefore, before accepting the recommendation to pass this bylaw, Council must consider this definition of historic significance and determine whether the Harrington's Store nomination meets this definition sufficiently to warrant designation.

APPROVAL		
NAME:	C Bellmore	**SIGNATURE:** C Bellmore
DATE:	July 9, 2021	

THE CITY OF DAWSON

Harrington's Municipal Historic Site Bylaw

Bylaw No. 2021-07

WHEREAS section 265 of the *Municipal Act*, RSY 2002, c. 154, and amendments thereto, provides that a council may pass bylaws for municipal purposes; and

WHEREAS section 37(1) of the *Historic Resources Act* permits council to designate land and buildings as a Municipal Historic Site; and

WHEREAS council has given notice pursuant to Part 5, Section 39 of the *Historic Resources Act* of its intention to consider passing this bylaw; and

WHEREAS council considers that Harrington's Store has heritage value or heritage character as defined in the *Heritage Bylaw*.

THEREFORE, pursuant to the provisions of the *Municipal Act* of the Yukon, the council of the City of Dawson, in open meeting assembled, **ENACT AS FOLLOWS**:

PART I - INTERPRETATION

1.00 Short Title

1.01 This bylaw may be cited as the ***Harrington's Store Municipal Historic Site Bylaw***.

2.00 Purpose

2.01 The purpose of this bylaw is to designate the building known as Harrington's Store and the land on which it stands on defined by the legal limits of Lot 20 Block J Ladue Estate Plan 8338A CLSR.

3.00 Definitions

3.01 In this Bylaw:

(a) Unless expressly provided for elsewhere within this bylaw the provisions of the *Interpretations Act (RSY 2002, c. 125)* shall apply;

(b) "CAO" means the Chief Administrative Officer for the City of Dawson;

(c) "city" means the City of Dawson;

CAO

Presiding Officer

(d) "council" means the council of the City of Dawson.

PART II – APPLICATION

4.00 Municipal Historic Site

4.01 The building known as Harrington's Store and the land on which it stands on defined by the legal limits of Lot 20 Block J Ladue Estate Plan 8338A CLSR is hereby designated as a Municipal Historic Site.

PART III – FORCE AND EFFECT

5.00 Severability

5.01 If any section, subsection, sentence, clause or phrase of this bylaw is for any reason held to be invalid by the decision of a court of competent jurisdiction, the invalid portion shall be severed and the part that is invalid shall not affect the validity of the remainder unless the court makes an order to the contrary.

6.00 Enactment

6.01 This bylaw shall come into force on the day of the passing by council of the third and final reading.

7.00 Bylaw Readings

Readings	Date of Reading
PUBLIC HEARING	**June 1, 2021**
FIRST	**May 18, 2021**
SECOND	
THIRD and FINAL	

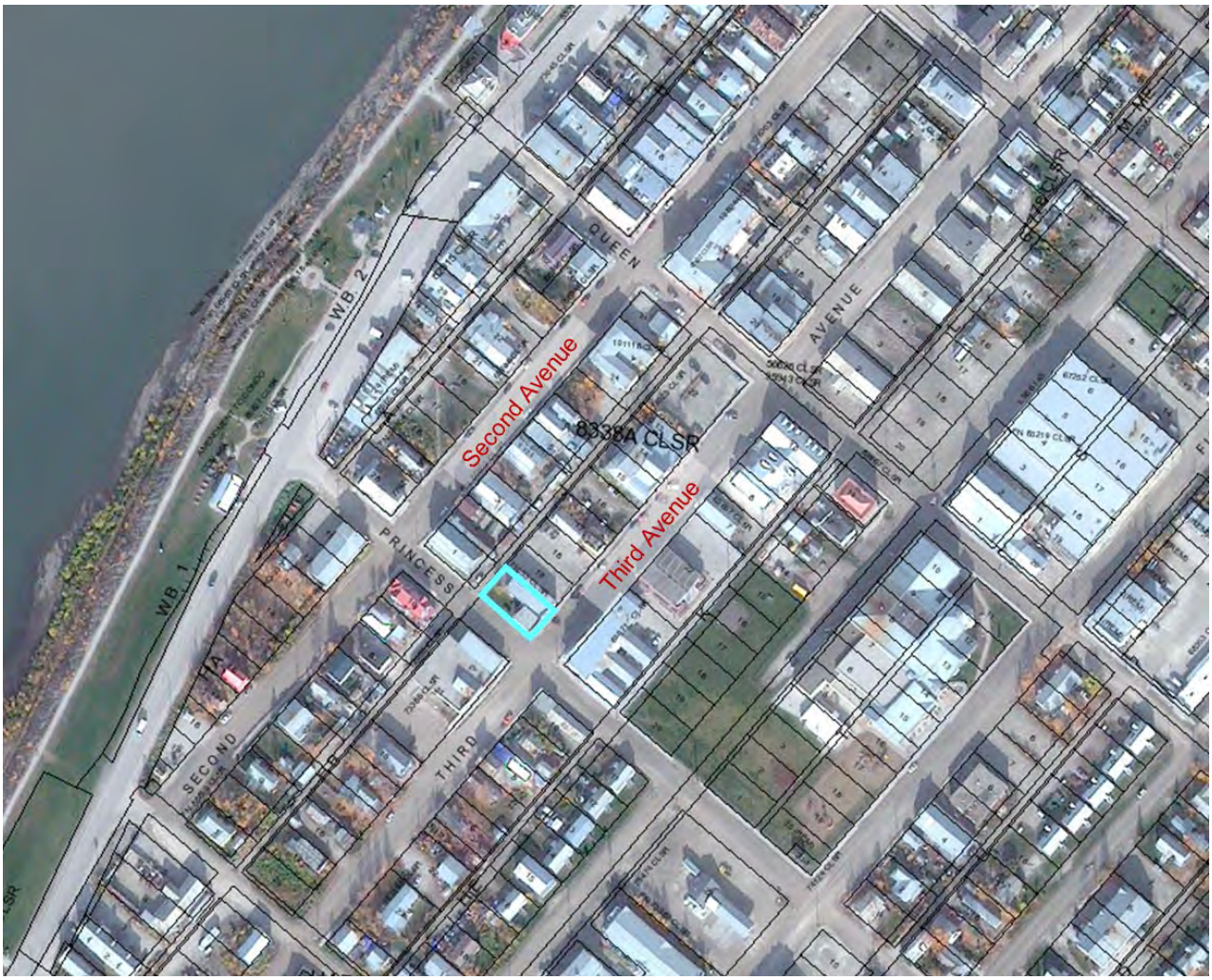
Original signed by

Wayne Potoroka, Mayor *Cory Bellmore, CAO*

Presiding Officer **Chief Administrative Officer**

PART IV – APPENDIX (APPENDICES)

Appendix 1. Location Map showing the Harrington's Store Municipal Historic Site



THE CITY OF DAWSON
Box 308 Dawson City, YT Y0B 1G0
PH: 867-993-7400 FAX: 867-993-7434
www.cityofdawson.ca

OFFICE USE ONLY	
APPLICATION FEE:	0
DATE PAID:	—
RECEIPT #:	—
APPLICATION #:	21-019

MUNICIPAL HISTORIC SITE DESIGNATION FORM

PLEASE READ THE ATTACHED INSTRUCTIONS, GUIDELINES, AND SUBMISSION REQUIREMENTS PRIOR TO COMPLETING FORM.

TYPE OF HISTORIC RESOURCE

[X] **Building** [ ] **Landscape**

LOCATION:

CIVIC ADDRESS: 901, Third Avenue **Yukon Historic Sites Inventory ID:** _____

LEGAL DESCRIPTION: LOT(S) 20 **BLOCK** J **ESTATE** Ladue **PLAN#** 8338A

APPLICANT INFORMATION

APPLICANT NAME(S): Travis Weber, Site Superintendent, KNHS, Parks Canada

MAILING ADDRESS: Box 390, Dawson, YT **POSTAL CODE:** Y0B 1G0

EMAIL: travis.weber@canada.ca **PHONE #:** 867-993-7200

OWNER INFORMATION (IF DIFFERENT FROM APPLICANT)

OWNER NAME(S): see above

MAILING ADDRESS: _____ **POSTAL CODE:** _____

EMAIL: _____ **PHONE #:** _____

DOES THE CURRENT OWNER SUPPORT POSSIBLE MUNICIPAL DESIGNATION OF THIS PROPERTY? IF YES, PLEASE PROVIDE WRITTEN PROOF OF THIS SUPPORT ATTACHED TO THIS APPLICATION. [ ] YES [ ] ~~NO~~

Submission made by owner

DECLARATION

- I/WE hereby make application for a Municipal Historic Site under the provisions of the City of Dawson Heritage Bylaw #2019-04 and in accordance with the plans and supporting information submitted and attached which form part of this application.
- I/WE have reviewed all of the information supplied to the City of Dawson with respect to an application for a Historic Site Designation and it is true and accurate to the best of my/our knowledge and belief.
- I/WE understand that the City of Dawson will rely on this information in its evaluation of my/our application and that any decision made by the City of Dawson on inaccurate information may be rescinded at anytime.
- I/WE hereby give my/our consent to allow Council or a person appointed by its right to enter the above land and/or building(s) with respect to this application only.

I/WE HAVE CAREFULLY READ THIS DECLARATION BEFORE SIGNING IT.

2021-02-18 _____
DATE SIGNED SIGNATURE OF APPLICANT(S)

2021-02-18 _____
DATE SIGNED SIGNATURE OF OWNER(S)

THE CITY OF DAWSON
Box 308 Dawson City, YT Y0B 1G0
PH: 867-993-7400 FAX: 867-993-7434
www.cityofdawson.ca

OFFICE USE ONLY	
PERMIT #:	

GENERAL HISTORICAL INFORMATION

AGE OF STRUCTURE: *Please provide the age of the structure you wish to designate and attach supporting evidence.*

Harrington's Store was built in 1899 or 1900 as a single story building and converted into a two-storey building in1902.

HISTORY OF OWNERSHIP: *Please list the property's original and subsequent owners.*

The first property title was issued to Mrs. John McDonald on September 15, 1899, by the Ladue Townsite Company. W. A. Harrington rented the building and ran a grocery store there from 1902-1903 and 1906-1917. In 1906 the building title was transferred to Andrew Rystogi, a real estate and financial agent, and Gustave Ortman. Rystogi later bought out Ortman. Billy Biggs purchased the property in 1950. Most likely after his death in 1955 the building was purchased by Fred Caley. Canada acquired the building most likely in 1968. However, the certificate of title was not obtained until November 1972.

USES OF HISTORIC RESOURCE: *Please list the past and current uses of the historic resource.*

The first known use is that of a grocery store, possibly from 1900 on. A second storey was added and used for housing in 1902. The use as Harrington's grocery store continued until 1903 and later from 1906 - 1917. The use in the intervening years 1903-1906 is unclear, but it the first floor may have been used as restaurant. From 1917-1922 the first floor was used as a bakery. In 1923 Billy Biggs converted the building into a bicycle repair shop. The exact date of closure for the bike shop is unknown but may have coincided with Billy Biggs death in 1955. By 1960, the building was vacant and boarded up. Parks Canada installed an interpretive display on the first floor of the building in the early1970s.

CULTURAL, SOCIAL, HISTORICAL INFORMATION: *Describe how the property relates to the community's past by identifying its associations with people, events, or historic uses.*

Harrington's Store is associated with the development of Dawson City as a supply, service and distribution centre during and following the Gold Rush. It is also associated with the city's development as a territorial capital. Another association is with Fred Caley who owned the building before selling it and other buildings to Parks Canada. Fred Caley owned and saved some prominent heritage buildings in Dawson and associated cultural resources for example the collection of Dawson Daily News editions, contained in the building with the same name.

Harrington's store is a well-known Gold Rush landmark and supports Dawson's historic fabric through its associations: its evocation of the time and place of the Klondike Gold Rush; the concentration of frontier structures, which confirm the town's early nature, diversity, northern isolation, and links to mining activity during the 1896-1910 period.

The building is well known within the community, given its use as a drop-in centre, temporary visitor reception centre, and exhibition hall and its visibility given its prominent location at a major Dawson intersection.

The most notable tenant was William A. Harrington. He operated a grocery store at this location from approximately 1903 to 1915. Harrington came to Dawson shortly after the Gold Rush and remained here until his death. He was also one of the founders of Seattle, Washington, and was one of that city's

leading wholesale merchants.

SPECIFIC HISTORIC INFORMATION: BUILDINGS

ARCHITECTURAL DETAILS: *Include a detailed description of the building, including siding, window type, roof type, decorative elements, number of storeys, etc. Also include a description of any unique design elements and quality of craftsmanship.*

Harrington's Store is valued for its aesthetic design, materials and craftsmanship.

The building is of a wood frame construction. What makes the building stand out is the Italianate architectural treatment, particularly the boxed cornice and panelled frieze, the square-sided oriel window placed at the salient angle, the richly ornamented double front door, and the painted cove shiplap siding. The second floor rooms are accessed by a flight of stairs rising to a single door on the Princess Street elevation. Awnings along both principal elevations and the dressed show windows, contribute to the Gold Rush character of the streetscape. -the Italianate architectural treatment and wood-frame construction complements the adjacent commercial buildings.

PHYSICAL CONDITION: *List any damage, repairs and/or alterations that have taken place. Please provide a date for significant alterations.*

For a more detailed assessment of the physical condition of the building please refer to the attached document: "Harrington's Store Building Condition Report Final Draft.PDF"

Harrington's Store underwent many changes over the past century. There is no information about the builder and there are no original drawings. Most of what is known about the building's evolution is derived from archival photographic evidence.
The earliest known image in which Harrington's is readily recognizable is from 1904, in the period when Harrington ran his grocery store from another location. There are many notable differences in this image from the Harrington's of today, including the following:

- Text on the south window (Princess Street elevation)
- Additional door and smaller window on northern half of the Third Avenue elevation
- Dark paint on the window and door frames and column beneath the oriel window.

Another photograph of the Harrington's Store building dates from 1935 when it would have been used by Biggs as a bicycle repair shop. From this image it is clear that between 1904 and 1935 the additional door on Third Avenue was removed and that there were changes to the window sizes and muntin on the lower level. This photo also illustrates that there was a single-storey annex behind the building along the Princess Street property line. It is not clear when this feature was added. No photos of the rear of the building have been found so there is no imagery depicting the rear stairs to access the second floor.

In 1944 there was most likely serious flood damage to the building. An image from 1944 shows flood waters that inundated the Third Avenue and Princess Street Intersection but does not show Harrington's store.

Photos of Harrington's Store from 1960 and 1961 show a derelict building with its lower floor boarded up. These images show that between 1935 and 1960, the windows on the lower level appear to have been changed again. In addition, nearly all glazing in the upper storey windows is broken, along with some of the muntins. The pillar supporting the oriel window was also removed. By the late 1960s, Harrington's was in very poor condition.

Between 1968 and 1972, the building was stabilized and the following changes took place:

- Removal of all existing siding and window units at the south and east elevations up to the height of the second floor;
- Replacement with plain horizontal boarding and a single recycled six-light fixed sash on south and east elevations;
- Demolition of the original shed roofed annex at the west elevation;
- Replacement of original foundation;
- Replacement of ground floor framing and flooring;
- Demolition of most internal partitioning.

In the late 1970s, Parks Canada created a master plan for the Klondike National Historic Sites. Within this document Harrington's is

considered as part of the Princess Street cluster, which was intended for intensive development and interpretation. Accordingly, Parks Canada embarked on a restoration for Harrington's Store. In 1977, the Restoration team produced plans for a "Simulated Façade". This partial restoration does not follow the current practices in the Standards and Guidelines for Historic Places in Canada which call for the return to a well-documented single point in time. Instead, the plans were an amalgam of features from the period spanning from 1904-1935.
The 1977 plans called for the following interventions:

- New sidewalk to match existing
- New clapboard to match existing
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- Simulated windows the east and south elevations
- Temporary removal of oil tank, signage frame and ladder of west wall and decorative roof supports of north wall, and their replacement after painting
- Repair or remake window sashes from existing models
- Replace all glazing
- Scrape flaking paint and repaint using pale colour for clapboard, plank wall, window sashes, sills and jambs; using dark colour for facings near doors, windows and corners, drip caps and mouldings. Suggested colours: cream and bronze.

Most if not all of these changes took place.

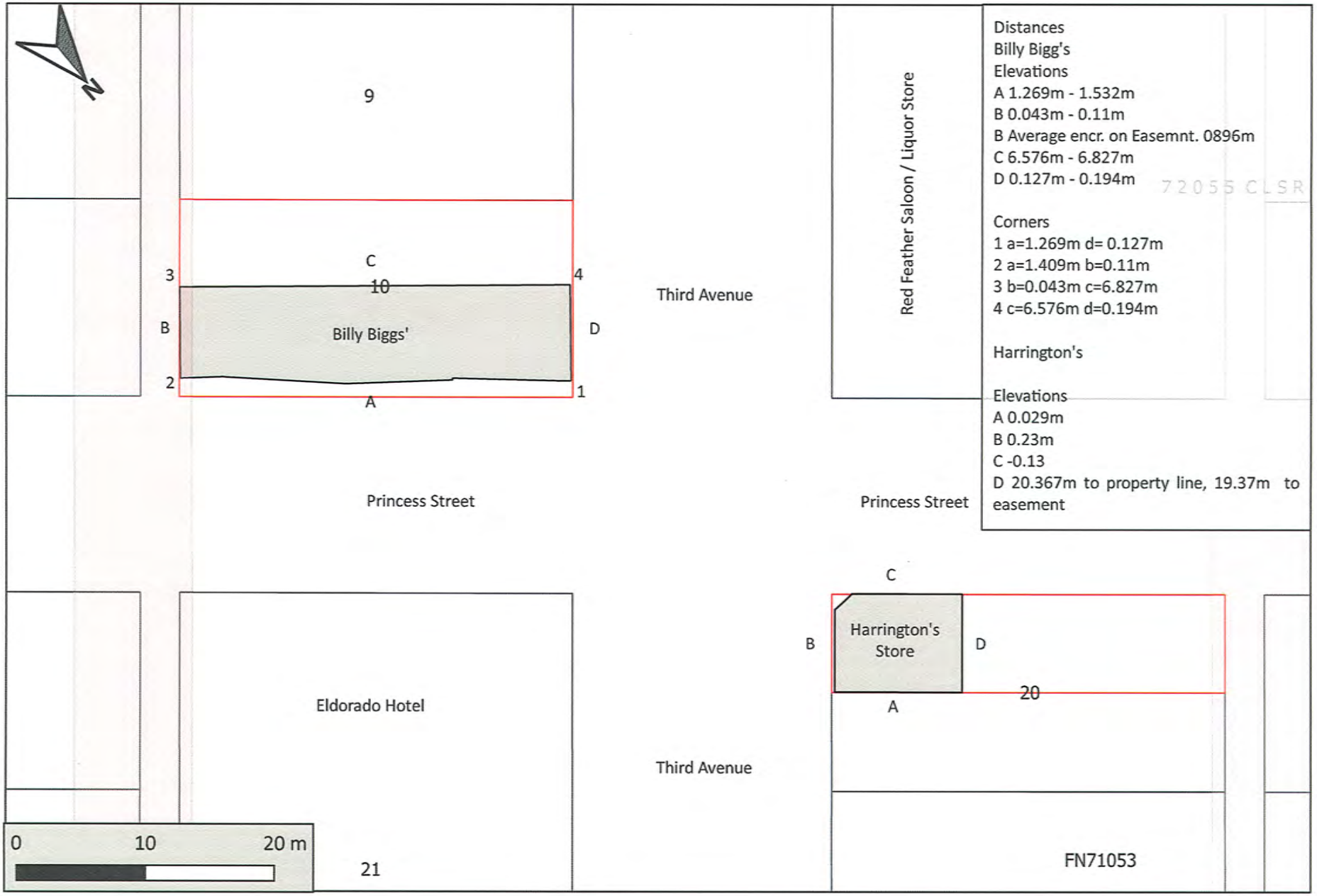
In 1979 Dawson was struck by another disastrous flood but there were no major impacts to Harrington's Store. Those present at the time recall that Harrington's Store did not shift during the flood and that the building was cleaned to remove sediment and then put back into use. In the 1980s, the interior of the Harrington's lower level was retrofitted and turned into a public exhibit space featuring the history of Dawson and the Gold Rush. In 1987, a new commercial building was constructed immediately adjacent to the north side of Harrington's – the commercial building's downspout directs rain and melt water towards Harrington's foundation cribbing. 30
In 1989, Harrington's Store was designated as Recognized Federal Heritage Building. Also in that year, plans were produced to replace the foundation and surrounding boardwalk. However, Parks Canada was unable to implement these changes. A heritage recording of Harrington's Store was produced in 2012 by Public Works and Government Services Canada. No significant changes have been made to Harrington's Store since the FHBRO evaluation.

SETTING AND CONTEXT: *Has the historic resource been moved? How does it fit with the neighbourhood? Include details on gardens, lawns, fences, trees, and how the building is sited on the lot. Is the building a landmark?*

The manner in which Harrington's Store maintains an unchanged relationship to its site, reinforces the Gold Rush character of its commercial streetscape setting and is a well-known building in Dawson, as evidenced by:

-its ongoing historic relationship to the corner of Third Avenue and Princess Street, given the proximity of the building to the lot lines and boardwalk;
-the awnings along both principal elevations and the dressed show windows, which contribute to the Gold Rush character of the streetscape;
-the Italianate architectural treatment and wood-frame construction which complements the adjacent commercial buildings;
-its familiarity within the community, given its use as a drop-in centre, temporary visitor reception centre, and exhibition hall;
-its visibility given its prominent location at a major Dawson intersection;
-its location kitty-corner to Billy Biggs, and both building's connection to their former owner Fred Caley..

Billy Biggs' and Harrington's Store
Location and Distances



Distances
Billy Bigg's
Elevations
A 1.269m - 1.532m
B 0.043m - 0.11m
B Average encr. on Easemnt. 0896m
C 6.576m - 6.827m
D 0.127m - 0.194m

Corners
1 a=1.269m d= 0.127m
2 a=1.409m b=0.11m
3 b=0.043m c=6.827m
4 c=6.576m d=0.194m

Harrington's

Elevations
A 0.029m
B 0.23m
C -0.13
D 20.367m to property line, 19.37m to easement

Parks Canada | Parcs Canada

February 18, 2021
c/o City Council
City of Dawson
Box 308
Dawson YT, Y0B 1G0

Dear Mayor and Council,

Please find attached two applications for municipal historic site status.

Both buildings described within the applications are owned by the government of Canada and administered by Parks Caanda. Harrington's Store is a recognized federal heritage building and Billy Biggs' Blacksmith Shop is a component building of the Dawson Historical Complex National Historic Site.

The designation of the Canadian Bank of Commerce as a municipal historic site set an important precedent. The City of Dawson has been demonstrating its leadership role in heritage conservation in various ways. By purchasing the Canadian Bank of Commerce, restoring it, and designating this constituent building of the Dawson Historical Complex National Historic Site as a municipal historic site, the municipality recognized and validated the duality of the importance of Dawson's historic buildings on the national and the regional level.

Some of Parks Canada's buildings are currently not in optimal use, Harrington's Store, and Billy Biggs' Blacksmith Shop among them. The Klondike Adaptive Realty Project (KARP) is assessing adaptive reuse opportunities for several Parks Canada buildings in the Klondike. This project is about finding and implementing sustainable solutions to protect and use historic structures.

Five[1] heritage buildings in various condition, with different designations and potential for adaptive reuse, were selected and have gone through detailed condition and heritage analyses. Harrington's Store and Billy Biggs' Blacksmith Shop are excellent candidates for adaptive reuse, potentially by an alternate owner.

Municipal historic site designation provides a number of benefits, including but not limited to:

- Heritage protection if Parks Canada chooses to dispose of a property.
- Increased digital footprint for these buildings.
- Better opportunities to collaborate on Dawson's living history.

Based on our experience with the process and outcomes, Parks Canada may submit more buildings for designation as municipal historic sites.

---

[1] Post Office, Harrington's Store, Billy Biggs' Blacksmith Shop, KTMC, and Ruby's Place.

We are guided by community input in our strategic planning and decision making. The Klondike National Historic Site Advisory Committee meets biannually to discuss KARP and other management topics for Klondike National Historic Sites. The City of Dawson has had representation on the committee since the inaugural meeting in September 2018. We value the input representatives have provided and look forward to working together to protect and present these treasured places.

If you have any questions with regard to any of the initiatives detailed above, I'd be happy to engage further.

Sincerely,

Travis Weber
Site Superintendent
Klondike National Historic Sites
Yukon Field Unit
Parks Canada
Travis.weber@canada .ca | Phone 867-993-3326

Report to Council

[X] For Council Decision [ ] For Council Direction [ ] For Council Information

[ ] In Camera

AGENDA ITEM:	**21-018 Billy Bigg's – Municipal Historic Site Designation**	
PREPARED BY:	Stephanie Pawluk, CDO	**ATTACHMENTS:** - Bylaw #2021-08 - Municipal Designation Nomination Form
DATE:	July 9, 2021	
RELEVANT BYLAWS / POLICY / LEGISLATION: ZBL 2018-19 OCP Heritage Bylaw Historic Resources Act		

RECOMMENDATION

It is respectfully recommended that Council give Second and Third Reading to Bylaw #2021-08.

ISSUE / PURPOSE

A nomination was submitted by Parks Canada for the designation of Billy Bigg's (Lot 10 Block HE Ladue Estate) as a Municipal Historic Site.

BACKGOUND SUMMARY

As per S. 8 of *Heritage Bylaw 2019-04*, Council, may by petition by any person or group of persons, designate any site as a Municipal historic Site if it determines that the site 'is an important illustration of the historic development of the Klondike Valley, or the natural historic of the peoples and cultures of the Klondike Valley Cultural Landscape'.

Bylaw #2021-08 passed First Reading unanimously on May 18, 2021 and successfully passed a Public Hearing on June 1, 2021. The Building Condition Report and Yukon Heritage Resources Board Evaluation Criteria was presented on May 11, 2021.

Heritage Bylaw 2019-04 outlines the required steps for designation of a Municipal Historic Site once a nomination has been received. The steps for Municipal Historic Site designation is as follows:

1. Nomination received by Administration
2. Heritage Advisory Committee convene to review the nomination
3. Committee of the Whole convene to review the nomination
4. 1st Reading of the Bylaw
5. Public Hearing scheduled for 1st June 2021
6. 2nd and 3rd Reading of the Bylaw

ANALYSIS / DISCUSSION

The suitability for Harrington's Store becoming a Municipal Historic Site was assessed using the Yukon Heritage Resources Board evaluation criteria for designation of historic sites. For more details on what each ranking means, please see the Evaluation Criteria in the attachments. The majority of this analysis can be found within the original application as HAC accepted this as written, noting that it was comprehensive and required little additional comment.

Age

Excellent

Comments

Billy Biggs was erected in 1899, but there were subsequent additions added to the back between 1907 and 1924.

The first ownership information dates back to 1902. The proprietor of the Great Northern Hotel (Billy Biggs), at the time, was Douglas Hamilton. In 1907 the building was purchased by William Oakden. Following the death of William Oakden, Alexander Arkins "Billy" Biggs purchased the building by 1924. After Billy Biggs death in 1955, Fred Caley purchased the building no earlier than 1956. The Dawson City Museum and Historical Society looked after the building until it was purchased in 1970 by Parks Canada.

Composition

Very Good

Comments

The Great Northern Hotel, was a two-and-a-half-storey gabled building with a partial false front, its parapet wall stepping up to reveal the upper floor gable, creating a triangular pediment. This false front with applied black lettering for signage and large grade-level windows, created an arresting section of streetscape. The building possessed a balloon frame and horizontally assembled wood siding on its exterior. Between 1907 and 1924, one frame annex and two log annexes were added to the rear of the building, likely existing structures moved there from another location.

Observations Envelope:

- The building ‘envelope’ and exterior wall assembly is generally in poor condition.
- The siding on the west elevation is generally in good condition with minor deterioration of paint at select areas. The paint finish is generally absent except at the front façade.
- There is notable deterioration of the exterior wall cladding and it is absent where adjacent to grade. A galvanized metal skirting covers the majority of the perimeter of Areas 2, 3 and 4 where bottom cladding and logs have deteriorated beyond repair.
- Daylight is visible between the boards of all elevations with the exception of the front façade indicating deficiencies in the detailing at the intersection of the roof as well as the siding.
- Gaps in the exterior wall assembly are the main source of snow and moisture infiltration at the sides and rear elevations of the building throughout.
- Exterior cladding is missing in multiple areas exposing the wood studs to the exterior.
- Exterior logs exhibit extensive checking and horizontal cracks.
- Water stains and deterioration inside the building can be attributed to leaks in the roof around chimneys and vents. Water stains below windows and doors indicate the presence of leaks at or around windows.
- The building has no eavestroughs and decay is located at the base of the wall where the cladding is less protected by minimal roof overhangs and where snow build up is inevitable.
- There is evidence of noticeable settling that has been temporarily stabilized; walls are sloping and water penetration is evident. As well a large crack exists in the dirt floor indicating ongoing movement of the soil.
- Areas at the horizontal wood bracing contain moss growth that requires remediation.
- A selection of doors remain along with some original hardware, although the majority of these openings are blocked off.

Observations Windows and Doors

- Many of the windows are of rudimentary construction and have experienced deterioration from water entry. Some of the sashes have been removed or are falling apart, while others are being over-stressed because of deformation of the frames. However, some of the glazing survives especially in those on the south elevation.
- On a few windows, there are multiple glazing segments missing.
- Multiple windows openings are boarded in with plywood.
- Second floor windows and sills show heavy deterioration.
- There are gaps around all windows allowing moisture penetration.
- The exterior surface of the main entrance doors is in fair condition exhibiting deterioration and cracking of the tongue and groove diagonal boarding.
- The second floor doors on the south elevations have likely been re-purposed and poorly repaired over the years. Most of the door hardware survives in place.
- All ground floor doors are shorter than original due to extensive decay.
- Window and door frames, and exterior trim are generally in poor condition with some localized decay.

Observations Roof

- There are penetrations through the roof assembly where water infiltration has occurred.
- There are local deficiencies around roof penetrations such as the chimneys, and at the intersection of the shed and front façade.
- Flashings and other water shedding details are not implemented resulting in deterioration of cladding below the roofs and down the face of the structure.
- Dormers at the roof edge exhibit deterioration.

Integrity

Very Good

Comments

Character defining elements are:

- The building's relationship with Princess Street and Third Avenue, exemplified by it sitting flush to the sidewalk along Third Avenue, this sitting reflects the grid street layout and orientation of buildings typical of the 1897-98 survey;
- The building's low-height, and agglomeration of volumes that creates a largely continuous open volume of space and illustrates the building's evolution over time;
- The 'boomtown' type storefront and roof configuration in the single storey back portion of the building, that reflect the vernacular approach to building design typical of Dawson City in the years 1897-1913;
- The building's simple rustic wood exterior, wall and roof systems, the use (and reuse) of logs, rough-sawn planking, and other unadorned and minimally crafted materials, evidencing vernacular construction techniques and materials typical of utilitarian buildings in Dawson City in the years 1897-1913 and within the Dawson Historical Complex as a whole;
- The simple, symmetrical treatment of the Third Avenue façade, featuring large centrally-placed double doors flanked by pairs of multi lite windows.

Some alterations are acknowledged as part of the application:

- Three rear log and frame additions were affixed to the original structure in 1913, comprised of one frame and two log annexes. These were likely existing structures moved to this site and fitted together. The first annex, which had double shed doors in both the north and south facades, is believed to have served as a wagon repair shop. The second annex, a log structure with saddle notch construction, was a machine shop. The easternmost addition, built of half-lapped logs,

dressed flat on the interior, but retaining the round on the exterior, possessed a door on its north end of the structure, opening onto Princess Street. The original building stands on a series of foundation piles, embedded deeply into the frozen ground. While no evidence of a wall sill was found in this area, remnants of the skirting at the base of the building was exposed. The first rear addition, stood on short round posts which were shallowly set into the ground. These posts have since deflected to the east. Evidence of skirting and a wall sill were also found here. The second rear addition rests directly on original ground surface. Under the last rear addition a deeply set foundation pile was found in the south east corner while no other piles, posts or sleepers were found elsewhere along its south wall.

- It is unknown how the building was affected by the 1944 flood. At some time in or after 1944, Biggs had much of the upper portion of the building removed and a shed roof sloping to the north replaced the original gabled roof, while the top half-storey was removed and the false front's height was reduced. The reasons for this alteration are unknown. It has been speculated that with the decline of blacksmithing, and with Bigg himself residing across the street, the upper floors were no longer needed. It has also been suggested, that the upper floors were removed when the original roof may have needed repairs. Supplementary shoring was first installed before the building was abandoned as a blacksmith and machine shop, perhaps in the 1940s. During the 1960s, the Dawson City Museum and Historical Society installed interior and exterior diagonal shoring. Additional raking shores were installed along the south wall, and bracing frames were erected in the middle sections of the building. Following Parks Canada's 1970 purchase of Billy Biggs' Blacksmith Shop, bracing frames and raking shores were altered and added to prevent the building from further deterioration due to settling and heaving permafrost.
- Flooring was removed in a 1980 building stabilization project. Small roof repairs also occurred during this earlier period of Parks Canada ownership of the building to reduce the entry of water, especially around the dormer windows on the second annex. Another stabilization occurred in 1983, correcting changes in grade; the north wall of the second annex was reconstructed in 1983. (Prior to work in these years on building stabilization, the original building and first annex foundations may have rested on joists on top of piles; the second annex had rested on grade, along with the log floor joists; and the final annex's perimeter walls bore on timber piles.) That same year the building was stabilized and geotextile cloth and fresh gravel were laid down. In 1989 plans were produced to replace the foundation. At that time, plans were also produced to alter the building's front façade sidewalk-facing windows were altered to house display window boxes.
- In 2005, due to permafrost damage, the building was moved and a layer of gravel (approx. 1.5' high and 6" above the road) was installed and the sidewalk raised. That year some asbestos remediation also occurred. In 2006 an interior walkway was added, some electrical work occurred, and a log restoration workshop occurred replacing three logs on south side of rear addition. The following year roof work occurred: removing extant tin, securing the plywood beneath it, adding a rubber membrane, and reinstalling the tin, while strips of spruce wood were used to cover the ends of plywood. Work conducted within the last five years includes: repairs to the windows; basic painting of the front of the building; and the spraying of exterior of logs and old wood with linseed oil/turpentine mix to prevent deterioration in wooden components. Tin skirting has also been added around the rear of the building to keep animals from entering it.

Context

Excellent

Comments

Billy Biggs is one of the few remaining structures from the Klondike Gold Rush. The heritage value of the building lies in:

- Its connections and services to the goldfields;

- The agglomeration of additions and modifications to the original structure, typical of the many and varied uses to which the building was put.
- Its ongoing historic relationship to the corner of Third Avenue and Princess Street, given the proximity of the building to the lot lines and boardwalk;
- Its visibility given its prominent location at a major Dawson intersection
- Townscape features of the 1896-1910 era including the orientation of lot lines and buildings, and the spatial relationship of built groupings of similar form, age and /or function within the townsite, for example, the grouping, Mme. Tremblay's, Klondike Kate's, Old Post Office or the grouping Klondike Thawing Machine Company, Westminster Hotel on the same block.
- Its relationship to the surrounding retail stores, hotels, and bars;
- Its form, materials and details, particularly on the street frontage, which reinforce nearby historic buildings such as Harrington's Store, Third Avenue Complex, West Boilershop and others.

Official Community Plan

Section 9 of the Official Community Plan contemplates Heritage Preservation. This proposal is in line with the identified long-term goal: "*Dawson's gold rush history is showcased by preserving key historical resources where possible."*

Zoning By-Law

The Zoning By-Law contemplates heritage management only in areas that are impacted by the Heritage Management Plan character areas. The nominated site is situated in the Downtown Core of the character areas identified and thus would be subject to Heritage Advisory Committee review.

One issue to note that the current building would be considered as non-conforming due to the absence of a rear setback (C1 zoning requires 5ft) and the encroachment into the alley. As per the *Municipal Act* and thus any structural alteration would not be permitted unless the whole property was brought into conformity with the Zoning Bylaw. Another issue to note is that there is currently an encroachment into the rear alley that would also impact any future development on the site.

Heritage Management Plan

The nominated property is situated in the Downtown area of the Heritage Management Plan. This area best depicts the commercial core of Dawson during the Gold Rush and Billy Bigg's would be considered one of the unique remaining Gold-Rush-era buildings. One of the recommendations for the Downtown Management Area is that all buildings and structures should be protected by designation under the provisions of the *Yukon Historic Resources Act*. Further, any future conservation work on Billy Bigg's would be required to follow the *Design Guidelines for Historic Dawson* and, should the building be subject to irreparable damage, reconstruction would be mandatory.

Heritage Resources Act

S. 37(1) of the *Historic Resources Act* gives municipal Councils the authority to designate by bylaw a municipal historic site. Eligible sites are those which have significant historic significance as contemplated in S. 15(1) of the *Act*, as follows:

A site may be designated as a historic site when Council is satisfied that the site is,

Whether in itself or because of historic resources or human remains discovered or believed to be at the site, an important illustration of

a) the historic or pre-historic development of the Yukon or a specific locality in the Yukon, or of the peoples of the Yukon or locality and their respective cultures; or

b) the natural history of the Yukon or a specific locality in the Yukon,

and has sufficient historic significance to be so designated.

Therefore, before accepting the recommendation to pass this bylaw, Council must consider this definition of historic significance and determine whether the Billy Bigg's nomination meets this definition sufficiently to warrant designation.

APPROVAL		
NAME:	C Bellmore	**SIGNATURE:** 
DATE:	July 9, 2021	

THE CITY OF DAWSON

Billy Bigg's Municipal Historic Site Bylaw

Bylaw No. 2021-08

WHEREAS section 265 of the *Municipal Act*, RSY 2002, c. 154, and amendments thereto, provides that a council may pass bylaws for municipal purposes; and

WHEREAS section 37(1) of the *Historic Resources Act* permits council to designate land and buildings as a Municipal Historic Site; and

WHEREAS council has given notice pursuant to Part 5, Section 39 of the *Historic Resources Act* of its intention to consider passing this bylaw; and

WHEREAS council considers that Billy Bigg's has heritage value or heritage character as defined in the *Heritage Bylaw*.

THEREFORE, pursuant to the provisions of the *Municipal Act* of the Yukon, the council of the City of Dawson, in open meeting assembled, **ENACT AS FOLLOWS**:

PART I - INTERPRETATION

1.00 Short Title

1.01 This bylaw may be cited as the ***Billy Bigg's Municipal Historic Site Bylaw***.

2.00 Purpose

2.01 The purpose of this bylaw is to designate the building known as Billy Bigg's and the land on which it stands on defined by the legal limits of Lot 10 Block HE Ladue Estate Plan 8338A CLSR.

3.00 Definitions

3.01 In this Bylaw:

(a) Unless expressly provided for elsewhere within this bylaw the provisions of the *Interpretations Act (RSY 2002, c. 125)* shall apply;

(b) "CAO" means the Chief Administrative Officer for the City of Dawson;

(c) "city" means the City of Dawson;

CAO _____ Presiding Officer _____

(d) "council" means the council of the City of Dawson.

PART II – APPLICATION

4.00 Municipal Historic Site

4.01 The building known as Billy Bigg's and the land on which it stands on defined by the legal limits of Lot 10 Block HE Ladue Estate Plan 8338A CLSR, as per Appendix 1 of this bylaw, is hereby designated as a Municipal Historic Site.

PART III – FORCE AND EFFECT

5.00 Severability

5.01 If any section, subsection, sentence, clause or phrase of this bylaw is for any reason held to be invalid by the decision of a court of competent jurisdiction, the invalid portion shall be severed and the part that is invalid shall not affect the validity of the remainder unless the court makes an order to the contrary.

6.00 Enactment

6.01 This bylaw shall come into force on the day of the passing by council of the third and final reading.

7.00 Bylaw Readings

Readings	Date of Reading
PUBLIC HEARING	**June 1, 2021**
FIRST	**May 18, 2021**
SECOND	
THIRD and FINAL	

Original signed by

Wayne Potoroka, Mayor *Cory Bellmore, CAO*

Presiding Officer **Chief Administrative Officer**

PART IV – APPENDIX (APPENDICES)

Appendix 1. Location Map showing the Billy Bigg's Municipal Historic Site

THE CITY OF DAWSON
Box 308 Dawson City, YT Y0B 1G0
PH: 867-993-7400 FAX: 867-993-7434
www.cityofdawson.ca

OFFICE USE ONLY	
APPLICATION FEE:	$0
DATE PAID:	–
RECEIPT #:	–
APPLICATION #:	21-018

MUNICIPAL HISTORIC SITE DESIGNATION FORM

PLEASE READ THE ATTACHED INSTRUCTIONS, GUIDELINES, AND SUBMISSION REQUIREMENTS PRIOR TO COMPLETING FORM.

TYPE OF HISTORIC RESOURCE

[X] **Building** [ ] **Landscape**

LOCATION:

CIVIC ADDRESS: 894, Third Avenue **Yukon Historic Sites Inventory ID:** _____

LEGAL DESCRIPTION: LOT(S) 10 **BLOCK** HE **ESTATE** Ladue **PLAN#** 8338A

APPLICANT INFORMATION

APPLICANT NAME(S): Travis Weber, Site Superintendent, KNHS, Parks Canada

MAILING ADDRESS: Box 390, Dawson, YT **POSTAL CODE:** Y0B 1G0

EMAIL: travis.weber@canada.ca **PHONE #:** 867-993-7200

OWNER INFORMATION (IF DIFFERENT FROM APPLICANT)

OWNER NAME(S): see above

MAILING ADDRESS: _____ **POSTAL CODE:** _____

EMAIL: _____ **PHONE #:** _____

DOES THE CURRENT OWNER SUPPORT POSSIBLE MUNICIPAL DESIGNATION OF THIS PROPERTY? IF YES, PLEASE PROVIDE WRITTEN PROOF OF THIS SUPPORT ATTACHED TO THIS APPLICATION. [ ] **YES** [ ] ~~**NO**~~

Submission made by owner

DECLARATION

- I/WE hereby make application for a Municipal Historic Site under the provisions of the City of Dawson Heritage Bylaw #2019-04 and in accordance with the plans and supporting information submitted and attached which form part of this application.
- I/WE have reviewed all of the information supplied to the City of Dawson with respect to an application for a Historic Site Designation and it is true and accurate to the best of my/our knowledge and belief.
- I/WE understand that the City of Dawson will rely on this information in its evaluation of my/our application and that any decision made by the City of Dawson on inaccurate information may be rescinded at anytime.
- I/WE hereby give my/our consent to allow Council or a person appointed by its right to enter the above land and/or building(s) with respect to this application only.

I/WE HAVE CAREFULLY READ THIS DECLARATION BEFORE SIGNING IT.

2021-02-18 _____
DATE SIGNED

_____
SIGNATURE OF APPLICANT(S)

2021-02-18 _____
DATE SIGNED

_____
SIGNATURE OF OWNER(S)

THE CITY OF DAWSON
Box 308 Dawson City, YT Y0B 1G0
PH: 867-993-7400 FAX: 867-993-7434
www.cityofdawson.ca

OFFICE USE ONLY	
PERMIT #:	

GENERAL HISTORICAL INFORMATION

AGE OF STRUCTURE: *Please provide the age of the structure you wish to designate and attach supporting evidence.*

The building commonly referred to as "Billy Bigg's" was erected in 1899. Major additions in the back most likeley from existing structures elsewhere in town were made between 1907 and 1924.

HISTORY OF OWNERSHIP: *Please list the property's original and subsequent owners.*

The first ownership information dates back to 1902. The proprietor of the Great Northern Hotel (Billy Biggs), at the time, was Douglas Hamilton, of whom little is known. In 1907 the building was purchased by William Oakden. Following the death of William Oakden, Alexander Arkins "Billy" Biggs purchased the building by 1924. After Billy Biggs death in 1955, Fred Caley purchased the building no earlier than 1956. The Dawson City Museum and Historical Society looked after the building until it was purchased in 1970 by Parks Canada.

USES OF HISTORIC RESOURCE: *Please list the past and current uses of the historic resource.*

The building now known as Billy Biggs' Blacksmith Shop was erected as the Great Northern Hotel. The exact construction date of the hotel is unknown; however, it appears in photographs dating to just after the great fire of April 1899, so it is likely it was erected soon after this event. It has been speculated that the building may have been under construction at the time of the fire. As first erected, the hotel was a two-and-a-half-storey gabled building with a partial false front. the Great Northern Hotel ceased operation in 1905. The owner, Douglas Hamilton, resided in the hotel at least until 1906. That is all that is known for the period from 1905-1907. In 1907, the new owner William Oakden, in partnership with Joseph Picotte, turned the building into a smithy. It is assumed, that between 1907 and 1924 , one frame annex and two log annexes were added to the rear of the building, likely existing structures moved there from another location. Biggs, who had run the Third Avenue Blacksmith Shop across the street since 1914, moved his operation into the building1923 or 1924. Biggs' smithy's years of operation span the years in which there was a shift from horse to automobile transportation. As of the 1930s, Biggs' Blacksmith Shop also did repair work to automobiles and trucks. Biggs operated the blacksmith shop until his death in 1955. The Dawson City Museum and Historical Society looked after the building as caretakers, until it was purchased in 1970 by Parks Canada. Subsequently, tools and equipment were removed by Parks Canada curatorial staff. The building is currently not in use.

CULTURAL, SOCIAL, HISTORICAL INFORMATION: *Describe how the property relates to the community's past by identifying its associations with people, events, or historic uses.*

Billy Biggs' is an important component of the ensemble of surviving buildings built between 1898 and 1910 that document Dawson's early development during and immediately after the Klondike Gold Rush. It also contributes to the streetscapes of historical buildings, which as a historical complex contribute to the overall sense of place, including the frontier character of structures, and a mix of vernacular constructional techniques.

Biggs' Blacksmith Shop, the last of several smithies that had once existed in Dawson City, represents a small but important gold rush support industry. Blacksmithing was crucial in the early history of the town, supplying and maintaining the specialized equipment employed in the Klondike Goldfields, and servicing the domestic market in the fledgling community.

Dawson's blacksmiths were not restricted to traditional horseshoe and nail making, but participated in the surge of innovation that came with northern mining. The extreme and unique conditions in the North forced the mining community to develop technology specifically for their needs. Blacksmiths were asked to design and make tools to meet conditions that weren't encountered elsewhere in the world. Biggs is a fine example of the special role that blacksmithing held in Dawson's development.

The heritage value of the building lies in its connections and services to the Goldfields and the agglomeration of additions and modifications to the original structure, typical of the many and varied uses to which the building was put.

Biggs Blacksmith Shop is named in the 1967 Historic Sites and Monuments Board Canada (HSMBC) Statement of Significance for Dawson Historic Complex National Historic Site, making it essential to the City's designation by

-its evocation of the time and place of the Klondike Gold Rush;

-concentration of frontier structures, which confirm the town's early nature, diversity, northern isolation, and links to mining activity during the 1896-1910 period.

SPECIFIC HISTORIC INFORMATION: BUILDINGS

ARCHITECTURAL DETAILS: *Include a detailed description of the building, including siding, window type, roof type, decorative elements, number of storeys, etc. Also include a description of any unique design elements and quality of craftsmanship.*

The Great Northern Hotel, was a two-and-a-half-storey gabled building with a partial false front, its parapet wall stepping up to reveal the upper floor gable, creating a triangular pediment. This false front with applied black lettering for signage and large grade-level windows, created an arresting section of streetscape. The building possessed a balloon frame and horizontally assembled wood siding on its exterior. Between 1907 and 1924, one frame annex and two log annexes were added to the rear of the building, likely existing structures moved there from another location.

Character defining elements are:

• The building's relationship with Princess Street and Third Avenue, exemplified by it sitting flush to the sidewalk along Third Avenue, this sitting reflects the grid street layout and orientation of buildings typical of the 1897-98 survey;

• The building's low-height, and agglomeration of volumes that creates a largely continuous open volume of space and illustrates the building's evolution over time;

• The 'boomtown' type storefront and roof configuration in the single storey back portion of the building, that reflect the vernacular approach to building design typical of Dawson City in the years 1897-1913;

• The building's simple rustic wood exterior, wall and roof systems, the use (and reuse) of logs, rough-

sawn planking, and other unadorned and minimally crafted materials, evidencing vernacular construction techniques and materials typical of utilitarian buildings in Dawson City in the years 1897-1913 and within the Dawson Historical Complex as a whole;

• The simple, symmetrical treatment of the Third Avenue façade, featuring large centrally-placed double doors flanked by pairs of multi lite windows;

PHYSICAL CONDITION: *List any damage, repairs and/or alterations that have taken place. Please provide a date for significant alterations.*

Three rear log and frame additions were affixed to the original structure in 1913, comprised of one frame and two log annexes. These were likely existing structures moved to this site and fitted together. The first annex, which had double shed doors in both the north and south facades, is believed to have served as a wagon repair shop. The second annex, a log structure with saddle notch construction, was a machine shop. The easternmost addition, built of half-lapped logs, dressed flat on the interior, but retaining the round on the exterior, possessed a door on its north end of the structure, opening onto Princess Street. The original building stands on a series of foundation piles, embedded deeply into the frozen ground. While no evidence of a wall sill was found in this area, remnants of the skirting at the base of the building was exposed. The first rear addition, stood on short round posts which were shallowly set into the ground. These posts have since deflected to the east. Evidence of skirting and a wall sill were also found here. The second rear addition rests directly on original ground surface. Under the last rear addition a deeply set foundation pile was found in the south east corner while no other piles, posts or sleepers were found elsewhere along its south wall.

It is unknown how the building was affected by the 1944 flood. At some time in or after 1944, Biggs had much of the upper portion of the building removed and a shed roof sloping to the north replaced the original gabled roof, while the top half-storey was removed and the false front's height was reduced. The reasons for this alteration are unknown. It has been speculated that with the decline of blacksmithing, and with Bigg himself residing across the street, the upper floors were no longer needed. It has also been suggested, that the upper floors were removed when the original roof may have needed repairs. Supplementary shoring was first installed before the building was abandoned as a blacksmith and machine shop, perhaps in the 1940s. During the 1960s, the Dawson City Museum and Historical Society installed interior and exterior diagonal shoring. Additional raking shores were installed along the south wall, and bracing frames were erected in the middle sections of the building. Following Parks Canada's 1970 purchase of Billy Biggs' Blacksmith Shop, bracing frames and raking shores were altered and added to prevent the building from further deterioration due to settling and heaving permafrost.

Flooring was removed in a 1980 building stabilization project. Small roof repairs also occurred during this earlier period of Parks Canada ownership of the building to reduce the entry of water, especially around the dormer windows on the second annex. Another stabilization occurred in 1983, correcting changes in grade; the north wall of the second annex was reconstructed in 1983. (Prior to work in these years on building stabilization, the original building and first annex foundations may have rested on joists on top of piles; the second annex had rested on grade, along with the log floor joists; and the final annex's perimeter walls bore on timber piles.) That same year the building was stabilized and geotextile cloth and fresh gravel were laid down. In 1989 plans were produced to replace the foundation. At that time, plans were also produced to alter the building's front façade sidewalk-facing windows were altered to house display window boxes.

In 2005, due to permafrost damage, the building was moved and a layer of gravel (approx. 1.5' high and 6" above the road) was installed and the sidewalk raised. That year some asbestos remediation also occurred. In 2006 an interior walkway was added, some electrical work occurred, and a log restoration workshop occurred replacing three logs on south side of rear addition. The following year roof work occurred: removing extant tin, securing the plywood beneath it, adding a rubber membrane, and reinstalling the tin, while strips of spruce wood were used to cover the ends of plywood. Work conducted within the last five years includes: repairs to the windows; basic painting of the front of the building; and the spraying of exterior of logs and old wood with linseed oil/turpentine mix to prevent deterioration in wooden components. Tin skirting has also been added around the rear of the building to keep animals from entering it.

The following observations regarding the structure were made in 2018:

- The wooden components of the interior stabilizing structure appear to be in an overall good condition.
- Cribbing appears to be in overall good condition, with miscellaneous moisture deterioration noted throughout.
- A higher concentration of shims were observed on the cribbing along the north and south elevations (compared to the cribs under the central walking aisle). Additionally, numerous shims along the north and south elevations were observed to be loose; alternately, shims along the central cribs were tight.
- No connections were observed between adjacent structures – daylight could be seen through the junction between adjacent structures.
- In general, the wood components of the first two structures was generally covered with interior boards. However, the base of localized exposed 2"x4" wall studs showed consistent moisture staining.
- The bottom three logs on the third structure are comparatively newer than the remainder of the structure, and appear to be in an overall good condition.
- In general, the logs on the north elevation appeared to be in comparatively better condition than those on the south elevation. This is likely a result of the higher sun exposure on the south elevation.
- The exposed log ends of the third and fourth structure appear to be poor condition, as the ends were observed to be dried and brittle. This is a typical condition when end grains are exposed; wood end grains wick in additional moisture and therefore undergo significant wetting and drying cycles. The extent of deterioration is unclear as there may be core decay.
- The handrails on the central aisle notably deflects with applied lateral pressure.

Observations Envelope:

- The building 'envelope' and exterior wall assembly is generally in poor condition.
- The siding on the west elevation is generally in good condition with minor deterioration of paint at select areas. The paint finish is generally absent except at the front façade.
- There is notable deterioration of the exterior wall cladding and it is absent where adjacent to grade. A galvanized metal skirting covers the majority of the perimeter of Areas 2, 3 and 4 where bottom cladding and logs have deteriorated beyond repair.
- Daylight is visible between the boards of all elevations with the exception of the front façade indicating deficiencies in the detailing at the intersection of the roof as well as the siding.
- Gaps in the exterior wall assembly are the main source of snow and moisture infiltration at the sides

and rear elevations of the building throughout.

- Exterior cladding is missing in multiple areas exposing the wood studs to the exterior.
- Exterior logs exhibit extensive checking and horizontal cracks.
- Water stains and deterioration inside the building can be attributed to leaks in the roof around chimneys and vents. Water stains below windows and doors indicate the presence of leaks at or around windows.
- The building has no eavestroughs and decay is located at the base of the wall where the cladding is less protected by minimal roof overhangs and where snow build up is inevitable.
- There is evidence of noticeable settling that has been temporarily stabilized; walls are sloping and water penetration is evident. As well a large crack exists in the dirt floor indicating ongoing movement of the soil.
- Areas at the horizontal wood bracing contain moss growth that requires remediation.
- A selection of doors remain along with some original hardware, although the majority of these openings are blocked off.

Observations Windows and Doors

- Many of the windows are of rudimentary construction and have experienced deterioration from water entry. Some of the sashes have been removed or are falling apart, while others are being over-stressed because of deformation of the frames. However, some of the glazing survives especially in those on the south elevation.
- On a few windows, there are multiple glazing segments missing.
- Multiple windows openings are boarded in with plywood.
- Second floor windows and sills show heavy deterioration.
- There are gaps around all windows allowing moisture penetration.
- The exterior surface of the main entrance doors is in fair condition exhibiting deterioration and cracking of the tongue and groove diagonal boarding.
- The second floor doors on the south elevations have likely been re-purposed and poorly repaired over the years. Most of the door hardware survives in place.
- All ground floor doors are shorter than original due to extensive decay.

Window and door frames, and exterior trim are generally in poor condition with some localized decay.

Observations Roof

- There are penetrations through the roof assembly where water infiltration has occurred.
- There are local deficiencies around roof penetrations such as the chimneys, and at the intersection of the shed and front façade.
- Flashings and other water shedding details are not implemented resulting in deterioration of cladding below the roofs and down the face of the structure.
- Dormers at the roof edge exhibit deterioration.

Observations Interior

- Exterior walls exhibit various eras of repair as the building has been raised and maintained over the

years.

- Original layouts and their interior walls in the four Areas are still recognizable.
- Interior finishes are minimal throughout the four Areas. Where interior finishes exist, they are in fair condition such as the ceiling in Area 1 with areas of cracked wood planks.
- There are visible penetrations around windows and exterior doors where daylight is visible.
- Water stains are evident on the underside of the exposed roof sheathing boards.
- On the second floor, inaccessible as the interior stairway was removed, the walls are uninsulated.
- Chimney penetrations are evident at the second floor where they are suspended from the roofing.
- No flooring exists throughout other than the exposed ground.

SETTING AND CONTEXT: *Has the historic resource been moved? How does it fit with the neighbourhood? Include details on gardens, lawns, fences, trees, and how the building is sited on the lot. Is the building a landmark?*

Billy Biggs is one of the few remaining structures from the Klondike Gold Rush. The heritage value of the building lies in

-its connections and services to the goldfields;

-the agglomeration of additions and modifications to the original structure, typical of the many and varied uses to which the building was put.

-its ongoing historic relationship to the corner of Third Avenue and Princess Street, given the proximity of the building to the lot lines and boardwalk;

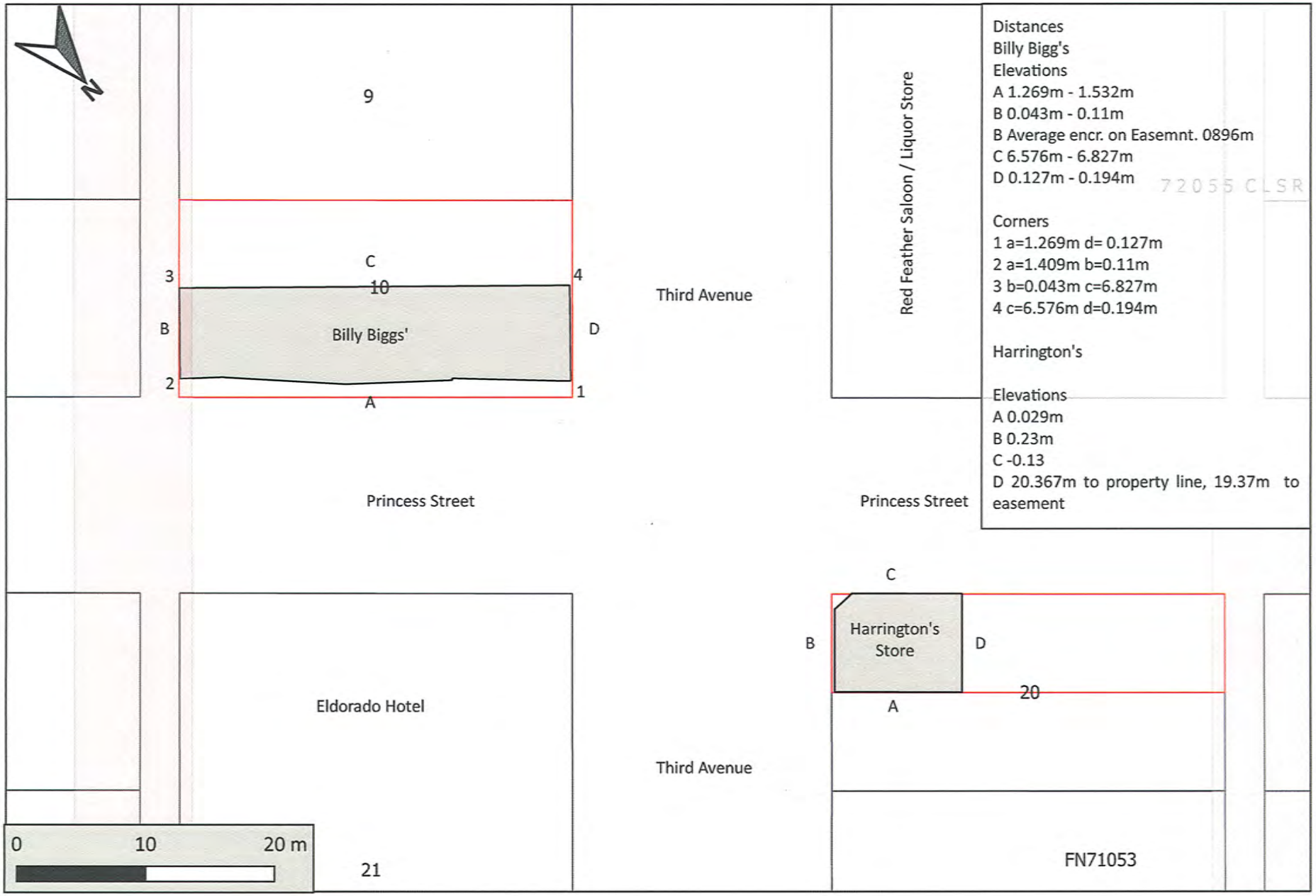
-its visibility given its prominent location at a major Dawson intersection, kitty corner from another Gold Rush aera building, Harrington's store and the Red Feather Saloon replica.

- townscape features of the 1896-1910 era including the orientation of lot lines and buildings, and the spatial relationship of built groupings of similar form, age and /or function within the townsite, for example, the grouping, Mme. Tremblay's, Klondike Kate's, Old Post Office or the grouping Klondike Thawing Machine Company, Westminster Hotel on the same block.

- its relationship to the surrounding retail stores, hotels, and bars;

- its form, materials and details, particularly on the street frontage, which reinforce nearby historic buildings such as Harrington's Store, Third Avenue Complex, West Boilershop and others;

Billy Biggs' and Harrington's Store
Location and Distances



Distances
Billy Bigg's
Elevations
A 1.269m - 1.532m
B 0.043m - 0.11m
B Average encr. on Easemnt. 0896m
C 6.576m - 6.827m
D 0.127m - 0.194m

Corners
1 a=1.269m d= 0.127m
2 a=1.409m b=0.11m
3 b=0.043m c=6.827m
4 c=6.576m d=0.194m

Harrington's

Elevations
A 0.029m
B 0.23m
C -0.13
D 20.367m to property line, 19.37m to easement

Parks Canada | Parcs Canada

February 18, 2021
c/o City Council
City of Dawson
Box 308
Dawson YT, Y0B 1G0

Dear Mayor and Council,

Please find attached two applications for municipal historic site status.

Both buildings described within the applications are owned by the government of Canada and administered by Parks Caanda. Harrington's Store is a recognized federal heritage building and Billy Biggs' Blacksmith Shop is a component building of the Dawson Historical Complex National Historic Site.

The designation of the Canadian Bank of Commerce as a municipal historic site set an important precedent. The City of Dawson has been demonstrating its leadership role in heritage conservation in various ways. By purchasing the Canadian Bank of Commerce, restoring it, and designating this constituent building of the Dawson Historical Complex National Historic Site as a municipal historic site, the municipality recognized and validated the duality of the importance of Dawson's historic buildings on the national and the regional level.

Some of Parks Canada's buildings are currently not in optimal use, Harrington's Store, and Billy Biggs' Blacksmith Shop among them. The Klondike Adaptive Realty Project (KARP) is assessing adaptive reuse opportunities for several Parks Canada buildings in the Klondike. This project is about finding and implementing sustainable solutions to protect and use historic structures.

Five[1] heritage buildings in various condition, with different designations and potential for adaptive reuse, were selected and have gone through detailed condition and heritage analyses. Harrington's Store and Billy Biggs' Blacksmith Shop are excellent candidates for adaptive reuse, potentially by an alternate owner.

Municipal historic site designation provides a number of benefits, including but not limited to:

- Heritage protection if Parks Canada chooses to dispose of a property.
- Increased digital footprint for these buildings.
- Better opportunities to collaborate on Dawson's living history.

Based on our experience with the process and outcomes, Parks Canada may submit more buildings for designation as municipal historic sites.

---

[1] Post Office, Harrington's Store, Billy Biggs' Blacksmith Shop, KTMC, and Ruby's Place.

We are guided by community input in our strategic planning and decision making. The Klondike National Historic Site Advisory Committee meets biannually to discuss KARP and other management topics for Klondike National Historic Sites. The City of Dawson has had representation on the committee since the inaugural meeting in September 2018. We value the input representatives have provided and look forward to working together to protect and present these treasured places.

If you have any questions with regard to any of the initiatives detailed above, I'd be happy to engage further.

Sincerely,

Travis Weber
Site Superintendent
Klondike National Historic Sites
Yukon Field Unit
Parks Canada
Travis.weber@canada .ca | Phone 867-993-3326

Report to Council

[X] For Council Decision [ ] For Council Direction [ ] For Council Information

[ ] In Camera

SUBJECT:	**Zoning Bylaw Amendment Application #21-023 & ZBL Amendment No. 12**	
PREPARED BY:	Stephanie Pawluk, CDO	**ATTACHMENTS:** 1. Application and Supporting Documentation. 2. Zoning Bylaw Amendment No. 12.
DATE:	July 8, 2021	
RELEVANT BYLAWS / POLICY / LEGISLATION: Municipal Act Official Community Plan Zoning Bylaw		

RECOMMENDATION

It is respectfully recommended that Council give Second and Third Reading to Zoning Bylaw Amendment No. 12.

ISSUE

Tr'ondëk Hwëch'in has submitted a Zoning Bylaw Amendment application to rezone a section of Tr'ondëk Subdivision (TH C-4 B/D) from R1: Single Family / Duplex Residential to P1: Parks and Natural Space to build a new outdoor playground.

BACKGROUND SUMMARY

Following internal public consultation, the residents of the Tr'ondëk Subdivision have expressed a desire for a neighbourhood playground and area of greenspace. The Family Wellness Department have undertaken extensive community consultation with citizens over recent months (including residents of Tr'ondëk Subdivision) and results yielded an urgent need for more public recreational space. The reasons for this put forward are:

- The 37-household neighbourhood is currently without a public park. The closest public greenspace is 0.9km away, and the closest public playground is located 2.1km away;
- The neighbourhood is anticipated to double in size over the next 3 years to at least 78 households, with a projected population of 300;
- Covid-19 health restrictions have illustrated a need for more outdoor social spaces;
- The residents and TH community have stated a need for recreational space where the design is informed by TH values, customs, traditions, and emphasise intergenerational connection.

Along with the ZBL amendment application, Administration has also received a development permit for the new playground (21-022). Administration will only be able to approve the development permit if a zoning bylaw amendment is passed.

Department Heads have been requested to review this application. At the time of writing this report, only one Department has provided feedback. Parks and Recreation advised that they are supportive of a new park in this location but that the absence of a crosswalk on the Klondike Highway does pose a limit to pedestrian access from the north side of the Klondike Highway. As the Tr'ondëk Subdivision is located directly opposite the potential location of the new recreation centre, the absence of infrastructure to facilitate

safe crossing is something the City and Yukon Government Department of Highways and Infrastructure will need to consider in the future in order to improve connectivity between recreation spaces. Given that the intention of this park is primarily to serve the Tr'ondëk Subdivision neighborhood, this is not, however, a direct concern associated with this application.

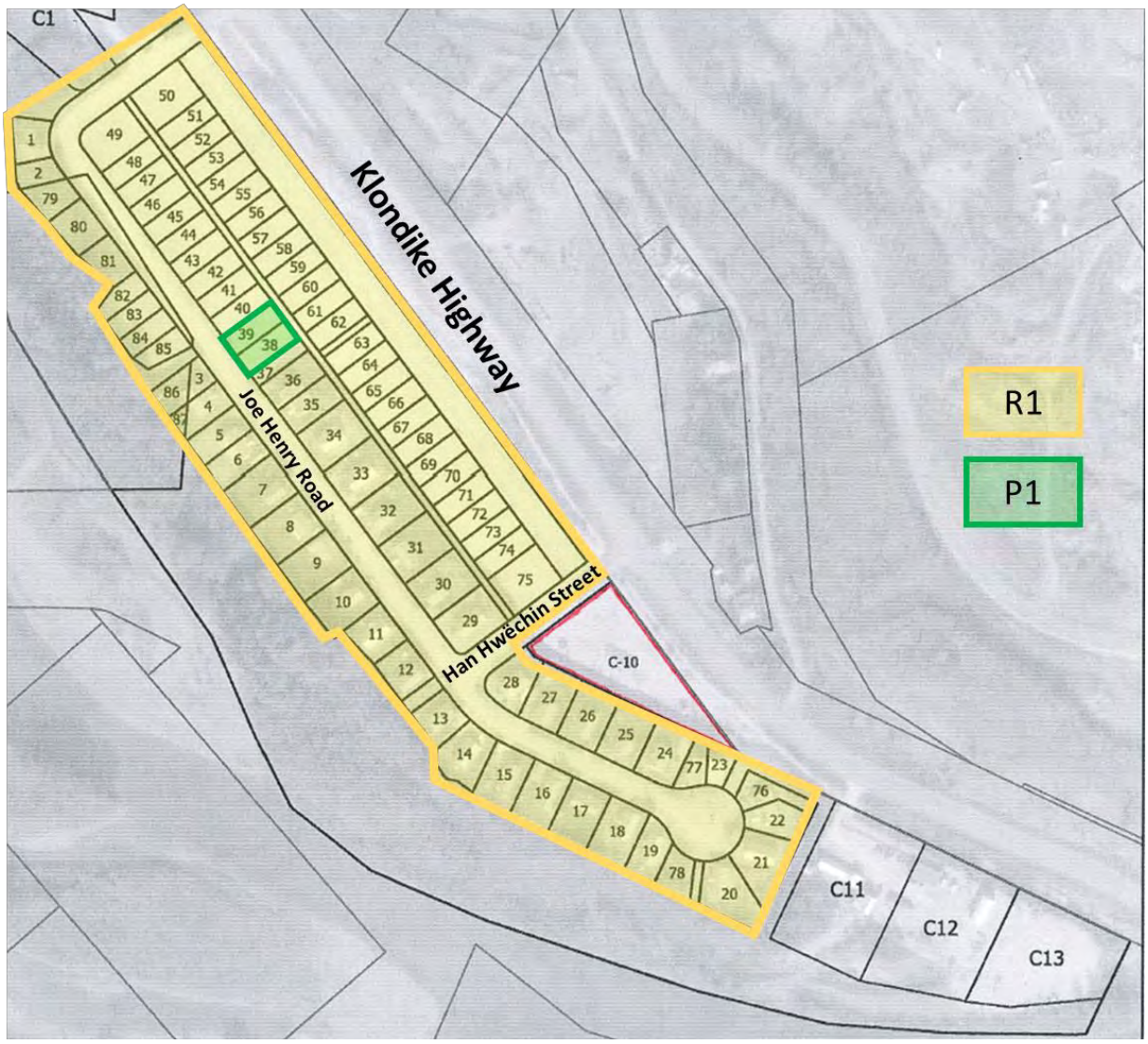


Figure 1: Proposed Location of New P1: Parks and Natural Space, highlighted in green

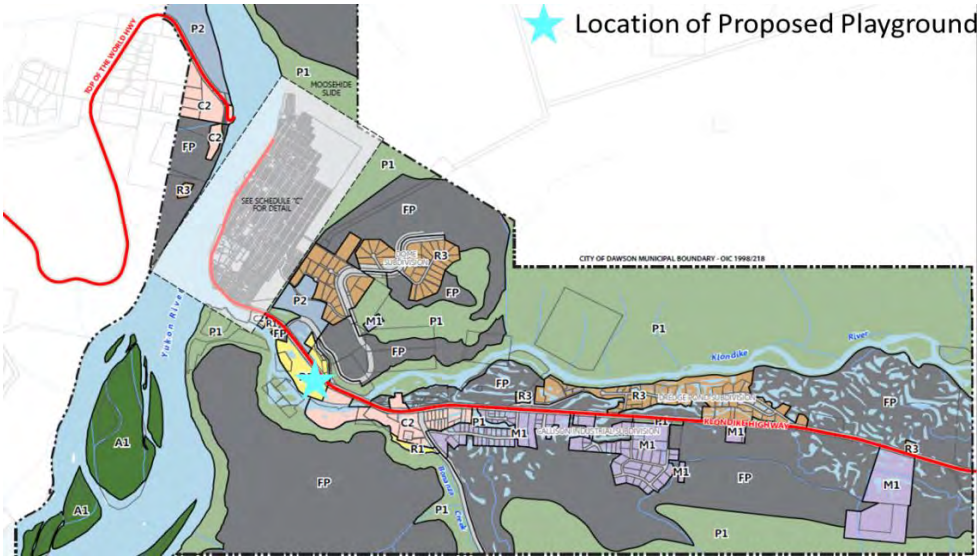


Figure 2: Zoning Bylaw 2018-19 Schedule B showing proposed location of new playground

ANALYSIS / DISCUSSION

Municipal Act

S. 289(2) of the Municipal Act states:

The council of a municipality shall not pass a zoning bylaw or any amendment thereto that does not conform to the provisions of an existing official community plan.

Therefore, this report will consider whether the proposed amendment is consistent with the Official Community Plan. Further, sections 294-296 (along with S. 17(5) of the Zoning Bylaw) outline the specific process required for public consultation with respect to a zoning bylaw amendment. Public notification has been given and a public hearing is scheduled for June 15, 2021.

Official Community Plan 2018-19

The current land use designation is Urban Residential, which is intended to support a broad range of uses, including those that support the cultural and community needs of residents and visitors. Further, s. 6.2 indicates that area characteristics of the Urban Residential may include small-scale open spaces which this zoning amendment would support. For these reasons, a new park and playground at this location is appropriate and compatible with the land use designations outlined in the Official Community Plan.

Section 5 of the OCP speaks to Tr'ondëk Hwëchin settlement lands and it is a long-term goal to collaborate with Tr'ondëk Hwëchin and address broad community land use and development issues. This new greenspace and playground will benefit both TH citizens and the wider Dawson City community.

Zoning Bylaw 2018-19

The current R1: Single Family / Duplex Residential zoning applies to all of Tr'ondëk Subdivision. A park is not a permitted use within this zone and a text amendment to add this has not been considered by administration as the purpose of the R1 zone is to permit single detached and duplex dwellings.

The purpose of P1: Parks and Natural Space zoning to provide parks and natural areas for outdoor enjoyment. Administration have completed a zoning bylaw assessment and the land that has been allocated for a new park meets the minimum parcel requirements for the P1 zone. Therefore, this proposed amendment is compatible with Zoning Bylaw 2018-19.

IMPLICATIONS

General: This zoning bylaw amendment will create much-needed outdoor recreational space in an area of Dawson that currently has limited access to existing facilities.

Financial: The applicant will be responsible for all associated fees and charges as well as ongoing maintenance and therefore there will be no financial ramifications to the City of Dawson.

APPROVAL		
NAME:	C. Bellmore	**SIGNATURE:** C Bellmore
DATE:	July 9, 2021	

THE CITY OF DAWSON

Zoning Bylaw Amendment No. 12 Bylaw

Bylaw No. 2021-09

WHEREAS section 265 of the Municipal Act, RSY 2002, c. 154, and amendments thereto, provides that a council may pass bylaws for municipal purposes.

WHEREAS section 288 of the Municipal Act, RSY 2002, c. 154, and amendments thereto, provides that a council, within two years after the adoption of an official community plan, or as soon as is practicable after the adoption of an amendment to an official community plan, a council must adopt a zoning bylaw.

WHEREAS section 288 of the Municipal Act, RSY 2002, c. 154, and amendments thereto, provides that no person shall carry out any development that is contrary to or at variance with a zoning bylaw.

THEREFORE, pursuant to the provisions of the *Municipal Act* of the Yukon, the council of the City of Dawson, in open meeting assembled, **ENACT AS FOLLOWS**:

PART I - INTERPRETATION

1.00 Short Title

1.01 This bylaw may be cited as the ***Zoning Bylaw Amendment No. 12 Bylaw***.

2.00 Purpose

2.01 The purpose of this bylaw is to provide for

(a) An amendment to the Zoning Bylaw from R1: Single Detached and Duplex Residential to P1: Parks and Natural Space.

CAO

Presiding Officer

Table of Contents

3.00 Definitions

3.01 In this Bylaw:

(a) Unless expressly provided for elsewhere within this bylaw the provisions of the *Interpretations Act,* RSY 2002, c. 125, shall apply;

(b) " Bylaw Enforcement Officer" means a person employed by the City of Dawson to enforce bylaws;

(c) “CAO” means the Chief Administrative Officer for the City of Dawson;

(d) “city” means the City of Dawson;

(e) “council” means the Council of the City of Dawson.

PART II – APPLICATION

4.00 Amendment

5.00 This bylaw amends a section of Tr’ondëk Subdivision (TH C-4 B/D) from R1: Single Detached and Duplex Residential to P1: Parks and Natural Space in the Zoning Bylaw Schedule B: Valley, Confluence, and Bowl, as shown in Appendix A of this bylaw.

PART III – FORCE AND EFFECT

6.00 Severability

6.01 If any section, subsection, sentence, clause or phrase of this bylaw is for any reason held to be invalid by the decision of a court of competent jurisdiction, the invalid portion shall be severed and the part that is invalid shall not affect the validity of the remainder unless the court makes an order to the contrary.

7.00 Enactment

7.01 This bylaw shall come into force on the day of the passing by Council of the third and final reading.

8.00 Bylaw Readings

Readings	Date of Reading
FIRST	**June 15, 2021**
PUBLIC HEARING	**June 15, 2021**
SECOND	
THIRD and FINAL	

Wayne Potoroka, Mayor
Presiding Officer

Cory Bellmore, CAO
Chief Administrative Officer

PART IV – APPENDIX (APPENDICES)

Appendix 1.

Figure 1. Location Map

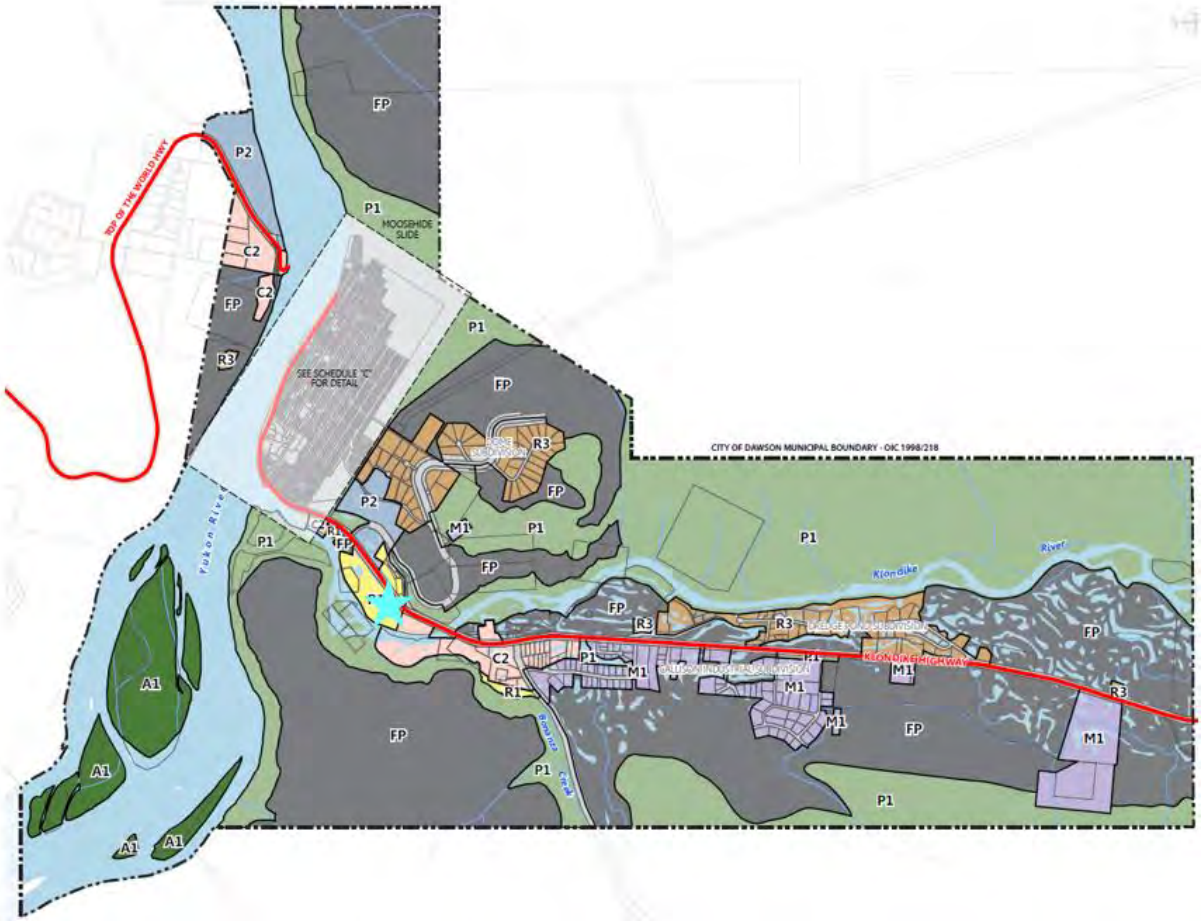
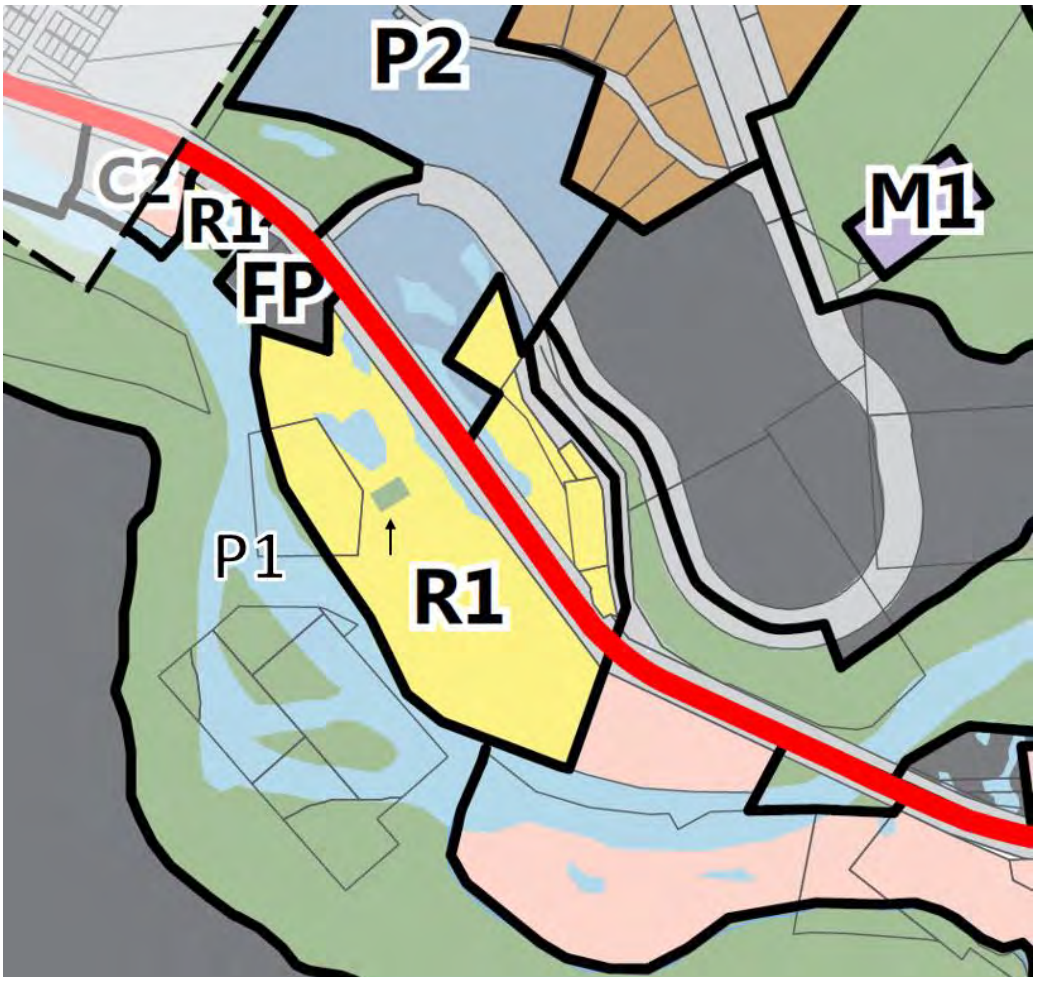


Figure 2. Amended area


P2
C2
R1
FP
M1
P1
R1

Report to Council

[X] For Council Decision [ ] For Council Direction [ ] For Council Information

[ ] In Camera

AGENDA ITEM:	**Official Community Plan and Zoning Bylaw Amendment #19-149 - Hawkes**	
PREPARED BY:	Cory Bellmore, CAO	**ATTACHMENTS:** - OCP amendment #2019-16 - ZBL amendment #2019-17 - Community Services Correspondence on the change in Bylaw
DATE:	July 2, 2021	
RELEVANT BYLAWS / POLICY / LEGISLATION: Municipal Act Zoning Bylaw OCP Placer Act		

RECOMMENDATION

That Council give Third and Final reading to:

- OCP amendment # 2019-16
- ZBL amendment #2019-17

ISSUE / PURPOSE

To finalize Third and final reading of Bylaws 2019-16 & 2019-17 which will allow for time limited zoning to facilitate the permitted use of resource extraction.

BACKGOUND SUMMARY

The application to amend a large portion of Future Planning and Parks and Natural Space designated lands to Mixed Use (OCP designation) and Industrial (Zoning Bylaw designation) to facilitate mineral development was received in October 2019. First Reading of the Bylaws passed December 4, 2019, and Second Reading passed July 7, 2020, as per Council resolutions C20-11-14 and C20-11-15:

C20-11-14 Moved by Mayor Potoroka, seconded by Councillor Kendrick that bylaw #2019-16 being the OCP amendment No. 3 Bylaw be given second reading subject to the following conditions:

- *Prior to Third Reading, the landowner submits a letter from the owner authorizing the applicant to apply for the OCPA and ZBA.*
- *Prior to Third Reading, the applicant and the City of Dawson enter into a legally binding agreement to relinquish access to claims currently located in a Future Planning zone after an agreed-upon amount of time.*

Motion Carried 4-1

C20-11-15 Moved by Mayor Potoroka, seconded by Councillor Kendrick that bylaw #2019-17 being the Zoning amendment No. 6 Bylaw be given second reading subject to the following conditions:

- *Prior to Third Reading, the landowner submits a letter from the owner authorizing the applicant to apply for the OCPA and ZBA.*
- *Prior to Third Reading, the applicant and the City of Dawson enter into a legally binding agreement to relinquish access to claims currently located in a Future Planning zone after an agreed-upon amount of time.*

Motion Carried 5-0

As per the second condition, Administration attempted to work with the applicant and the land owner (YG) but was unsuccessful in satisfying this condition.

In order to continue to move forward with this application, Administration moved forward with the option to pursue a time-limited zoning for this parcel of land to satisfy the goal of allowing the claim owner to exercise the rights of mineral extraction for a limited period of time and return the parcel to Future Development and Parks and Greenspace following the expiry of that period. For this application, the period of time explored aligned with the applicants approved water license expiry date of November 4, 2030.

In order to facilitate this change, Administration sought a Statutory Declaration from the Claim owners to ensure that there is currently no lawful non-conforming use of the Lands as well as the amendment to the OCP and ZBL would not create a situation of legally non-conforming use of the lands when the time limited M1 zoning reverts back to Future Planning and Parks and Natural Space.

Administration has now received this signed declaration from the Claim Owners.

ANALYSIS / DISCUSSION

In order to proceed with this direction Administration sought direction from Community Services regarding the amendment of the bylaw from 2nd reading – requiring the negotiation for a relinquishment of claims to 3rd reading for removal of this condition and changing the bylaw to a time limited option given that the OCP is a bylaw that requires Ministerial approval. Community Services responded positively that the nature of 3 readings of a bylaw is to allow for change (correspondence attached).

APPROVAL		
NAME:	Cory Bellmore, CAO	**SIGNATURE:** 
DATE:	July 2, 2021	

THE CITY OF DAWSON

Official Community Plan Amendment No. 3 Bylaw

Bylaw No. 2019-16

WHEREAS section 265 of the Municipal Act, RSY 2002, c. 154, and amendments thereto, provides that a council may pass bylaws for municipal purposes.

WHEREAS section 278 of the Municipal Act, RSY 2002, c. 154, and amendments thereto, provides that a council must, within three years of formation or alteration of municipal boundaries, adopt or amend by bylaw an official community plan.

WHEREAS section 285 of the Municipal Act, RSY 2002, c. 154, and amendments thereto, provides that an official community plan may be amended, so long as the amendment is made in accordance with the same procedure established for adoption of an official community plan.

THEREFORE, pursuant to the provisions of the *Municipal Act* of the Yukon, the council of the City of Dawson, in open meeting assembled, **ENACT AS FOLLOWS**:

PART I - INTERPRETATION

1.00 Short Title

This bylaw may be cited as the ***OCP Amendment No. 3 Bylaw***

2.00 Purpose

2.01 The purpose of this bylaw is to provide for

(a) A re-designation of lands from Parks and Greenspace and Future Planning to Mixed Use to accommodate a time limited re-zoning of lands from Parks and Greenspace and Future Planning to Industrial until November 4, 2030, after which they will automatically be re-designated Parks and Greenspace and Future Planning.

CAO

Presiding Officer

Table of Contents

3.00 Definitions

3.01 In this Bylaw:

(a) Unless expressly provided for elsewhere within this bylaw the provisions of the *Interpretations Act,* RSY 2002, c. 125, shall apply;

(b) “Amended Area” means the area shown in Appendix 1;

(c) "Bylaw Enforcement Officer" means a person employed by the City of Dawson to enforce bylaws;

(d) “CAO” means the Chief Administrative Officer for the City of Dawson;

(e) “City” means the City of Dawson;

(f) “Council” means the Council of the City of Dawson;

PART II – APPLICATION

4.00 Amendment

4.01 This bylaw re-designates a portion of the Amended Area from Future Planning to Mixed Use, as shown in Appendix 1.

4.02 This bylaw re-designates a portion of the Amended Area from Parks and Greenspace to Mixed Use, as shown in Appendix 1.

PART III – FORCE AND EFFECT

5.00 Severability

5.01 If any section, subsection, sentence, clause or phrase of this bylaw is for any reason held to be invalid by the decision of a court of competent jurisdiction, the invalid portion shall be severed and the part that is invalid shall not affect the validity of the remainder unless the court makes an order to the contrary.

6.00 Enactment

6.01 This bylaw shall come into force on the day of the passing by Council of the third and final reading.

7.00 Bylaw Readings

Readings	Date of Reading
FIRST	**December 4, 2019**
NOTICE TO MINISTER	**June 11, 2020**
PUBLIC HEARING	**July 7, 2020**
SECOND	**July 7, 2020**
MINISTERIAL APPROVAL	**July 29, 2020**
THIRD and FINAL	

Original signed by

Name of Presiding Officer, Title

Presiding Officer

Name of CAO (or designate), Title

Chief Administrative Officer

8.00 Appendices

Appendix 1. Amended Area

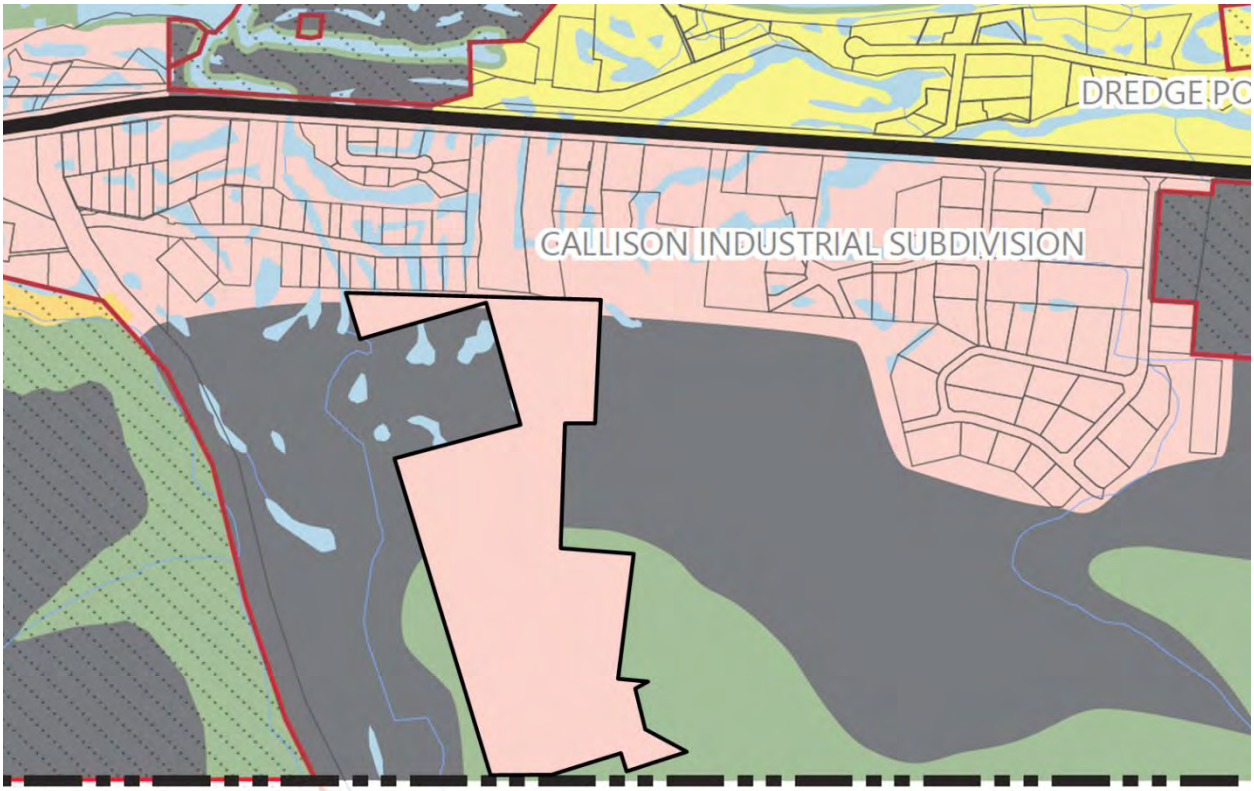


Figure 1: Map amendment.

P 00748	P 07992	P 08446	P 08981	P 10783
P 00749	P 07993	P 08861	P 10413	P 35904
P 00750	P 07994	P 08862	P 10414	P 35905
P 07901				

Table 1. The Grant Numbers the Amended Area consists of.

THE CITY OF DAWSON

Zoning Bylaw Amendment No. 6 Bylaw

Bylaw No. 2019-17

WHEREAS section 265 of the Municipal Act, RSY 2002, c. 154, and amendments thereto, provides that a council may pass bylaws for municipal purposes.

WHEREAS section 288 of the Municipal Act, RSY 2002, c. 154, and amendments thereto, provides that a council, within two years after the adoption of an official community plan, or as soon as is practicable after the adoption of an amendment to an official community plan, a council must adopt a zoning bylaw.

WHEREAS section 288 of the Municipal Act, RSY 2002, c. 154, and amendments thereto, provides that no person shall carry out any development that is contrary to or at variance with a zoning bylaw.

THEREFORE, pursuant to the provisions of the *Municipal Act* of the Yukon, the council of the City of Dawson, in open meeting assembled, **ENACT AS FOLLOWS**:

PART I - INTERPRETATION

1.00 Short Title

This bylaw may be cited as the ***Zoning Amendment No. 6 Bylaw***

2.00 Purpose

2.01 The purpose of this bylaw is to provide for

(a) A time limited re-zoning of lands from Parks and Greenspace and Future Planning to Industrial until November 4, 2030, after which they will automatically be rezoned Parks and Greenspace and Future Planning.

CAO

Presiding Officer

Table of Contents

3.00 Definitions

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(a) Unless expressly provided for elsewhere within this bylaw the provisions of the *Interpretation Act,* RSY 2002, c. 125, shall apply;

(b) “Amended Area” means the area shown in Appendix 1;

(c) "Bylaw Enforcement Officer" means a person employed by the City of Dawson to enforce bylaws;

(d) “CAO” means the Chief Administrative Officer for the City of Dawson;

(e) “City” means the City of Dawson;

(f) “Council” means the Council of the City of Dawson;

PART II – APPLICATION

4.00 Amendment

4.01 Section 14.2 is hereby amended by adding a new section 14.2.4 titled ‘Special Modifications’.

4.02 Section 14.2.4 is hereby amended by adding a new section as follows: a) Grant numbers: P 00748, P 00749, P 00750, P 07901, P 07992, P 07993, P 07994, P 08446, P 08861, P 08862, P 08981, P 10413, P 10414, P 10783, P 35904, P 35905 are temporarily zoned Industrial until November 4, 2030, as per Bylaw No. 2019-17.

4.03 The zoning maps attached to and forming part of Zoning Bylaw 2018-19 are hereby amended by changing the zoning of a portion of the Amended Area from Future Planning to Industrial, as shown in Appendix 1, until November 4, 2030.

4.04 The zoning maps attached to and forming part of Zoning Bylaw 2018-19 are hereby amended by changing the zoning of a portion of the Amended Area from Parks and Greenspace to Industrial, as shown in Appendix 1, until November 4, 2030.

PART III – FORCE AND EFFECT

5.00 Severability

5.01 If any section, subsection, sentence, clause or phrase of this bylaw is for any reason held to be invalid by the decision of a court of competent jurisdiction, the invalid portion shall be severed and the part that is invalid shall not affect the validity of the remainder unless the court makes an order to the contrary.

6.00 Enactment

6.01 This bylaw shall come into force on the day of the passing by Council of the third and final reading.

7.00 Bylaw Readings

Readings	Date of Reading
FIRST	**December 4, 2019**
PUBLIC HEARING	**July 7, 2020**
SECOND	**July 7, 2020**
THIRD and FINAL	

Original signed by

Name of Presiding Officer, Title

Presiding Officer

Name of CAO (or designate), Title

Chief Administrative Officer

8.00 Appendices

Appendix 1. Amended Area

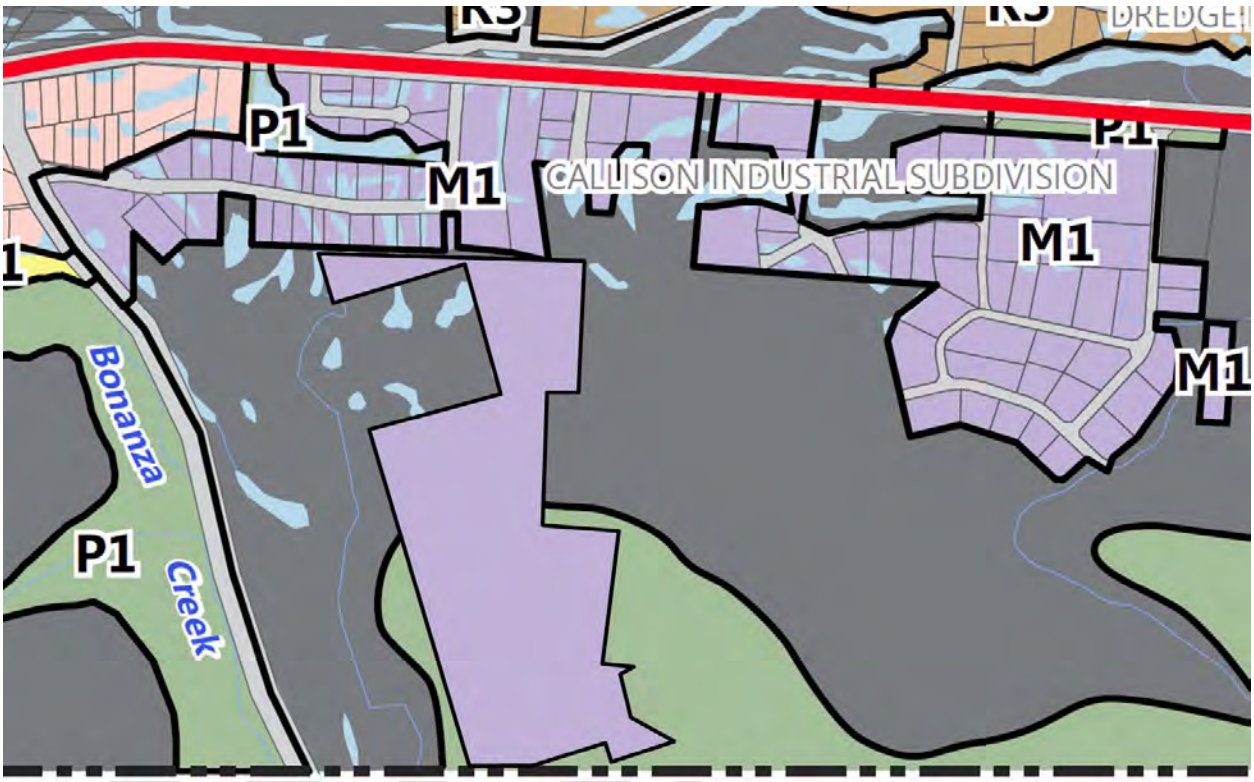

Figure 1. Map amendment.

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P 07901				

Table 1. The Grant Numbers the Amended Area consists of.

Report to Council

☐	For Council Decision	☒	For Council Direction
☐	For Council Information		

☐ In Camera

SUBJECT:	Little Blue Daycare Request for Block 20, Government Reserve	
PREPARED BY:	Stephanie Pawluk, CDO	**ATTACHMENTS:** 1. 2021 Land Sale Bylaw No. 1 2. Legal registered survey of Blocks 19, 20 & 21, Government Reserve 3. Research on history of Block 20, Government Reserve 4. July 9, 2021 applicant letter
DATE:	July 10, 2021	
RELEVANT BYLAWS / POLICY / LEGISLATION: 2018-03- Sale of Municipal Lands Policy #14-02- Procurement Policy		

RECOMMENDATION

It is respectfully recommended that Council postpone 1st reading of Bylaw 2021-11 Land Sale Bylaw No. 1 pending further research and collaboration with Tr'ondëk Hwëch'in.

ISSUE / BACKGROUND

The Little Blue Day Care has made a request for City-owned Block 20, Government Reserve, which is situated adjacent to the Little Blue Day Care on Block 19, Government Reserve. The impetus of this request is to facilitate the construction of a "new, bigger daycare".

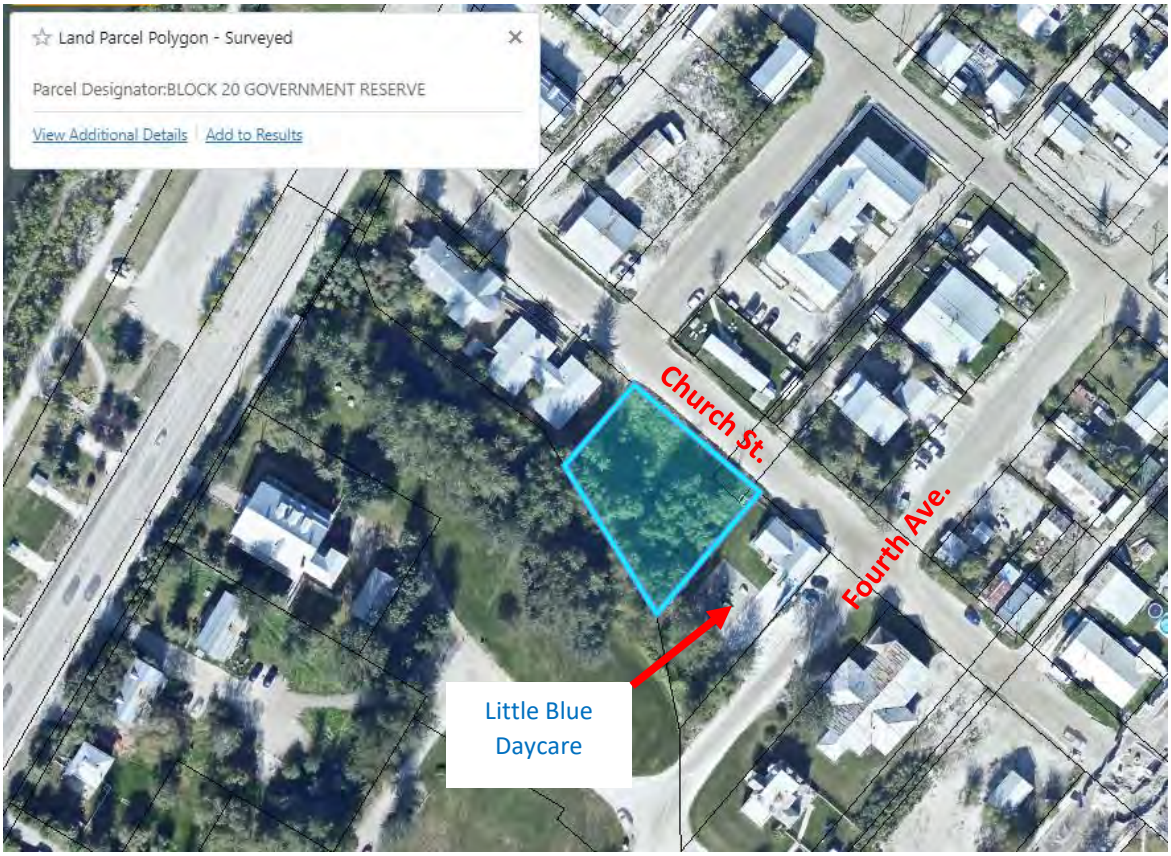


Figure 1: Block 20, Government Reserve

Block 20, Government Reserve is approximately 0.34 acres, which equates to over three times the size of a standard town lot. It is serviced and appears to currently be unused, aside from a trail that provides pedestrian access to the property to the south.

Figure 2: Context photo showing the Little Blue Daycare to the left and the Thrift Store to the right.

This request was initially discussed at June 8th, 2020 Committee of the Whole meeting CW21-14. Council directed Administration to draft a land sale bylaw and forward it to Council for consideration. Land disposition occurs through three readings of a land sale bylaw in accordance with the Municipal Act.

The following matters arose during this discussion:

- A discussion with Tr'ondëk Hwëtch'in is to be initiated regarding the history of this land in relation to the former existence of a residential day school or hostel and the future of the land and potential options for reconciliation efforts in relation to this site.
- Administration is to pursue research and present the process of land disposition that occurred with Tr'inke Zho.
- The desire to maintain the greenspace corridor beside the church, perhaps by way of an access easement, should a disposition occur.

ANALYSIS

History

The history of this land in relation to the former existence of a residential day school or hostel needs to be explored and understood prior to moving forward. The City needs to initiate a conversation with Tr'ondëk Hwëtch'in on the following matters:

- The location of the residential day school or hostel and whether it existed on or in proximity to Block 19 or 20.
- The possibility of Tr'ondëk Hwëtch'in choosing to pursue ground truthing investigations of this land.
- Whether Tr'ondëk Hwëtch'in has an interest in this site depending the outcome of research and investigations.
- The request associated with Tr'ondëk Hwëtch'in interests, generally.

In the spirit of reconciliation, in partnership with Tr'ondëk Hwëtch'in, Council should carefully consider the history of this land in deciding the future of it.

Sale of Municipal Lands Policy #2018-03

As with all land dispositions, this request is subject to the Sale of Municipal Lands Policy #2018-03. As per s. 4 of the Policy, this application is currently being circulated to all department heads for review and comment to determine whether the land could be considered surplus. No comments or concerns have been raised by departments at the time of the writing of this report.

S. 4. F) states that "*unserviced* full lots may be released for disposition in the sole discretion of Council." The requested full lot exists in the townsite and has services to it.

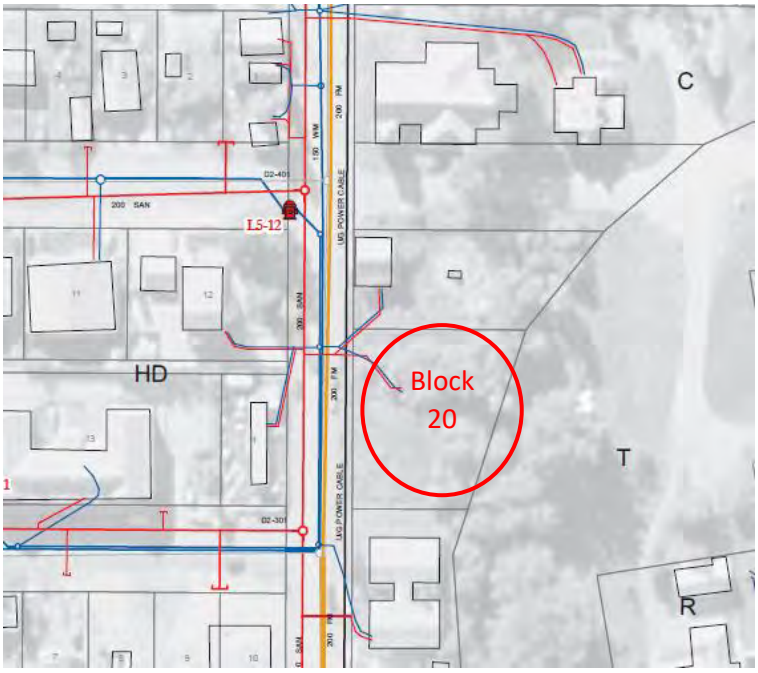


Figure 3: City Water & Sewer Infrastructure map showing services to Block 20.

The proponent has requested the purchase of a full lot; as such, section 6 of the Policy applies. S. 6. B) states:

> *"Full lots deemed surplus shall be sold at a value per square foot that is equivalent to the average assessed value per square foot of each adjacent property, based on the current Assessment Roll in effect, to a minimum of $1.00 per square foot."*

S. 6. A) states:

> *"Full lots… shall only be sold under an Agreement for Sale that ensures development of the lot within a specified period of time with a permitted use for that zone as per the Zoning Bylaw".*

As such, this disposition would have to involve an agreement for sale and specific development and operating plans would have to be provided by the applicant. The City has not received specifics regarding the proposed development to date. The proposed use (childcare facility) is an allowable use in the P2 zone.

S. 6. C) states:

> *"a full lot that is determined through a municipal planning exercise to have no developable value to the City may be disposed of for $1.00 per square foot, at the sole discretion of Council. This may require a condition in the Agreement for Sale that the purchaser acknowledge and accept liability for the reason that the lot was determined to have no developable value."*

The Yukon Government, in tandem with CoD Administration, has recently produced a vacant lands inventory and analysis in Dawson City. As part of this work, publicly owned vacant lots have undergone slope analysis to determine potential developability. This property was identified as potentially suitable land for development. Thus, this lot cannot be deemed to have no developable value to the City and market value applies.

Zoning

This lot is zoned Public and Institutional (P2 zone). A childcare centre is an allowable use in this zone.

Official Community Plan

The OCP outlines a series of Guiding Principles in S. 3.0 that are intended to provide a framework for the realization of the OCP's vision, goals, and policies in decision making, including the following:

- Work Together
  - Collaborate with Tr'ondëk Hwëch'in
  - Create and maintain partnerships
  - Engage residents
  - Use open and transparent decision-making processes
- Grow Responsibly
  - Maintain a sufficient land supply for future development
  - Use comprehensive development practices

S. 6.0: Land Use Concept identifies the following applicable goals:

- Strive to use a highest and best use approach.
- Promote appropriate development of the Historic Townsite.
- Protect environmentally sensitive areas, including those surrounding water courses.

CONCLUSION

Given the history associated with this land as discussed above, as well as the high value of this large, ~0.34 acre, serviceable lot in the townsite, Council must consider the highest and most appropriate use of the land in considering disposition, as directed by the Sale of Municipal Lands Policy.

Council should also carefully consider what municipal support for the varied operational models currently in practice for childcare in the municipality should consider for future potential support. Given that there is outstanding information that is critical to a decision, Administration recommends postponing this land sale bylaw until the necessary conversations are had and more information is available.

OPTIONS

1. **Postpone 1st reading of Bylaw 2021-11 Land Sale Bylaw No. 1 pending further research and collaboration with Tr'ondëk Hwëch'in.**

2. **Proceed with 1st reading of Bylaw 2021-11 Land Sale Bylaw No. 1 and direct administration to receive specific development and operating plans from the applicant.**

APPROVAL		
NAME:	Cory Bellmore, CAO	**SIGNATURE:** C Bellmore
DATE:	July 10, 2021	

THE CITY OF DAWSON

2021 Land Sale No. 1 Bylaw

Bylaw No. 2021-11

WHEREAS section 265 of the *Municipal Act*, RSY, 2002, c. 154, and amendments thereto, provides that a council may pass bylaws for municipal purposes; and

WHEREAS the City of Dawson is the owner of property described as Block 20, Government Reserve, Plan 70080 in the City of Dawson, which property is not needed by the City of Dawson and is not reserved; and

WHEREAS the City of Dawson is desirous of reaching an agreement with the purchaser to sell this parcel to them;

THEREFORE, pursuant to the provisions of the *Municipal Act* of the Yukon, the council of the City of Dawson, in open meeting assembled, **ENACT AS FOLLOWS**:

PART I - INTERPRETATION

1.00 Short Title

1.01 This bylaw may be cited as the **2021 *Land Sale No. 1. Bylaw***

2.00 Purpose

2.01 The purpose of this bylaw is to provide for

(a) the sale of City of Dawson land described as Block 20, Government Reserve.

PART II – APPLICATION

3.00 Transfer

3.01 The Chief Administrative Officer is hereby authorized on behalf of the City of Dawson to enter into an agreement for sale for the disposal of Block 20, Government Reserve.

3.02 The conditions of sale are as follows:

(a) The purchaser shall enter into an agreement for sale with the City of Dawson outlining the responsibilities of each party.
(b) Purchase price will be a value per square foot that is equivalent to the average assessed value per square foot of each adjacent property, based on the current Assessment Roll in effect, to a minimum of $1.00 per square foot, as per the Sale of Municipal Land Policy.

CAO

Presiding Officer

(c) Block 20, Government Reserve is to be consolidated with the adjacent Block 19, Government Reserve.

PART III – FORCE AND EFFECT

4.00 Severability

4.01 If any section, subsection, sentence, clause or phrase of this bylaw is for any reason held to be invalid by the decision of a court of competent jurisdiction, the invalid portion shall be severed and the part that is invalid shall not affect the validity of the remainder unless the court makes an order to the contrary.

5.00 Enactment

5.01 This bylaw shall come into force on the day of the passing by council of the third and final reading.

6.00 Bylaw Readings

Readings	Date of Reading
FIRST	
SECOND	
THIRD and FINAL	

Presiding Officer

Chief Administrative Officer

CANADA LANDS SURVEYS RECORDS
7 0 0 8 0
JANUARY 27 1986

PLAN AND FIELD NOTES
OF SURVEY OF

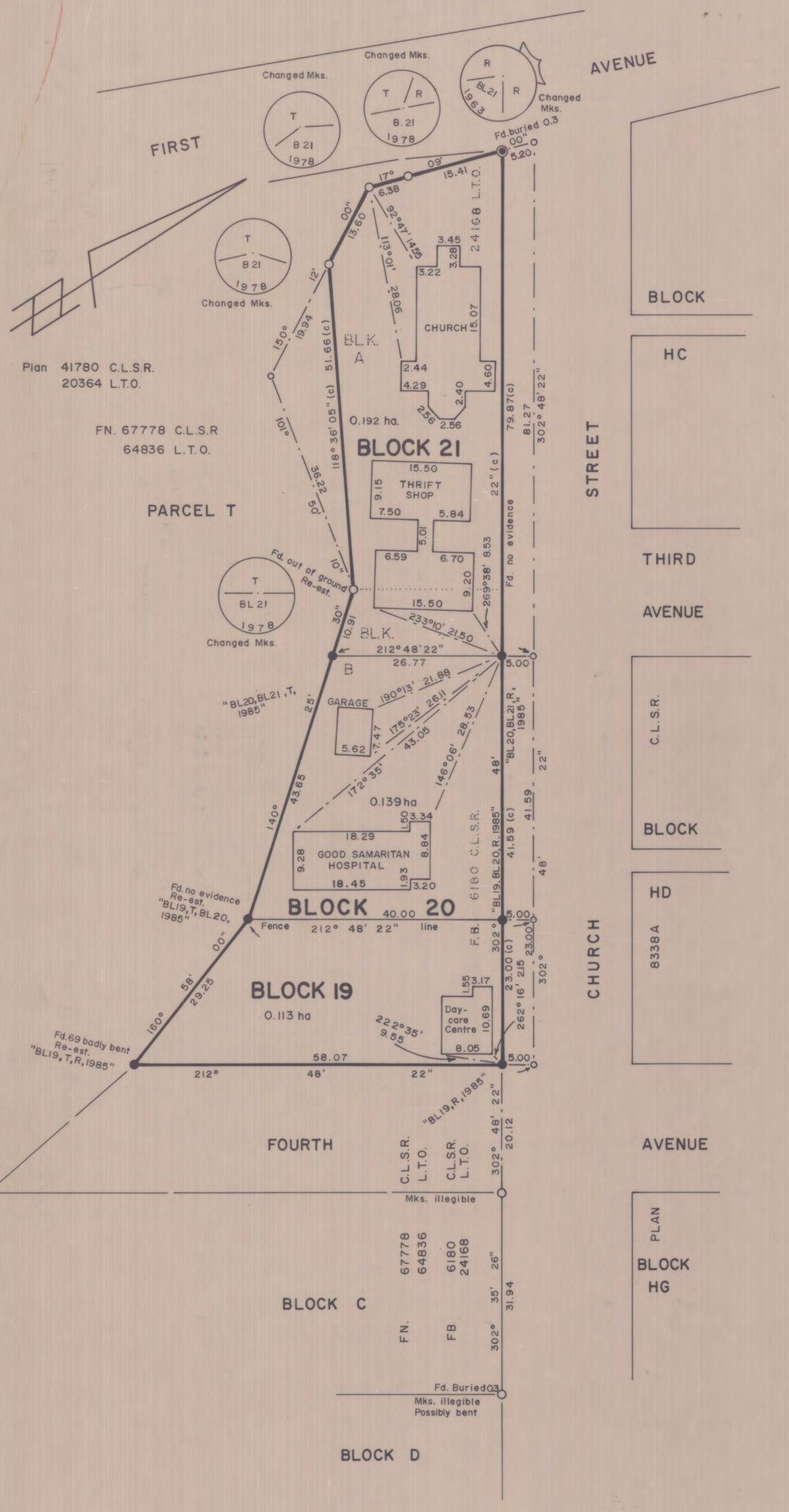
BLOCKS 19, 20 and 21

COMPRISING FORMER BLOCKS A and B, FIELD NOTES 6180 C.L.S.R., 24168 L.T.O.

GOVERNMENT RESERVE
DAWSON CITY
YUKON TERRITORY.

SCALE 1:500 — 10 5 0 10 20 30 40 50 metres

THIS SURVEY WAS EXECUTED DURING THE PERIOD SEPTEMBER 19 TO OCTOBER 24, 1985, BY GABRIEL AUCOIN, C.L.S.



LEGEND

Bearings are astronomic derived from the bearing 302°48'22" for the line between found P at the N.W. corner of Block A and found 69 at the N.W. corner of Block C, as shown on Field Notes 67778 C.L.S.R., 64836 L.T.O.; and according to those F.N. are referred to the meridian of Longitude 141° W.

C.L.S. Standard Posts found ◉
C.L.S. 69 Posts found ○
C.L.S. 77 Posts placed ●
Traverse lines and stations o— · —o
Lands dealt with bounded thus ———

I, Gabriel Aucoin, Canada Lands Surveyor, do solemnly declare that this plan accurately shows the manner in which the land included therein has been surveyed and subdivided by me, and that the said plan is prepared in accordance with the provisions of the Land Titles Act.

Dated at Whitehorse, Y.T.
this 8 day of November, 1985

Signed in the presence of Denise

Gabriel Aucoin
Gabriel Aucoin, C.L.S.

I, Denise Garvice, of the City of Whitehorse, in the Yukon Territory make oath and say:

1. I was personally present and did see Gabriel Aucoin named in the within instrument, who is personally known to me to be the person named therein, duly sign and execute the same for the purposes named therein;
2. That the same was executed at the City of Whitehorse, in the Yukon Territory, and that I am the subscribing witness thereto;
3. That I, Denise Garvice, know the said Gabriel Aucoin and he is in my belief of the full age of twenty-one years.

Denise
Witness

Sworn before me at Whitehorse, Y.T.
this 8 day of November, 1985

Bernice Irving
A Notary Public in and for the Yukon Territory.

APPROVED:

For. D.K. Lam
Commissioner of the Yukon Territory.

Jan 13, 86
Date

OWNER: BLOCK A, C.O.T. 47R ; BLOCK B, C.O.T. 234W

Ronald C. Ferris
The Diocese of Yukon

December 4, 1985
Date

Registered this 21 January 1986
at 10:00 o'clock A.M.
under No. 77548 C/T No. 47R 234W
K. Amaro by REGISTRAR

Energy, Mines and Resources Canada
Whitehorse, Y.T., January 7, 1986
J.C. Mitchell
Regional Surveyor

NORTH WEST SURVEY GROUP
WHITEHORSE, YUKON.

Koll 3082

2082-85

Examined: G. Racine
X-LTA-85 85-12-31

C-1248 08007

Lot 20, Government Reserve Addition Research

2011

- Resolution# C11-27-18: issue a Request for Expressions of Interest (RFEI)

2012

- Meeting C12-07: Low Impact Development (LID) discuss RFEI (proposed residential project)
- Resolution# C12-07-06: Council approves LID's residential project
- Meeting C12-10: Little Blue Daycare wanted lot to remain as Parks & Greenspace
- Meeting C12-16: area residents (Chris Ball) want lot to remain as greenspace
- Official Community Plan Bylaw #12-23: Lot beside Daycare (block 20) was proposed to be for residential (LID). Prior to third and final reading delegation from Little Blue Daycare (including the children) requested council designate the lot as park. Third and final reading of bylaw designated the lot as Park.

2013

- Meeting C13-11: was noted that LID project was terminated due to public input. Correspondence from Chris Ball RE: didn't want the lot to be developed or sold

2015

- August 18, 2015 COW Meeting: Little Blue Daycare requested lot exchange beside daycare to allow for their plans (August 2015 see attached).
- Submissions were also made at the December 8th, 2015 Public Hearing. (one submission attached for info)
- OCP bylaw amended (bylaw #15-12) to change land designation of this lot to Institutional.

2016

- Zoning Bylaw amended (bylaw #16-08) to change zoning to institutional. Third and final reading August 16, 2016.

2018

- New OCP and Zoning Bylaws. Lot is designated as P2 Zone – Public and Institutional Zone. Childcare centre is an allowable use.

2021

- Little Blue Daycare requests lot for expansion of Daycare.

  Proposal (possibly one or all of these ideas will be done):

  1) With the current plans for the build they would have 30% of the property dedicated to green space. They would clear up the area and maintain a "greenbelt area". This allows for a maintained corridor between Church St and the park behind.
  2) Erect a monument dedicated to the previous use of the lot as a residential day school. They would work with the local First Nation Government to ensure it was done appropriately and respectfully.
  3) The playground they create would be accessible to the community allowing for age-appropriate outdoor space.

- They would like to build a new building on the proposed lot as well as updating the original building for an after school/summer camp

DAWSON SOCIETY FOR CHILDREN AND FAMILIES

July 9, 2021

Dear Wayne, Cory and Liz,

I am reaching out regarding the resolution to move forward with the lot beside the Daycare on Church Street for use of the land for Little Blue to build and expand. I am requesting a written letter from the City indicating this resolution.

I am in talks with a number of Ministers in YG regarding funding the build of a new bigger Daycare. Having the letter of resolution from the City will move our process forward at a much quicker rate.

Our first step is hiring a project manager for an updated situation report and gathering of the many stakeholders to plan the process.

Thank you,

Sue Lancaster

Director, Little Blue

Little Blue Learning Centre, 98 Church St. PO Box 34, Dawson City, YT Y0B1G0, TEL/FAX 867-993-5167
littlebluelearningcentre@gmail.com Dawson Daycare

Report to Council

[X] For Council Decision [ ] For Council Direction [ ] For Council Information

[ ] In Camera

SUBJECT:	**Council Remuneration Bylaw Review**	
PREPARED BY:	Cory Bellmore, CAO	**ATTACHMENTS:** • Council Remuneration in other communities • Council Remuneration Bylaw #2018-10 • Travel Policy #08-01
DATE:	May 5, 2021	
RELEVANT BYLAWS / POLICY / LEGISLATION: • Council Remuneration Bylaw #2018-10 • Travel Policy #08-01		

RECOMMENDATION

That Council give 1st reading to Bylaw 2021-10 Council remuneration Bylaw.

ISSUE

As per Bylaw #2018-10, during the final year of Council's term, Council shall schedule a review of the bylaw and proceed to amend it as deemed advisable at the time.

BACKGROUND SUMMARY

The City of Dawson has a history of revising the remuneration bylaw every three years prior to a municipal election. As Council reviews the bylaw, it is reasonable for Council to consider the cost to the City, the ability to attract elected officials to run for office, and the changing taxation environment.

ANALYSIS / DISCUSSION

For 2019 and later tax years, non-accountable allowances paid to elected officers will be included in their income. This change was stated in the 2017 federal budget, which received royal assent on June 22, 2017 (Bill C 44).

The cost to the City is an important and necessary cost of ensuring good government and perceived as good value for taxpayers' dollars. Cost of living increases are included in the current bylaw, the time commitment involved in being a Councillor has increased over time and with increased funding and regulatory changes federally, territorially, and municipally, it isn't likely that the time commitment will be reduced.

AYC collected information on current Council Remuneration amounts in other Yukon communities. See attached information for details on the different community remuneration for salary/per diems and other extras.

The City of Dawson remuneration for elected officials sits about average to the other 6 rural municipalities in the Yukon, being the 2nd highest overall.

The City of Dawson is the second largest municipality in the Yukon, Whitehorse being the largest. The City has taken on a more proactive role in managing the community than most other small rural municipalities and often has complex files not seen in other communities. For example, subdivision approval and mining in municipal

boundaries are complex issues left to YG to manage in all other communities besides Whitehorse and Dawson.

In researching of the number of meetings (regular, committee & special) from 2019 – 2021(so far) in 5 rural municipalities, the City of Dawson elected officials have scheduled and special meetings approximately 20-46% more than the other communities.

Administration recommends the following increase to the Council Remuneration in bylaw 2021-10

	Current Renumeration	Renumeration for 2010-10	% increase
Mayor	15909.76	17500.74	10%
Council	10606.60	11667.26	10%

This increase more accurately reflects the time and commitment involved in an elected official position for the City of Dawson and is comparable to other Yukon municipalities.

APPROVAL		
NAME:	Cory Bellmore, CAO	**SIGNATURE:** 
DATE:	May 7, 2021	

Mayor and Councillor Renumeration 2021 Review

Village of Carmacks	$12,600.00	Mayor - annually
	$6,600.00	Deputy Mayor - annually
	$6,600.00	Councillors - annually
		By resolution may approve payment of travel, meals, accommodation & per diem (at YG rates)
	$100.00	Mayor - per diem, meetings 3 hours or less
	$75.00	Councillors - per diem, meetings 3 hours or less
	$200.00	Mayor - per diem, meetings 3+ hours
	$150.00	Councillors - per diem, meetings 3+ hours
	$200.00	Mayor & Councillors - per diem, meetings in other communities
	$100.00	Mayor & Councillors, per travel day separate from meeting days, 250km or less, within Yukon
	$200.00	Mayor & Councillors, per travel day separate from meeting days, 250km or greater, within Yukon
	$200.00	Mayor & Councillors, per travle day separate from meeting days, outside Yukon
	$600.00	Mayor - annually, meetings with visitors to the community, to be reimbursed upon presentation of receipts
	$25.00	Deputy Mayor - per diem if the mayor is absent and the DM is required to perform Mayor duties
	$50.00	Deputy Mayor - per diem to chair a regular or special meeting of council if the Mayor is absent from the meeting
City of Dawson	$15,215.66	Mayor - annually
	$10,143.97	Councillors - annually
		Adjusted annually from CPI, not to exceed 2.5% in any given year and no adjustment if the CPI is negative
	$150.00	Councillors - per diem, 4 hrs or less when at any training session, event or meeting that has been approved by council
	$200.00	Councillors - per diem, more than 4 hours
		Travel expenses reimbursed in accordance with the City of Dawson Travel Policy
Town of Faro	$1,490.00	Mayor - monthly ($17,880 annually)
	$886.00	Councillors - monthly ($10,632 annually)
		Adjusted annually based on the CPI
Village of Haines Junction	$14,666.00	Mayor - annually
	$11,733.00	Councillors - annually
		Adjusted annually based on CPI
		Travel reimbursed on the same basis as YG empolyees on travel status
Village of Mayo	$200.00	Mayor - attendance at regular and joint council meetings
	$150.00	Councillors - attendance at regular and joint council meetings
	$150.00	Mayor - attendance at non-council meetings inside community less than 2 hours
	$100.00	Councillors - attendance at non-council meetings inside the community less than 2 hours
	$200.00	Mayor - attendance at non-council meetings inside community more than 2 hours
	$150.00	Councillors - attendance at non-council meetings inside community more than 2 hours
	$250.00	Mayor - full day meeting
	$200.00	Councillors - full day meeting
	$250.00	Mayor - attendance at meeting outside community, per day
	$200.00	Councillors - attendance at meeting outside community, per day
	$40.00	Mayor and Councillors - hourly rate for hours spent travelling to and from meetings outside the community within Yukon
		For travel to meetings outside Yukon the daily rate will apply (Mayor and Councillors)
		Travel expenses paid out per Village of Mayo travel expense policy
Village of Teslin	$8,000.00	Mayor - annually. $3,750 base and additional $125 per regular or special meeting of Council attended
	$7,300.00	Councillors - annually. $3,000 base and additional $125 per regular or special meeting of Council attended
	$200.00	per day to attend meetings or performing duties in capacity of M&C outside of regular or special meetings of council
	$150.00	half day, as immediately above
		M&C shall receive an honourarium when appointed as members of committees
		over and above their council indemnity (amount not specified)
Town of Watson Lake	$10,000.00	Mayor - annually
	$7,500.00	Councillors - annually
	$125.00	M&C - per diem - out of town meetings, courses and conventions as required in the discharge of the duties of their office
		Travel expenses reimbursed as set out in the travel expense policy
City of Whitehorse	$104,552.00	Mayor - annually
	$37,639.02	Councillors - annually
		Adjusted annually based on CPI
		Mayor - benefit plan including health, dental, life insurance, AD&D, WI/LTD, time off with pay, EAP
		Councillors - benefit plan, same as Mayor, except for time off with pay, and additional child care allowance (for care during meetings)
	$10,500.00	Mayor - annual, to reimburse for expenses incurred while performing duties
	$3,750.00	Councillors - annual, to reimburse for expenses incurred while perfroming duties
	$6,000.00	Councillors - for expenses incurred when an invitation or obligation of the entire council is delegated to one or more
		This $6,000 is collective, not $6,000 for each councillor.
		Travel expenses in accordance with the Travel Expense Administrative Directive.
	$100.00	Councillors - daily, when representing City at a function or event, attending non-regular meetings, or participating in training related to City business, 1-4 hours
	$150.00	Councillors, as above, 4 hours or more
		Reimbursement for travel/meeting a representative on the AYC board

Please note: this is for the 2021-2024 term

THE CITY OF DAWSON

Council Remuneration Bylaw

Bylaw No. 2021-10

WHEREAS section 173 of the *Municipal Act*, RSY 2002, c. 154, and amendments thereto, provides that council may, by bylaw, establish the amount and any criteria in relation to the remuneration of a member of council (including the type of or rate or conditions for remuneration) in relation to

(a) attendance at a council meeting or a council committee meeting;

(b) expenses incurred in the course of attending a council meeting or a council committee meeting; or

(c) any other expenses incurred in the course of performing any duty required to be performed by a member of council.

THEREFORE, pursuant to the provisions of the *Municipal Act* of the Yukon, the council of the City of Dawson, in open meeting assembled, **ENACT AS FOLLOWS**:

PART I - INTERPRETATION

1.00 Short Title

1.01 This bylaw may be cited as the ***Council Remuneration Bylaw***.

2.00 Purpose

2.01 The purpose of this bylaw is to provide for remuneration to be paid to the Mayor and Councillors.

3.00 Definitions

3.01 In this Bylaw:

(a) Unless expressly provided for elsewhere within this bylaw the provisions of the *Interpretations Act (RSY 2002, c. 125)* shall apply;

(b) “city” means the City of Dawson;

(c) “council” means the council of the City of Dawson.

CAO _____ Presiding Officer _____

PART II – APPLICATION

4.00 Annual Remuneration

4.01 The base annual remuneration for the Mayor for the 2021—2024 term of office shall be $17,500.74 effective from November 1st, 2021 to October 31, 2024.

4.02 The base annual remuneration for each Councillor during the 2021—2024 term of office shall be $11,667.26 effective from November 1st, 2021 to October 31st, 2024.

4.03 (a) on an annual basis, the base annual remuneration shall be adjusted by applying a factor equal to the change in Consumer Price Index (Nov.- Nov.) calculated by Statistics Canada for Whitehorse, subject to the following:

I. annual increase shall not exceed 2.5% in any given year; and

II. where the Consumer Price Index indicates a negative adjustment, no adjustment shall be applied.

(b) the adjusted base annual remuneration shall become effective on January 1st of the following calendar year.

4.04 Annual remuneration shall be paid bi-weekly and, where a member of council fails for any reason to serve in the respective office for a full twelve months, the remuneration shall be prorated on a bi-weekly basis for the period served.

5.00 Remuneration Review

5.01 During the final year of council's term of Office, council shall schedule a review of the *Council Remuneration Bylaw* and proceed to amend it as deemed advisable at that time.

6.00 Additional Payments

6.01 In addition to the annual remuneration provided pursuant to this bylaw, a member of council may be paid a per diem for each day the member of council is engaged in representing the City at any training session, event or meeting where such representation has been approved in advance by council resolution. The per diem shall be prorated as follows:

Representation	Entitlement	Amount
More than 4 hours	Full-Day	$200.00
4 hours or less	½ Day	$150.00

6.02 The per diem provided pursuant to this bylaw shall be paid with respect to such day or days on which a member of council:

(a) represents the City at an approved training session, event or meeting; or

(b) is required to be absent from the municipality for four or more hours for the purpose of travelling to and from an approved training session, event or meeting.

7.00 Expenses

7.01 Prior approval of council is required for funding or reimbursement of expenses incurred in conjunction with the travel of any member of council outside the City of Dawson.

7.02 Members of council shall be reimbursed for travel expenses in accordance with the *City of Dawson Travel Policy*.

PART III – FORCE AND EFFECT

8.00 Severability

8.01 If any section, subsection, sentence, clause or phrase of this bylaw is for any reason held to be invalid by the decision of a court of competent jurisdiction, the invalid portion shall be severed and the part that is invalid shall not affect the validity of the remainder unless the court makes an order to the contrary.

9.00 Bylaw Repealed

9.01 Bylaw 2018-10, and amendments thereto, are hereby repealed.

10.00 Enactment

10.01 This bylaw shall come into force on the day of the passing by council of the third and final reading.

CAO

Presiding Officer

11.00 Bylaw Readings

Readings	Date of Reading
FIRST	
SECOND	
THIRD and FINAL	

Wayne Potoroka, Mayor
Presiding Officer

Cory Bellmore, CAO
Chief Administrative Officer