APPENDIX G – REFERENCE REPORTS

Please refer to the following Reference Documents, which are attached to this Appendix G.

Description
Existing Drawings and Photos of the Building
Building Condition Assessment Report for Cochrane Powerhouse – September 19, 2022 – Prepared by Roth IAMS
Study and Findings for the Cochrane Powerhouse – Prepared by G. Architects Inc. March 25, 2026

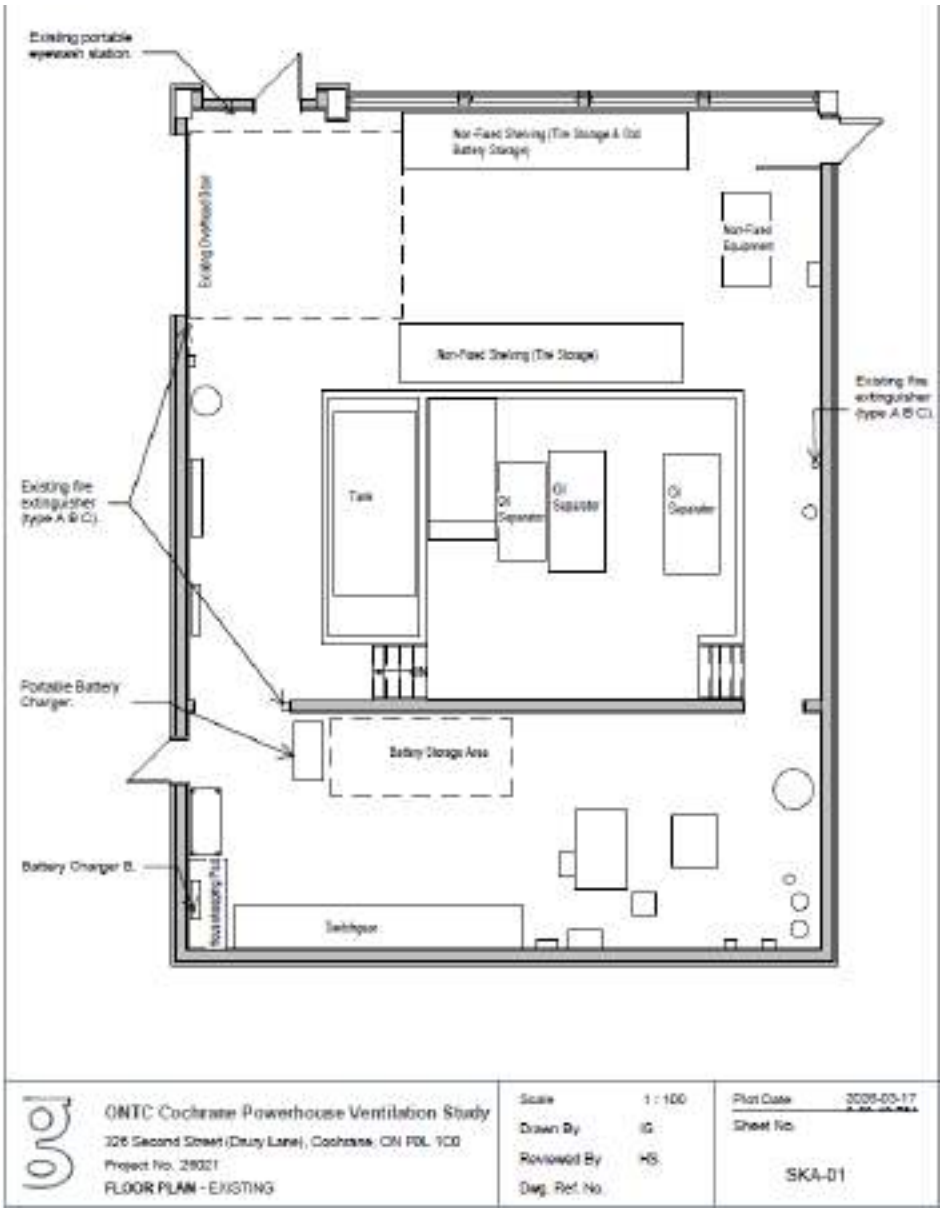


Figure 1: Existing Floor Plan created by G Architects as part of the Cochrane Powerhouse Study

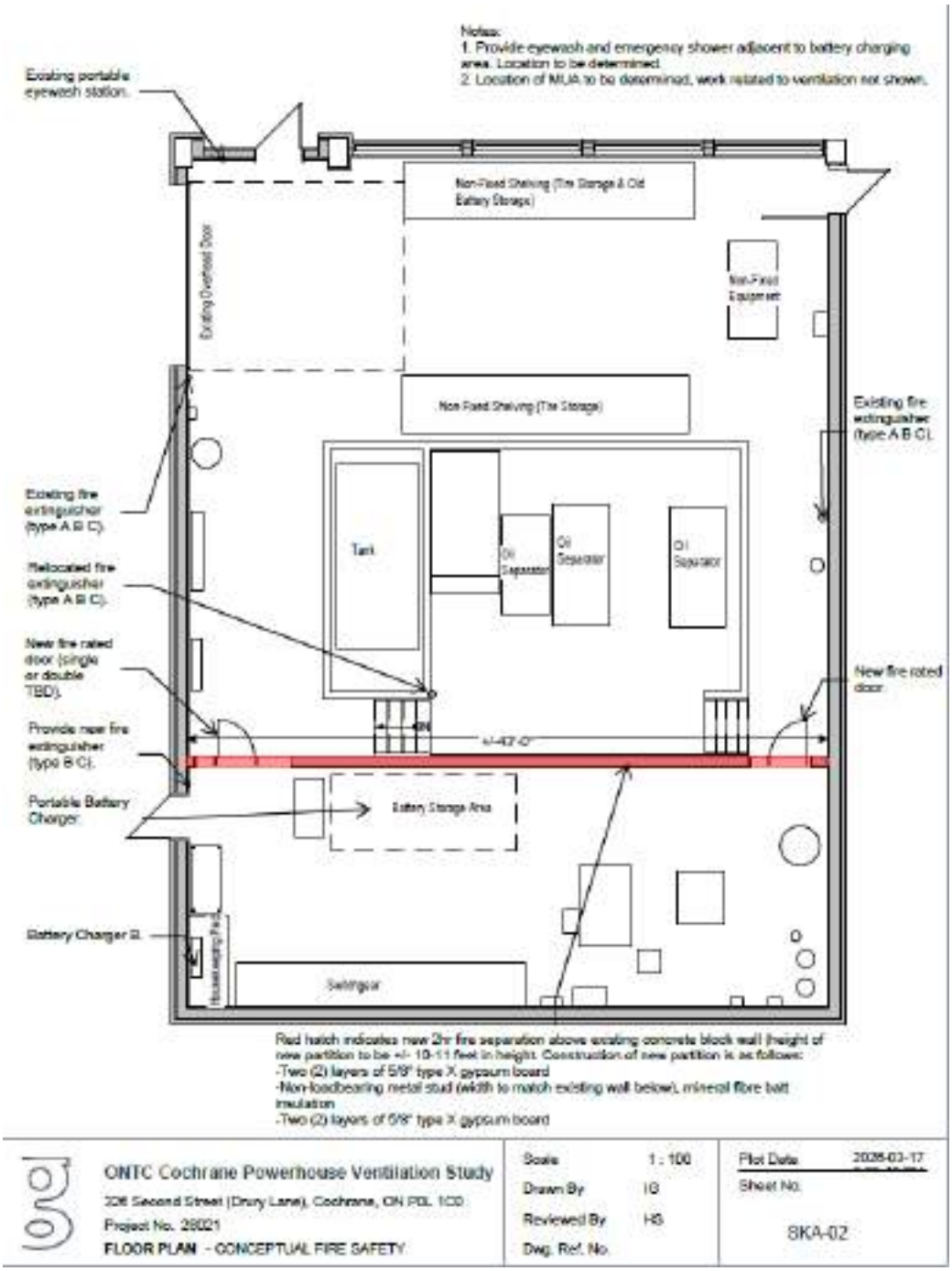


Figure 2: Drawings from G Architects, highlighting some of the required changes.

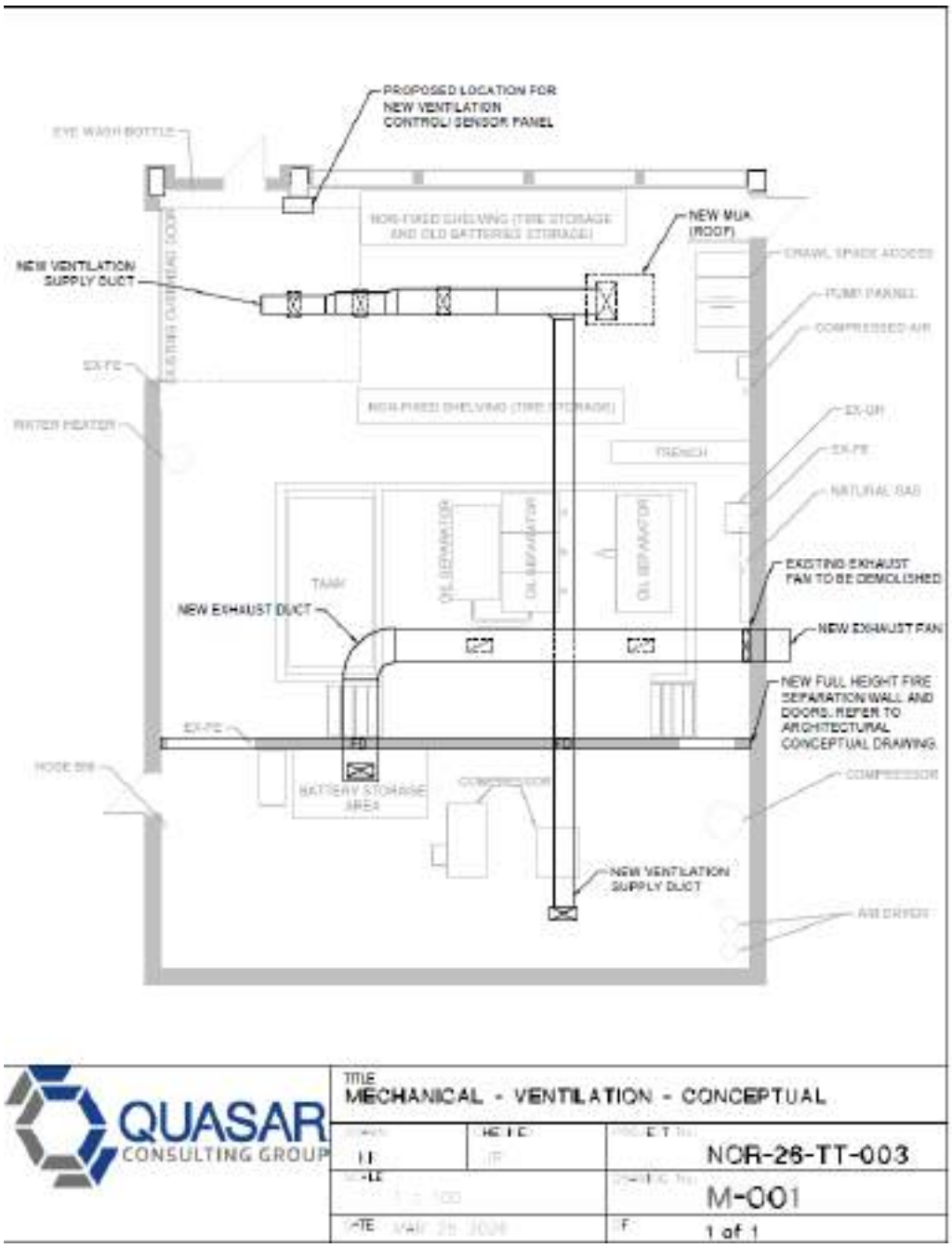


Figure 3: Proposed Ventilation System and Location from G Architects Study for Cochrane Powerhouse, in Coordination with Quasar Consulting Group.

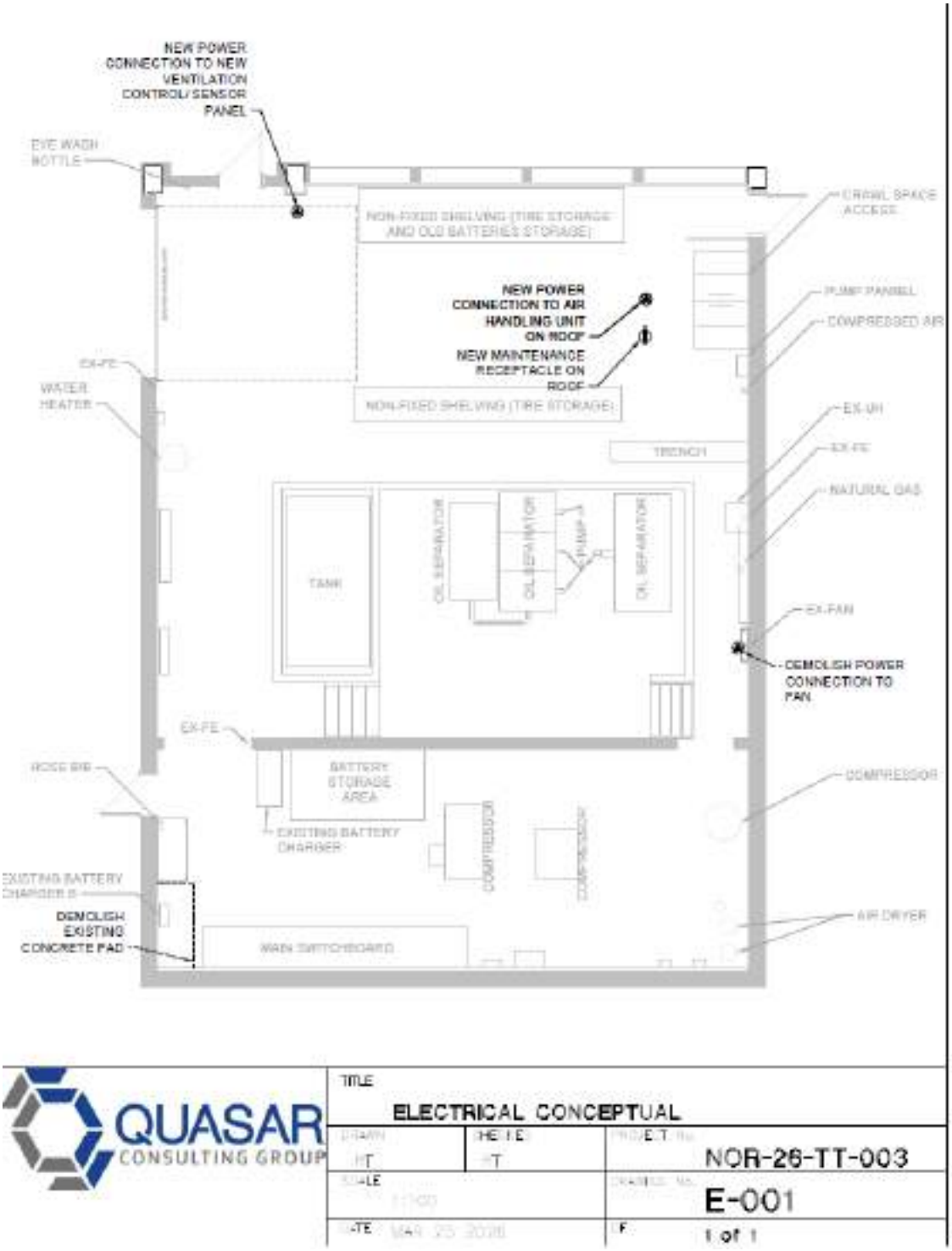


Figure 4: Electrical Study Findings by G Architects and Quasar Consulting Group.

Figure 5: Cochrane Powerhouse, electrical panels and fire extinguisher

Figure 6: Walkway

Figure 7: Heavy machinery storage

Figure 8: Flooring defects

Figure 9: Oil/ water separation tanks and ventilation

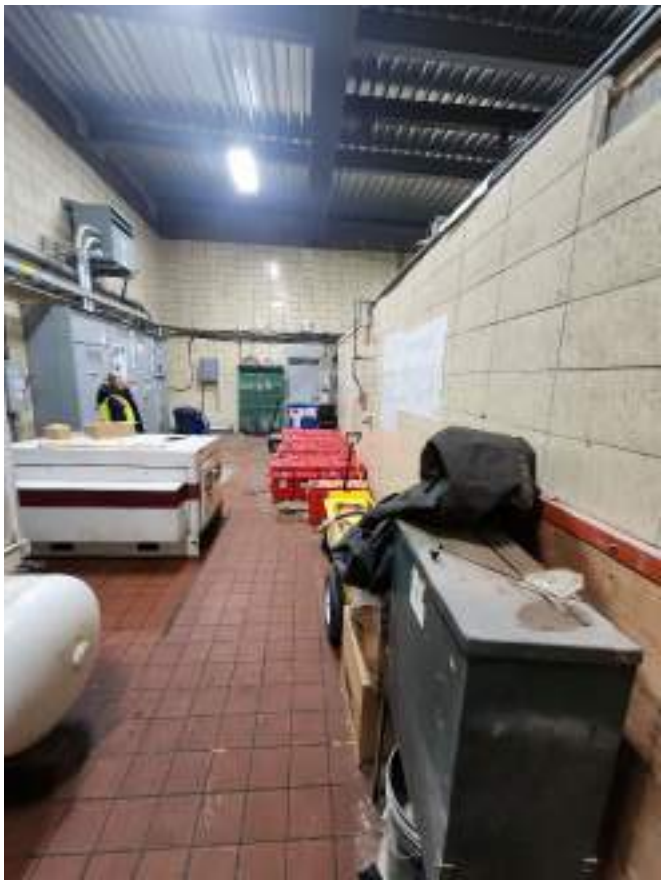


Figure 10: Battery storage and charging area

Figure 11: Battery storage area to walkway

Figure 12: Battery charging area

Figure 13: Oil tank

Ontario Northland Transportation Commission

Building Condition Assessment Report

Cochrane Powerhouse

Version: Final

September 19, 2022

Prepared by:
Roth IAMS
Project No. 21096
www.rothiams.com

Roth IAMS
Integrated Asset Management Strategies

EXECUTIVE SUMMARY

Roth IAMS Ltd. (Roth IAMS) was retained by the Ontario Northland Transportation Commission (ONTC) to undertake Building Condition Assessments (BCAs) and engineering life cycle analysis of the ONTC buildings. ONTC's objective for the BCA is to identify the current condition of the asset components, and to provide capital and maintenance renewals that may be required to address the current backlog and over the next 20 years.

Please note that the year 1 (2022) in this report refers to ONTC fiscal year 2023 (April 2022 to March 2023). The same extends to the subsequent years in this report.

Concurrent to the BCA, the following checklists were completed:

- A code compliance checklist, which generally refers to the OBC. The code compliance checklist focused on the potential fire and life safety issues that may have an impact on the building performance;
- A high-level, potential environmental concern checklist. The checklist was structured to address onsite and offsite (approximately 20 M on adjacent properties) environmental concerns that may have an environmental impact either onsite or offsite; and
- A Designated Substance Survey checklist. The objective of the DSS checklist was to identify designated substances that may be associated either directly (embedded) or indirectly (external) with the assessed building components.

This report covers the BCA for Cochrane Powerhouse, which is located at 326B Second Street (Drury Lane), Cochrane, Ontario.

The Building Condition Assessment (BCA) report, based on the scope of work, for the subject facility is provided in **Appendix A**. The 20-Year Opinion of Probable Costs (OPC) Table is included in **Appendix B.** The code checklist is provided in **Appendix C**.

FACILITY SUMMARY

The Cochrane Powerhouse is a facility that is part of the shops complex located at 326 Second Street, Cochrane, ON. The subject building is a single-storey structure that formerly housed boilers that provided heating to the building within the its vicinity in the complex. Service tunnels under the floor slab contain distribution piping that had directed heated water to other buildings. Currently, the Cochrane Powerhouse contains oil/water separation tanks and electrical distribution equipment. Based on the gathered information, the building was constructed in 1956 and major renovations occurred in 1967 and 2016. The building area is approximately 247 square metres (2,650 square feet).

SUMMARY OF FINDINGS

BUILDING CONDITION ASSESSMENT

In general, several of the facility base building components have either surpassed or approaching the end of their expected useful life (EUL).

IMMEDIATE TERM

The table below (if applicable) highlights the capital or maintenance renewals recommended in the immediate term (2022). Identified in the Immediate Term are also health and safety risks, and fire and life safety risks, which need to be addressed in the next 30 to 90 days to minimize potential hazards.

Table 1 - Immediate Term (2022)

Uniformat II	Uniformat Name	Description	Action Year	Budget Cost ($)
B103001	Structure	A study to check the condition of the exterior walls, which are load-bearing, is recommended. It is recommended that the study include remedial options, scope of work, and estimated repair costs.	2022	$10,000
C302001	Ceramic / Porcelain Tile Floor Cover	Replace Ceramic / Porcelain Tile Floor Cover	2022	$119,925

Table 1 - Immediate Term (2022)				
Uniformat II	Uniformat Name	Description	Action Year	Budget Cost ($)
D409090	Fire Safety Plans	Allowance to update/prepare a Fire Safety Plan as requested in OFC Section 2.8 Emergency Planning.	2022	$5,800
D501005	Secondary Distribution Panelboards	Replace Secondary Distribution Panelboards	2022	$39,000
D501005	Secondary Distribution Panelboards	To account for potential changes to the electrical distribution, recommend a Coordinated and Arc Flash Study be undertaken, every five years, prior to lifecycle replacement or major renovations.	2022	$28,800
D501005	Secondary Distribution Panelboards	In anticipation of either a major repair or a lifecycle replacement, recommend the preparation of a single-line diagram.	2022	$9,600
D502001	Branch Wiring and Devices	Replace Branch Wiring and Devices	2022	$76,261
F202010	Designated Substance Survey	To minimize the health risk especially during a demolition, construction or restoration project recommend a designated substance survey (DSS) be undertaken, prior.	2022	$8,700
G104001	Potential Environmental Concern	Based on the baseline screening checklist (Potential Environmental Concerns) an Environmental Site Assessment is recommended to confirm, if any, impact to the environment	2022	$300,000

Table 1 - Immediate Term (2022)				
Uniformat II	Uniformat Name	Description	Action Year	Budget Cost ($)
		(subsurface soil and groundwater). The cost, which includes potential remediation, is provisional (placeholder) needs to be confirmed by the environmental study.		
G301002	Potable Water Distribution	According to the Ontario Building Code, for a building that is not sprinklered, a fire department pumper vehicle can be located in the access route so that the unobstructed path of travel for the firefighter is not more than 45 m from the hydrant to the vehicle. The installation of a fire hydrant nearer to the building is recommended.	2022	$15,000
Total Immediate Term Costs				**$613,086**

SHORT TERM

Short term is defined as the next 4 years (2022 to 2026) after the immediate term. The following capital and maintenance renewals (Table 2) are recommended, based on the BCA, in the short term (2023-2026).

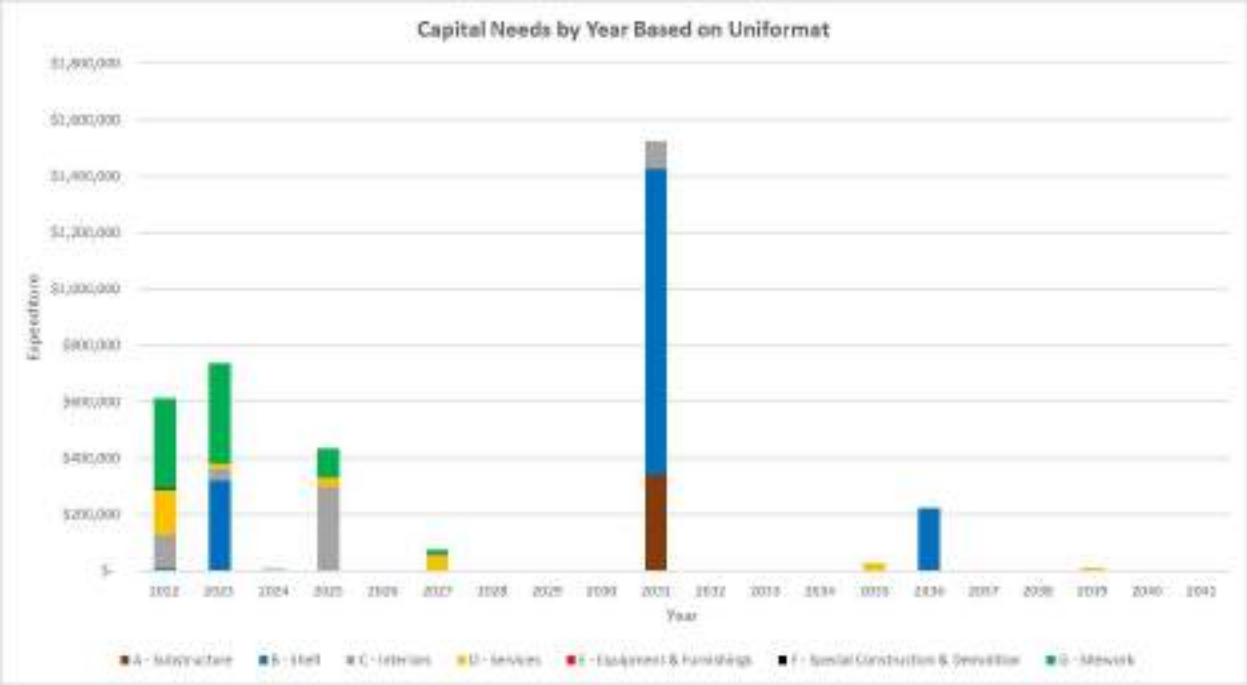
Table 2 - Capital and Maintenance Renewals in 2023 - 2026				
Uniformat II	Uniformat Name	Description	Action Year	Budget Cost ($)
B103001	Structure	The R value of the exterior walls is reportedly very low. The installation of insulating foam during major repair of the walls is recommended.	2023	$200,000
B103001	Structure	Repairs as directed by the proposed study is	2023	$100,000

Table 2 - Capital and Maintenance Renewals in 2023 - 2026				
Uniformat II	Uniformat Name	Description	Action Year	Budget Cost ($)
		recommended. The provided cost is for budgeting purposes only. More accurate costs are to be derived from the study.		
B203023	Exterior Single-Door	Replace Exterior Single-Door	2023	$10,400
C201002	Exterior Stair Construction	Replace Exterior Stair Construction	2023	$42,250
D301002	Gas Supply Systems	Replace Gas Supply Systems	2023	$16,055
G202003	Parking Paved Surface	Replace Parking Paved Surface	2023	$348,563
G205004	Grassed Surfaces	Replace Grassed Surfaces	2024	$6,500
C301023	Ceramic Wall Tile	Replace Ceramic Wall Tile	2025	$273,000
D202001	Domestic Water Pipes and Fittings	Replace Domestic Water Pipes and Fittings	2025	$32,110
G301002	Potable Water Distribution	Replace Potable Water Distribution	2025	$39,780
G302001	Sanitary Sewer System	Replace Sanitary Sewer System	2025	$52,000
Total Budget Cost in 2023 - 2026				**$1,120,658**

20-YEAR EXPENDITURE FORECAST BY UNIFORMAT

Figure 1 provides the 'Expenditure Forecast by Uniformat' for the subject facility over the next 20 years (2022 to 2041).

Figure 1 – Expenditure Forecast by Uniformat



20-Year Capital and Maintenance Renewals

Based on the BCA, the capital and maintenance renewal (repair or replace) expenditures by Uniformat II recommended or anticipated over the next 20 years are provided in Table 3. The renewal expenditures have been adjusted with an annual inflation rate of 3.0%. The renewal expenditures include repairs or replacements required to address elements which are a fire and life safety risk, a health and safety risk, and/or performance risk based on either the observed condition or expected useful life.

Table 3 – Capital and Maintenance Renewals by Uniformat and Time Periods

Uniformat Division	2022	2023-2026	2027-2041	Totals
A – Substructure	$0	$0	$345,935	$345,935
B – Shell	$10,000	$319,712	$1,306,642	$1,636,354
C – Interiors	$119,925	$341,832	$99,504	$561,261
D – Services	$159,461	$51,624	$102,032	$313,117
E – Equipment & Furnishings	$0	$0	$0	$0
F – Special Construction	$8,700	$0	$0	$8,700
G – Building Sitework	$315,000	$466,206	$19,968	$801,174
Totals	$613,086	$1,179,374	$1,874,081	$3,666,541

Facility Condition Index (FCI)

Facility Condition Index is a benchmark used to index the relative condition of a facility. The FCI is calculated as a ratio of the sum of capital and renewal requirements costs for an asset over a set period of time divided by the Current Replacement Value (CRV) of the building. Given that a single-year (immediate requirements) FCI tends to fluctuate and is subject to the building deferred maintenance, a 5-Year FCI, which focuses on the short-term trends, is recommended. The 5-Year FCI tends not to fluctuate as much, making long term planning easier and more effective.

The CRV is calculated using the Marshall and Swift Valuation Services cost guide (cost guide). The Marshall & Swift is designed to integrate the building data (labour, material and installation of the building components) to provide estimates for the reconstruction of the building. The ‘Calculator Method’, where the average cost of the building floor area (per square meter or square foot) will be advanced, will form the platform to estimate the

building base cost. The Class of Construction (non-combustible construction, fire-resistant construction, combustible construction, etc.), the Quality of Construction (excellent, good, average, and low cost) and the Occupancy Type (Residential, Educational, Recreational, etc.) will used to adjust the building base cost. The base cost will be further refined and adjusted to address the type of heating and cooling, elevators, and fire suppression systems (sprinkler system). Also considered in the final analysis and CRV estimate will be nuances such as size and shape, height of building, and number of storey.

In order to not offset the FCI, budget costs to complete of Arc Flash Studies, Single-line Diagrams, Fire Safety Plans and Designate Substance Surveys, Engineering Studies and Engineering Analysis Preconstruction were excluded from the 5-Year capital and maintenance renewal requirements.

The FCI for the Cochrane Powerhouse

$$\textbf{FCI} = \frac{\boldsymbol{Renewal\ Requirements\ in\ 5\ Years}}{\boldsymbol{Current\ Replacement\ Value}} \times \mathbf{100}$$

FCI = $948,354 ÷ $1,594,000

FCI = <u>59.5%</u>

Based on the FCI standard rating scale (See Section 3.8), the building is in poor condition.

System Condition Index (SCI)

The System Condition Index (SCI) provides the relative condition of a major system. The SCI is the ratio of the capital and maintenance requirements of a system to the total replacement of the subject system. Table 4 provides the SCIs of six major systems.

Table 4 – System Condition Index (SCI)

System	Five-Year Expenditures	Total Replacement Cost	SCI
Foundations & Structure (Uniformat A & B10)	$300,000	$580,900	51.6%
Exterior Enclosure (Uniformat B20 & B30)	$10,400	$797,859	1.3%

Table 4 – System Condition Index (SCI)			
Interior Construction (Uniformat C)	$435,175	$511,436	85.1%
Plumbing (Uniformat D20)	$32,110	$125,544	25.6%
HVAC (Uniformat D30)	$16,055	$51,805	31.0%
Electrical (Uniformat D50)	$115,261	$393,721	29.3%

CODE COMPLIANCE CHECKLIST

A Code Compliance checklist, which was completed concurrent with the BCA, focused potential fire and life-safety risks that may impact the facility operations. The Code Compliance checklist referenced the Ontario Building Code (OBC) and limited to the checklist and a visual non-intrusive high-level review of the building elements. Also reviewed relevant fire and life-safety risks as they relate to Ontario Occupational Health & Safety Act & Regulations (OH&S). The completed checklist is provided in **Appendix C**.

POTENTIAL ENVIRONMENTAL CONCERNS CHECKLIST

Also concurrent with the BCA, a baseline screening Potential Environmental Concerns Checklist was completed. The subject checklist, which was prepared in collaboration with ONTC, focused on: Potential Onsite Environmental Concerns; and Potential Off-site Environmental Concerns. The off-site review was restricted to environmental concerns approximately 20 M from the subject property perimeter on adjacent lands.

The completion of the checklist, which was limited to readily visible onsite and off-site potential environmental concern does not constitute a Phase I Environmental Site Assessment (Phase I ESA). Given that the environmental remediation, if required, will require a deeper analysis (Environmental Site Assessment Phase II), in the BCA report a placeholder with a high-level estimate is provided.

Table 5 tracks the Potential Environmental Concerns.

Table 5 – Potential Environmental Concerns		
	Description	**Observation**
Potential Onsite Concerns		
	Aboveground storage tank	Yes
	Underground storage tank	N/A
	Vehicle Fueling Equipment	N/A

Table 5 – Potential Environmental Concerns		
	Description	**Observation**
	Oil/water Separator	Yes
	Extensive staining on the concrete floor (especially with crack)	N/A
	Hydraulic Hoists	N/A
	Waste Oil Storage Barrels/tank	N/A
	Outdoor Chemical Storage (unpaved surface)	N/A
	Outdoor Chemical Storage (paved or concrete) with extensive staining	N/A
	Pole and/or Rail Tie Storage Area	N/A
	PCB Storage Area	N/A
	PCB-containing transformer	N/A
	Other:	N/A
Potential Offsite Concerns		
	Adjacent Vehicle Fueling Equipment	N/A
	Railway Tracks	N/A
	Aboveground Fuel Storage Tank	N/A
	Other:	N/A

DESIGNATED SUBSTANCE SURVEY CHECKLIST

A Designated Substance Survey (DSS) checklist was also completed concurrent with the BCA. The objective of DSS checklist was to track suspect designated substances (asbestos, PCB, mercury, ozone depleting substance, lead and silica) that may be associated with the assessed building and site elements. The designated substance may be embedded within or present as a cover (insulation) external to the element. Where suspect, a high-level estimated cost to abate the designated substance was separately included in the report. It should be noted that the abatement cost are estimates and subject to sampling (to confirm presence) and a tender from an approved designated substance abatement contractor.

No designated substances were identified or reported at the subject building.

Table of Contents

APPENDIX

1.0 INTRODUCTION

Roth IAMS Ltd. (Roth IAMS) was retained by the Ontario Northland Transportation Commission (ONTC) to undertake Building Condition Assessments (BCAs) and engineering life cycle analysis of ONTC buildings. ONTC's objective for the BCA is to identify the current condition of the asset components, and to provide a capital and maintenance renewal that may be required to address the current backlog over the next 20 years.

The Building Condition Assessment (BCA) report, based on the scope of work, for the subject facility is provided in **Appendix A**. The 20-Year Opinion of Probable Costs Table is included in **Appendix B.**

The National Building Code (NBC) checklist is provided in **Appendix C**.

1.1 FACILITY

Table 7 highlights the Salient Feature of the subject facility.

Table 7 – Facility Details	
Building Name	Cochrane Powerhouse
Address	326B Second Street (Drury Lane), Cochrane, Ontario
Estimated Building Floor Area (sq. m.)	247
Number of Storey	1
Date of Construction	1956

2 SCOPE OF WORK

2.1 METHODOLOGY AND APPROACH

The BCA carried out by Roth IAMS is generally based on the ASTM Standard Guide for Property Condition Assessments: Baseline Property Condition Assessment Process (E2018-15) and consisted of the following:

- Background Information Request and Review;
- Interview(s) with Knowledgeable Site Staff;
- Walk-through Site Assessment Visit;
- Completing NBC checklist;
- Preparation of an BCA Report, including salient findings and supporting photographs; and
- Preparation of an Opinion of Probable Costs (OPC) Table to track the observed physical deficiencies, and non-compliance to NBC.

The ASTM defines a physical deficiency as a conspicuous defect or significant deferred maintenance of a site's material systems, components, or equipment as observed during the site assessor's walk-through site visit. Included within this definition are material systems, components, or equipment that are approaching, have reached, or have exceeded their typical expected useful life (EUL) or whose remaining useful life (RUL) should not be relied upon in view of actual or effective age, abuse, excessive wear and tear, exposure to the elements, lack of proper or routine maintenance, etc. This definition specifically excludes deficiencies that may be remedied with routine maintenance, miscellaneous minor repairs, normal operating maintenance, etc., and excludes conditions that generally do not constitute a material physical deficiency of the site.

The review of the Site was based on a visual walk-through review of the visible and accessible components of the property, building and related structures. The roof surface, interior and exterior wall finishes, and floor and ceiling finishes of the on-site building and related structures were visually assessed to determine their condition and to identify physical deficiencies, where observed. The assessment did not include an intrusive investigation of wall assemblies, ceiling cavities, or any other enclosures/assemblies. No physical tests were conducted, and no samples of building materials were collected to substantiate observations made, or for any other reason.

The review of the mechanical systems, electrical systems, and fire & life safety systems at the property included discussions with the site representative and review of pertinent maintenance records that were made available. A visual walk-through assessment of the systems, electrical systems, and fire & life safety systems was conducted to determine the type of systems present, age, and aesthetic condition, with considerations of the reported performance. No physical tests were conducted on these systems.

A detailed evaluation of the property development's compliance with applicable national and/or provincial Building Codes and/or Fire Codes is not part of the scope of this assessment. It is assumed that the existing buildings and related structures were reviewed and approved by local authorities at the time of construction. However, applicable codes may be referenced by Roth IAMS, at their discretion, to identify deficiencies and appropriate recommendations.

Replacement and repair costs are based on unit rates published by Means Publishing and/or Marshall & Swift Valuation Service, combined with local experience gained by Roth IAMS. The quantities associated with each item have been estimated during a walk-through site assessment and do not represent exact measurements or quantities. At the time of replacement, specific "scope of work" statements and quotations should be determined, and the budgetary items revised to reflect actual expenditures. Not included are items that would be addressed as routine maintenance. However, the capital costs may include items, which are currently managed under the Operations and Maintenance budget for the site.

Opinions of probable costs for deficiencies that are individually less than the established threshold amount are generally not included in the BCA and OPC table. The exception are deficiency costs relating to life, safety or accessibility, these may be included regardless of this cost threshold.

2.2 Deviations from the Guide

The major deviations from ASTM E2018-15 for this project that was not included are as follows:

- A review of municipal/public records for zoning;
- A comprehensive building and/or fire & life safety code/regulatory review for compliance. It is assumed that at the time of building construction/commission and/or subsequent renovation(s), a duty of care was undertaken to ensure the building and related structures were constructed in accordance with the current building and fire code, as well as reviewed and approved by the local authorities having jurisdiction;
- An assessment of the property's compliance with barrier-free accessibility requirements; and
- A review of municipal/regional records to determine if the property resides in a designated flood plain.

Furthermore, the BCA did not include a:

- Verification of the number of parking spaces;
- Verification of gross and net usable areas of the site building(s); and
- Review of as-built construction drawings for the building and site.

3 DEFINITIONS

The following are definitions to aid in the understanding of the assessment.

3.1 EVALUATION PERIOD

The evaluation period is the tactical planning window used by owners or facility managers to plan the repairs or replacement of elements or systems required to maintain the continued performance of the facility. The Evaluation Period depends on the owner or facility manager business plans and may include short and/or long terms planning windows. For this project, the Evaluation Period requested by the ONTC is 20 years.

3.2 OPINIONS OF PROBABLE COSTS

The opinions of probable (OPC) cost are budget cost estimates to repair or replace major defects in materials or systems that may significantly affect the value of the property or continued operation of the facilities, and to replace base building elements /systems that have either reached or are anticipated to reach their expected useful life. The OPC are intended to assist the owner or facility manager develop a general understanding of budget costs that may be required to maintain the physical condition of the building.

The OPC are not construction costs and are for global budgeting purposes only, since the cost are based on a walk-though survey. The OPC cost are based on unit cost developed based on historical costing information and our experience with similar systems in other buildings. The OPC are Class D estimates, which are subject to design and tender (specs). A detailed or exhaustive examination of quantities/costs of equipment, materials, or labour required for the remedial work were not performed. Unless otherwise stated, engineering costs for remedial work have not been included in this report. The OPC are based on unit costs published in standard cost guides (RS Means, Marshall and Swift Valuation Services, etc.), industry/market standards, and our experience managing renewals.

Only planned actions with a total cost greater than $1,500 were included in this report. Actions with a cost below this threshold were assumed maintenance and to be executed under a separate budget (Operation and Maintenance). The exception are actions required to address either fire or life safety or health and safety. These were included in the report regardless of cost.

3.3 EXPECTED USEFUL LIFE

The Expected Useful Life (EUL) is the average amount of time in years that an element or system is estimated to perform with minimal repair, when installed new and assuming the routine maintenance is practiced.

The EUL is based on information provided in manufacturer's literature, cost guides, industry standards, and our experience with the performance of similar elements and systems renewals. The EUL is an estimate that is based on the function of quality of

materials used, manufacturing and installation, as well as on the frequency and intensity of service, the degree of maintenance afforded to the asset, and local weather conditions.

3.4 Remaining Useful Life

The realization of an element's EUL does not necessarily constitutes its replacement. A detailed condition assessment or investigation is recommended as a prudent approach to confirm the component Remaining Useful Life (RUL) and the need for either a repair (maintenance) or a replacement. Risks, including safety or the cost of damage to the facility and its use, were considered in estimating the RUL and the schedule for major repairs or replacements.

3.5 Recommendation Type

Recommendation types in this report indicate the actions required to address the condition of the element or system observed at the time of the site assessment visit.

- **Study:** Where a further investigation into the condition or options is required to confirm the repair/replace scope of work and the cost.
- **Major Repair:** Where deterioration or deficiency observed is isolated (generally less than 30% of the element), and an action is required to either ensure continued performance or to extend the service life of the element or system.
- **Lifecycle Replacement:** Where the deterioration or deficiency observed is systemic or based on the observed condition or age, the element or system is expected to realize its EUL.

3.6 Condition Ratings and Site Observations

Roth IAMS applied a condition rating to each component assessed and included in the report. Table 8 outlines the condition rating system utilized.

Table 8 – Condition Rating

Rating	Definition	Replacement Year
1 – Very Good	The element is physically sound and is performing its function as originally intended. Element is new or at the beginning of its service life.	Greater than the current year (> 10 years)
2 - Good	The element is functioning as intended; the normal deterioration observed is consistent with the element age and no capital or maintenance renewal is anticipated within the next five years.	Greater than the current year (> 5 years)
3 - Fair	Functioning as intended; normal deterioration and distress observed requiring either a repair or a lifecycle replacement within the next five years to maintain functionality.	Current year + 2 to 4 years

Table 8 – Condition Rating		
Rating	Definition	Replacement Year
4 - Poor	Not functioning as intended. Significant deterioration and distress were observed or reported. Deferral of the repair or replacement, which is recommended within two years, may result in either a partial or full shut down of the facility.	Current Year + 0 to 1 year
5 – Very Poor	Based on the reported or observed condition, the element has failed. Failure to address the recommended repair or replace, which is required within the next 30 to 60 days, may result in either a partial or full shutdown of the facility.	Current Year

3.7 Renewal Prioritization Matrix

The capital and maintenance renewals (repairs and replacements) were ranked on the renewal needs, and the impact to operations, should the renewal be deferred.

Table 9 Renewal Prioritization Matrix	
Priority	Definition
Priority A: Life Safety	Life safety hazardous which if deferred may result either in loss of life or critical or extremely severe injury. Failure to address year may endanger building the public (occupants or visitors).
Priority B: Structural Integrity	The observed deterioration if allowed to progress may compromise the structural integrity of the building (or system). An engineering study by structural engineer is recommended to confirm, if required, the scope and cost of the repair/replacement. Failure to execute may result in unsafe, life-threatening conditions and may eventually render the building structurally unsound and physically obsolescent.
Priority C: Code Compliance	Obvious non-compliance to code especially where failure to address may result fire or a life safety hazard.
Priority D: Building Functionality	Capital and maintenance renewal to ensure continued performance of the building and building systems. Includes all building systems. This work is necessary in order to maintain occupants' quality of life and to prevent the building from becoming physically or functionally obsolescent.
Priority E: Potential Environmental Concern	Building or site conditions that may suggest a potential environmental concern.
Priority F - Suspect Building Designated Substance	Suspect hazardous building material and designated substances either imbedded within the element or as an insulation external to the element
Priority G - Cost Effective Initiative	Capital and maintenance (replace or repair) of a building element, if implemented, may result in building operational

Table 9 Renewal Prioritization Matrix	
Priority	Definition
	cost savings (energy conservation measures (LED lamps, insulated glass units, etc.).

3.8 FACILITY CONDITION INDEX

The FCI is a key performance indicator used to benchmark the relative condition of an asset to other assets in a portfolio or assets in general. Table 10 highlights the rating scale used to determine the condition of the subject asset.

Table 10 – Facility Condition Index		
FCI	**Description**	**Condition Rating**
0%-10%	The Facility and its components are functioning as intended; limited (if any) deterioration observed on major systems.	**Good**
11%-30%	The Facility and its components are functioning as intended; however, some elements are beginning to show signs of wear; More frequent component and equipment failure is anticipated.	**Fair**
31%-60%	The Facility and its components are showing signs of increasing deterioration. Potential frequent component and equipment failures may occur.	**Poor**
>60%	The Facility and its components appear worn with obvious deterioration. Critical component or equipment failure are more frequent. Occasional building shutdowns could occur. Management risk is high.	**Critical**

4 CONCLUSIONS AND LIMITING CONDITIONS

This report has been prepared for the exclusive and sole use of the Ontario Northland Transportation Commission (ONTC). The report may not be relied upon by any other person or entity without the express written consent of Roth IAMS and the ONTC.

Any reliance on this report by a third party, any decisions that a third party makes based on this report, or any use at all of this report by a third party is the responsibility of such third parties. Roth IAMS accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made, or actions taken, based on this report.

The assessment of the building/site components was performed using methods and procedures that are consistent with standard commercial and customary practice as outlined in ASTM Standard E 2018-15 for facility condition assessments. As per this ASTM Standard, the assessment of the building/site components was based on a visual walk-through site visit, which captured the overall condition of the site at that specific point in time only.

No legal surveys, soil tests, environmental assessments, geotechnical assessments, detailed barrier-free compliance assessments, seismic assessments, detailed engineering calculations, or quantity surveying compilations have been made. No responsibility, therefore, is assumed concerning these matters. Roth IAMS did not design or construct the building(s) or related structures and therefore will not be held responsible for the impact of any design or construction defects, whether or not described in this report. No guarantee or warranty, expressed or implied, with respect to the property, building components, building systems, property systems, or any other physical aspect of the property is made.

The recommendations and our opinion of probable costs associated with these recommendations, as presented in this report, are based on walk-through non-invasive observations of the parts of the building which were readily accessible during our visual review. Conditions may exist that are not as per the general condition of the system being observed and reported in this report. Opinions of probable costs presented in this report are also based on information received during interviews with operations and maintenance staff. In certain instances, Roth IAMS has been required to assume that the information provided is accurate and cannot be held responsible for incorrect information received during the interview process. Should additional information become available with respect to the condition of the building and/or site elements, Roth IAMS requests that this information be brought to our attention so that we may reassess the conclusions presented herein.

The opinions of probable costs are intended for order of magnitude budgeting purposes only. The scope of work and the actual costs of the work recommended can only be determined after a detailed examination of the element/system in question, understanding of the site restrictions, understanding of the effects on the ongoing operations of the

ite/building, definition of the construction schedule, and preparation of tender documents. We expressly waive any responsibilities for the effects of any action taken as a result of these endeavors unless we are specifically advised of prior to, and participate in the action, at which time, our responsibility will be negotiated.

Our opinions and recommendations presented in our reports will be rendered in accordance with generally accepted professional standards and are not to be construed as a warranty or guarantee regarding existing or future physical conditions at the Site or regarding compliance of Site systems/components and procedures/operations with the various regulating codes, standards, regulations, ordinances, etc.

Respectfully submitted,
ROTH IAMS LTD.

Detlev Grad, P.Eng.
Senior Technical Reviewer, Team Leader
detlev.grad@rothiams.com
613-691-2169 x 201

APPENDIX A

Building Condition Assessment Report

A Substructure
A10 Foundations

Element Description	
Name	A101001 - Standard Foundations
Installation Year	1956
Condition	2 - Good
Expected Useful Life	75 Years
Remaining Useful Life	9 Years
Renewal Year	2031
Quantity / Unit of Measure	65 / LM Footprint
Unit Cost	$984.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$207,870.00

Description
According to the provided drawings prepared in April 1956 by Proctor, Redfern & Laughlin Consulting Engineers, the foundations consist of concrete piers on concrete footings and concrete grade beams. The underground service tunnels are also constructed with concrete.

Condition Narrative
No major deficiencies were observed or reported on the superstructure to suggest differential settlement of the building foundations.

Photos


Cochrane Powerhouse - A101001

Cochrane Powerhouse - A101001

Cochrane Powerhouse - A101001

Cochrane Powerhouse - A101001

Recommendations

Recommendations #1 - Standard Foundations	
Type	Life Cycle Replacement
Year	2031
Cost	$207,870.00
Priority	Priority D: Building Functionality

Replace Standard Foundations

Element Description	
Name	A103001 - Slab on Grade
Installation Year	1956
Condition	2 - Good
Expected Useful Life	75 Years
Remaining Useful Life	9 Years
Renewal Year	2031
Quantity / Unit of Measure	247 / SM Footprint
Unit Cost	$71.33
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$57,260.16

Description

According to the provided drawings prepared in April 1956 by Proctor, Redfern & Laughlin Consulting Engineers, the floor structure is generally a 6" reinforced concrete slab on earth. Where the steel-framed platform is located, a 12" slab on grade is provided. The drawings indicate the concrete floor slabs are reinforced with welded mesh.

Condition Narrative

No significant deficiencies were observed or reported.

Recommendations

Recommendations #1 - Slab on Grade	
Type	Life Cycle Replacement
Year	2031
Cost	$57,260.16
Priority	Priority D: Building Functionality

Replace Slab on Grade

B Shell
B10 Superstructure

Element Description	
Name	B103001 - Structure
Installation Year	1956
Condition	4 - Poor
Expected Useful Life	75 Years
Remaining Useful Life	9 Years
Renewal Year	2031
Quantity / Unit of Measure	247 / SM Building
Unit Cost	$280.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$224,770.00

Description

The superstructure appears to consist of a galvanized metal roof deck on metal beams that are supported by either metal columns or load-bearing masonry exterior walls on the building perimeter. Based on observation and information from the provided drawings prepared in March 2016 by Northshore Engineering & Drafting Services, it appears part of the roof structure was replaced.

Condition Narrative

Stress cracks on the bricks of the exterior walls were observed at various locations. Repairs to the brick wall had occurred previously. Given the past wall repair and roof structure history, and based on the observed condition, a study to check the condition of the structure and exterior walls, and subsequent repairs are recommended. The R value of the exterior walls is reportedly very low. The installation of insulating foam during major repair of the walls is recommended.

Photos

Cochrane Powerhouse - B103001

Cochrane Powerhouse - B103001

Cochrane Powerhouse - B103001

Cochrane Powerhouse - B103001

Cochrane Powerhouse - B103001

Cochrane Powerhouse - B103001

Recommendations

Recommendations #1 - Structure	
Type	Engineering Study
Year	2022
Cost	$10,000.00
Priority	Priority B: Structural Integrity

A study to check the condition of the exterior walls, which are load-bearing, is recommended. It is recommended that the study include remedial options, scope of work, and estimated repair costs.

Recommendations #2 - Structure	
Type	Major Repair
Year	2023
Cost	$100,000.00
Priority	Priority B: Structural Integrity

Repairs as directed by the proposed study is recommended. The provided cost is for budgeting purposes only. More accurate costs are to be derived from the study.

Recommendations #3 - Structure - R Value	
Type	Major Repair
Year	2023
Cost	$200,000.00
Priority	Priority G - Cost Effective Intiative

The R value of the exterior walls is reportedly very low. The installation of insulating foam during major repair of the walls is recommended.

Recommendations #4 - Structure	
Type	Life Cycle Replacement
Year	2031
Cost	$224,770.00
Priority	Priority D: Building Functionality

Replace Structure

Element Description	
Name	B103001 - Structure - Oil Water Separator Tanks
Installation Year	2000
Condition	2 - Good
Expected Useful Life	75 Years
Remaining Useful Life	53 Years
Renewal Year	2075
Quantity / Unit of Measure	100 / SM Building
Unit Cost	$280.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$91,000.00

Description

A metal-framed platform that provides access to and secures the oil water separator tanks is constructed at the centre of floor space. The platform has a grated metal surface and is accessed from the general floor space via metal stairs completed with grated metal treads and painted metal guards.

Condition Narrative

No significant deficiencies were observed or reported.

Photos

Cochrane Powerhouse - B103001

Cochrane Powerhouse - B103001

B20 Exterior Enclosure

Element Description	
Name	B201021 - Masonry
Installation Year	1956
Condition	4 - Poor
Expected Useful Life	75 Years
Remaining Useful Life	9 Years
Renewal Year	2031
Quantity / Unit of Measure	310 / SM
Unit Cost	$600.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$604,500.00

Description

The exterior wall system is brick wall, where the face brick is tied to the substrate by brick headers. Based on the provided drawings prepared in April 1956 by Proctor, Redfern & Laughlin Consulting Engineers, the bricks are tied to concrete walls.

Condition Narrative

Stress cracks on the bricks at various locations were observed. At the northwest corner of the building, the original bricks have been replaced with concrete; the site representative noted that deficiencies (spalled brick and cracks) had occurred at this location and repairs were undertaken. As recommended under B103001 Structure, a study to check the condition of the exterior walls and subsequent repairs have been recommended.

Photos

Cochrane Powerhouse - B201021

Cochrane Powerhouse - B201021

Cochrane Powerhouse - B201021

Cochrane Powerhouse - B201021

Cochrane Powerhouse - B201021

Cochrane Powerhouse - B201021

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Cochrane Powerhouse - B201021

Cochrane Powerhouse - B201021

Cochrane Powerhouse - B201021

Cochrane Powerhouse - B201021

Cochrane Powerhouse - B201021

Recommendations

Recommendations #1 - Masonry	
Type	Life Cycle Replacement
Year	2031
Cost	$604,500.00
Priority	Priority D: Building Functionality

Replace Masonry

Element Description	
Name	B201026 - Wood Siding
Installation Year	2020
Condition	1 - Excellent
Expected Useful Life	30 Years
Remaining Useful Life	28 Years
Renewal Year	2050
Quantity / Unit of Measure	30 / SM
Unit Cost	$200.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$19,500.00

Description

Plywood siding is installed on the north elevation, at the previous openings that were filled with glass block. The interior side is covered with metal siding.

Condition Narrative

The site representative noted the plywood is acoustic sealed and on the interior side, spray insulation and metal cladding was installed. It was reported the work was completed in approximately 2020.

Photos

Cochrane Powerhouse - B201026

Cochrane Powerhouse - B201026

Cochrane Powerhouse - B201026

Element Description	
Name	B203021 - Overhead Doors - Standard
Installation Year	2021
Condition	1 - Excellent
Expected Useful Life	25 Years
Remaining Useful Life	24 Years
Renewal Year	2046
Quantity / Unit of Measure	1 / Each
Unit Cost	$3,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$9,750.00

Description

A sectional metal overhead door on the west elevation provides access into the building. The site representative noted the access was created and the overhead door installed in 2021.

Condition Narrative

No significant deficiencies were observed or reported.

Photos

Cochrane Powerhouse - B203021

Element Description	
Name	B203023 - Exterior Single-Door - 1956
Installation Year	1956
Condition	4 - Poor
Expected Useful Life	30 Years
Remaining Useful Life	1 Year
Renewal Year	2023
Quantity / Unit of Measure	2 / Each
Unit Cost	$1,600.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$10,400.00

Description

The main entrance, which is on the west elevation, and the emergency exit near the northeast corner of the building are provided with metal doors in metal frames. The installation year was not available.

Condition Narrative

Corrosion on the doors and frames were observed. With continued exposure to the elements, the current condition is anticipated to progress. Lifecycle replacement is recommended.

Photos

Cochrane Powerhouse - B203023

Cochrane Powerhouse - B203023

Recommendations

Recommendations #1 - Exterior Single-Door	
Type	Life Cycle Replacement
Year	2023
Cost	$10,400.00
Priority	Priority D: Building Functionality

Replace Exterior Single-Door

Element Description	
Name	B203023 - Exterior Single-Door - 2021
Installation Year	2021
Condition	1 - Excellent
Expected Useful Life	30 Years
Remaining Useful Life	29 Years
Renewal Year	2051
Quantity / Unit of Measure	1 / Each
Unit Cost	$1,600.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$5,200.00

Description

A metal man door mounted on a metal frame with butt hinges is located on the north elevation. The man door access replaced the previous overhead door access (the overhead door opening was relocated to the west elevation). It was reported the entrance and door were constructed in 2021.

Condition Narrative

No significant deficiencies were observed or reported.

Photos

Cochrane Powerhouse - B203023

Cochrane Powerhouse - B203023

B30 Roofing

Element Description	
Name	B301023 - Conventional - Single Ply Membrane
Installation Year	2016
Condition	2 - Good
Expected Useful Life	20 Years
Remaining Useful Life	14 Years
Renewal Year	2036
Quantity / Unit of Measure	247 / SM
Unit Cost	$185.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$148,508.75

Description

The roof assembly on the building is covered with a single-ply membrane. According to the provided drawings prepared in March 2016 by Northshore Engineering & Drafting Services, the roof membrane is mechanically fastened to 2 layers of 2-1/2 inch rigid insulation. A 10 mil vapour barrier on the metal deck and underneath the rigid insulation is provided.

Condition Narrative

The roof cover is reportedly performing. At the time of the assessment, no roof leaks were reported or observed.

Photos

Cochrane Powerhouse - B301023

Cochrane Powerhouse - B301023

Cochrane Powerhouse - B301023

Cochrane Powerhouse - B301023

Recommendations

Recommendations #1 - Conventional - Single Ply Membrane	
Type	Life Cycle Replacement
Year	2036
Cost	$148,508.75
Priority	Priority D: Building Functionality

Replace Conventional - Single Ply Membrane

C Interiors
C10 Interior Construction

Element Description	
Name	C101001 - Fixed Partitions
Installation Year	1956
Condition	2 - Good
Expected Useful Life	75 Years
Remaining Useful Life	9 Years
Renewal Year	2031
Quantity / Unit of Measure	247 / SM Building
Unit Cost	$95.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$76,261.25

Description
A partition, likely constructed of concrete masonry, divides the building into two sections - the Boiler Room and the Electrical Control Room.

Condition Narrative
No significant deficiencies were observed or reported.

Photos

Cochrane Powerhouse - C101001


Cochrane Powerhouse - C101001


Cochrane Powerhouse - C101001

Recommendations

Recommendations #1 - Fixed Partitions	
Type	Life Cycle Replacement
Year	2031
Cost	$76,261.25
Priority	Priority D: Building Functionality

Replace Fixed Partitions

C20 Stairs

Element Description	
Name	C201002 - Exterior Stair Construction - Roof Ladder
Installation Year	1956
Condition	4 - Poor
Expected Useful Life	40 Years
Remaining Useful Life	1 Year
Renewal Year	2023
Quantity / Unit of Measure	13 / Per Riser
Unit Cost	$1,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$42,250.00

Description

Access to the roof is provided by an external metal ladder that is attached to the east elevation of the building. The ladder is completed with a metal cage.

Condition Narrative

Corrosion on the ladder and cage were observed. Continued exposure to the elements may accelerate the deterioration, and this may further weaken the ladder. Based on age and observed condition, replacement of the steel framed ladder is recommended.

Photos

Cochrane Powerhouse - C201001

Cochrane Powerhouse - C201002

Cochrane Powerhouse - C201002

Cochrane Powerhouse - C201002

Recommendations

Recommendations #1 - Exterior Stair Construction	
Type	Life Cycle Replacement
Year	2023
Cost	$42,250.00
Priority	Priority D: Building Functionality

Replace Exterior Stair Construction

C30 Interior Finishes

Element Description	
Name	C301023 - Ceramic Wall Tile
Installation Year	1956
Condition	3 - Fair
Expected Useful Life	40 Years
Remaining Useful Life	3 Years
Renewal Year	2025
Quantity / Unit of Measure	420 / SM
Unit Cost	$160.00
Difficulty / Regional / Soft Cost Factors	1.25 / 2.50000 / 1.30000
Replacement Cost	$273,000.00

Description

The interior side of the exterior walls and the partition that divides the floor space are finished with glazed ceramic tiles. The ceramic tiles appear to be original to building construction.

Condition Narrative

The ceramic tiles are heavily stained and have exceeded their expected useful life. Lifecycle replacement is recommended. The cost has been increased to cover costs for electrical equipment relocation.

Photos

Cochrane Powerhouse - C301023

Cochrane Powerhouse - C301023

Cochrane Powerhouse - C301023

Cochrane Powerhouse - C301023

Cochrane Powerhouse - C301023

Cochrane Powerhouse - C301023

Cochrane Powerhouse - C301023

Cochrane Powerhouse - C301023

Recommendations

Recommendations #1 - Ceramic Wall Tile	
Type	Life Cycle Replacement
Year	2025
Cost	$273,000.00
Priority	Priority D: Building Functionality

Replace Ceramic Wall Tile

Element Description	
Name	C302001 - Ceramic / Porcelain Tile Floor Cover
Installation Year	1956
Condition	5 - Very Poor
Expected Useful Life	40 Years
Remaining Useful Life	0 Years
Renewal Year	2022
Quantity / Unit of Measure	205 / SM
Unit Cost	$180.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$119,925.00

Description

Quarry tiles are installed in all floor areas except on the metal platform.

Condition Narrative

Damaged, missing, and stained quarry tiles were observed. Lifecycle replacement is recommended. Deferral of the replacement may result in the increase in potential of tripping hazards.

Photos

Cochrane Powerhouse - C302001

Cochrane Powerhouse - C302001

Cochrane Powerhouse - C302001

Cochrane Powerhouse - C302001

Cochrane Powerhouse - C302001

Cochrane Powerhouse - C302001

Recommendations

Recommendations #1 - Ceramic / Porcelain Tile Floor Cover	
Type	Life Cycle Replacement
Year	2022
Cost	$119,925.00
Priority	Priority D: Building Functionality

Replace Ceramic / Porcelain Tile Floor Cover

D Services
D20 Plumbing

Element Description	
Name	D202001 - Domestic Water Pipes and Fittings
Installation Year	1956
Condition	3 - Fair
Expected Useful Life	40 Years
Remaining Useful Life	3 Years
Renewal Year	2025
Quantity / Unit of Measure	247 / SM Building
Unit Cost	$40.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$32,110.00

Description

Domestic water distribution system, is copper pipes. Where exposed the domestic water pipes are insulated with neoprene insulation. The incoming supply line is not provided with backflow preventer.

Condition Narrative

No significant deficiencies were observed or reported. However, the system appears to be original to building construction and can experience pipe fatigue over time which can result in failure. Lifecycle replacement is recommended.

Photos

Cochrane Powerhouse - D202001

Cochrane Powerhouse - D202001

Recommendations

Recommendations #1 - Domestic Water Pipes and Fittings	
Type	Life Cycle Replacement
Year	2025
Cost	$32,110.00
Priority	Priority D: Building Functionality

Replace Domestic Water Pipes and Fittings

Element Description	
Name	D202006 - Domestic Hot Water Heaters
Installation Year	2012
Condition	2 - Good
Expected Useful Life	15 Years
Remaining Useful Life	5 Years
Renewal Year	2027
Quantity / Unit of Measure	284 / litre
Unit Cost	$36.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$33,228.00

Description

Building domestic hot water supply is provided by an electric domestic hot water (DHW) tank heater. The DHW tank heater, which is manufactured by GSW, Model No. 6G80SDEB1 and Serial No. S1230 F701201. The DHW heater has a storage capacity of 284 L and a heating maximum input capacity of 4500 Watts.

Condition Narrative

No significant deficiencies were reported or observed.

Photos

Cochrane Powerhouse - D202006

Cochrane Powerhouse - D202006

Cochrane Powerhouse - D202006

Recommendations

Recommendations #1 - Domestic Hot Water Heaters	
Type	Life Cycle Replacement
Year	2027
Cost	$33,228.00
Priority	Priority D: Building Functionality

Replace Domestic Hot Water Heaters

Element Description	
Name	D203001 - Waste Pipe and Fittings
Installation Year	2005
Condition	1 - Excellent
Expected Useful Life	40 Years
Remaining Useful Life	23 Years
Renewal Year	2045
Quantity / Unit of Measure	247 / SM Building
Unit Cost	$45.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$36,123.75

Description

Sanitary waste and vent piping is a combination of cast iron and PVC pipes, which connect plumbing fixture and floor drains to common sanitary lines that discharge the buildings sanitary waste to municipal sanitary sewer system. The sanitary waste is managed by an oil separator system before it is discharged.

Condition Narrative

No significant deficiencies were reported or observed. Some of the piping may be original to building construction.

Photos

Cochrane Powerhouse - D203001

Cochrane Powerhouse - D203001

Cochrane Powerhouse - D203001

Element Description	
Name	D204002 - Roof Drains
Installation Year	2016
Condition	1 - Excellent
Expected Useful Life	40 Years
Remaining Useful Life	34 Years
Renewal Year	2056
Quantity / Unit of Measure	247 / SM Building
Unit Cost	$30.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$24,082.50

Description

Rainwater drainage system consists of internal rainwater leaders that connect roof drains to the site storm-water sewer system. According to information provided the storm-water sewer system discharges to the municipal system.

Condition Narrative

No significant deficiencies were observed or reported.

Photos

Cochrane Powerhouse - D204002

Cochrane Powerhouse - D204002

D30 HVAC

Element Description	
Name	D301002 - Gas Supply Systems
Installation Year	1956
Condition	4 - Poor
Expected Useful Life	35 Years
Remaining Useful Life	1 Year
Renewal Year	2023
Quantity / Unit of Measure	247 / SM
Unit Cost	$20.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$16,055.00

Description

The building natural gas distribution system, which begins at the natural gas meter located on the east elevation, consists black steel pipes. The pipes are painted yellow as prescribed by the identification standards.

Condition Narrative

No significant deficiencies were observed or reported. However, the system appears to be original to building construction and can experience gas leaks over time. Lifecycle replacement is recommended.

Photos

Cochrane Powerhouse - D301002

Cochrane Powerhouse - D301002

Cochrane Powerhouse - D301002

Recommendations

Recommendations #1 - Gas Supply Systems	
Type	Life Cycle Replacement
Year	2023
Cost	$16,055.00
Priority	Priority D: Building Functionality

Replace Gas Supply Systems

Element Description	
Name	D304007 - Exhaust Fans
Installation Year	2010
Condition	2 - Good
Expected Useful Life	25 Years
Remaining Useful Life	13 Years
Renewal Year	2035
Quantity / Unit of Measure	1 / Each
Unit Cost	$6,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$19,500.00

Description

A wall mounted exhaust fan provides general building exhaust. The fan is manufactured by CANARM. The capacity of the fan was not available.

Condition Narrative

No significant deficiencies were observed or reported.

Photos

Cochrane Powerhouse - D304007

Cochrane Powerhouse - D304007

Recommendations

Recommendations #1 - Exhaust Fans	
Type	Life Cycle Replacement
Year	2035
Cost	$19,500.00
Priority	Priority D: Building Functionality

Replace Exhaust Fans

Element Description	
Name	D305002 - Suspended Unit Heaters
Installation Year	2012
Condition	2 - Good
Expected Useful Life	15 Years
Remaining Useful Life	5 Years
Renewal Year	2027
Quantity / Unit of Measure	1 / Each
Unit Cost	$5,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$16,250.00

Description

In the powerhouse, heating is provided by ceiling suspended natural gas fired unit heater manufactured by Lennox, Model LF24-400S-5.

Condition Narrative

No significant deficiencies were observed or reported.

Photos

Cochrane Powerhouse - D305002

Cochrane Powerhouse - D305002

Recommendations

Recommendations #1 - Suspended Unit Heaters	
Type	Life Cycle Replacement
Year	2027
Cost	$16,250.00
Priority	Priority D: Building Functionality

Replace Suspended Unit Heaters

D40 Fire Protection

Element Description	
Name	D409090 - Fire Safety Plans
Installation Year	1956
Condition	4 - Poor
Expected Useful Life	100 Years
Remaining Useful Life	50 Years
Renewal Year	2072
Quantity / Unit of Measure	1 / ----
Unit Cost	$0.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$0.00

Description

"The OFC Section 2.8, requires that major occupancies based on the occupant load listed below, have Emergency Planning, Fire Safety Plans (FSPs). (a) Group ‘A’ or ‘B’ occupancy, (b) Group ‘C’ occupancy where the occupant load exceeds 10, (c) Group ‘D’ occupancy where the occupant load exceeds 300, (d) Group ‘E’ occupancy where the occupant load exceeds 300, (e) Group ‘F’ Division 1 occupancy where the occupant load exceeds 25, (f) Group ‘F’ Division 2 occupancy where the occupant load exceeds 100, or (g) Group ‘F’ Division 3 occupancy where the occupant load exceeds 300."

Condition Narrative

Allowance to update/prepare a Fire Safety Plan as requested in OFC Section 2.8 Emergency Planning.

Recommendations

Recommendations #1 - Prepare a Fire Safety Plan	
Type	Fire Safety Plan
Year	2022
Cost	$5,800.00
Priority	Priority C: Code Compliance

Allowance to update/prepare a Fire Safety Plan as requested in OFC Section 2.8 Emergency Planning.

D50 Electrical

Element Description	
Name	D501002 - Secondary Transformer
Installation Year	2018
Condition	1 - Excellent
Expected Useful Life	40 Years
Remaining Useful Life	36 Years
Renewal Year	2058
Quantity / Unit of Measure	75 / kVA
Unit Cost	$75.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$18,281.25

Description

The electrical distribution includes a secondary transformer manufactured by HPS. The transformer is rated 75 kVA.

Condition Narrative

No significant deficiencies were observed or reported.

Photos

Cochrane Powerhouse - D501002

Cochrane Powerhouse - D501002

Element Description	
Name	D501003 - Main Disconnect and Switchboard
Installation Year	2018
Condition	1 - Excellent
Expected Useful Life	40 Years
Remaining Useful Life	36 Years
Renewal Year	2058
Quantity / Unit of Measure	1 / Each
Unit Cost	$30,000.00
Difficulty / Regional / Soft Cost Factors	2.00 / 2.50000 / 1.30000
Replacement Cost	$195,000.00

Description

The main switchboard, which is located in the electrical room, is manufactured by Eaton, and rated 800 Amp and 480 Volt.

Condition Narrative

No significant deficiencies were observed or reported.

Photos

Cochrane Powerhouse - D501003

Cochrane Powerhouse - D501003

Cochrane Powerhouse - D501003

Element Description	
Name	D501005 - Secondary Distribution Panelboards
Installation Year	1956
Condition	5 - Very Poor
Expected Useful Life	40 Years
Remaining Useful Life	0 Years
Renewal Year	2022
Quantity / Unit of Measure	2 / Each
Unit Cost	$1,500.00
Difficulty / Regional / Soft Cost Factors	4.00 / 2.50000 / 1.30000
Replacement Cost	$39,000.00

Description

Electrical distribution within the building is controlled by panelboards updated in 2018. The panelboards are rated 100 to 225 Amps.

Condition Narrative

No significant deficiencies were observed or reported. However, the system appears to be original to building construction and can experience electrical or thermal breakdown over time. Lifecycle replacement is recommended.

Photos

Cochrane Powerhouse - D501005

Recommendations

Recommendations #1 - Secondary Distribution Panelboards	
Type	Life Cycle Replacement
Year	2022
Cost	$39,000.00
Priority	Priority D: Building Functionality

Replace Secondary Distribution Panelboards

Recommendations #2 - Undertake an Arc Flash Study	
Type	Arc Flash Study
Year	2022
Cost	$28,800.00
Priority	Priority C: Code Compliance

To account for potential changes to the electrical distribution, recommend a Coordinated and Arc Flash Study be undertaken, every five years, prior to lifecycle replacement or major renovations.

Recommendations #3 - Completion of Single-line diagram	
Type	Single Line Diagram
Year	2022
Cost	$9,600.00
Priority	Priority C: Code Compliance

In anticipation of either a major repair or a lifecycle replacement, recommend the preparation of a single-line diagram.

Element Description	
Name	D502001 - Branch Wiring and Devices
Installation Year	1956
Condition	5 - Very Poor
Expected Useful Life	40 Years
Remaining Useful Life	0 Years
Renewal Year	2022
Quantity / Unit of Measure	247 / SM Building
Unit Cost	$95.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$76,261.25

Description

The electrical distribution system includes branch wiring to end devices such as switches and receptacles. Electrical distribution includes commercial grade insulated copper wire, flex or armoured cable, outlets, switches and receptacles.

Condition Narrative

No significant deficiencies were observed or reported. However, the branch wiring appears to be original and can experience insulation breakdown over time which can eventually result in failure. Replacement is recommended.

Photos

Cochrane Powerhouse - D502001

Recommendations

Recommendations #1 - Branch Wiring and Devices	
Type	Life Cycle Replacement
Year	2022
Cost	$76,261.25
Priority	Priority D: Building Functionality

Replace Branch Wiring and Devices

Element Description	
Name	D502002 - Interior Lighting
Installation Year	2019
Condition	1 - Excellent
Expected Useful Life	35 Years
Remaining Useful Life	32 Years
Renewal Year	2054
Quantity / Unit of Measure	247 / SM Building
Unit Cost	$65.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$52,178.75

Description

Interior lighting is generally provided by linear ceiling mounted light fixtures.

Condition Narrative

No significant deficiencies were observed or reported. The lighting was reportedly upgraded to LED in 2019.

Photos

Cochrane Powerhouse - D502002

Element Description	
Name	D502003 - Exit Lighting
Installation Year	2012
Condition	1 - Excellent
Expected Useful Life	35 Years
Remaining Useful Life	25 Years
Renewal Year	2047
Quantity / Unit of Measure	2 / Each
Unit Cost	$500.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$3,250.00

Description

The exit lighting system includes illuminated single-sided exit signs provided at the designated emergency exists and path of travel. The exit signs are integrated with emergency battery pack units.

Condition Narrative

No significant deficiencies were observed or reported. Upgrade to pictogram exit signs should be considered.

Photos

Cochrane Powerhouse - D502003

Cochrane Powerhouse - D502003

Element Description	
Name	D502041 - Exterior Lighting
Installation Year	2019
Condition	1 - Excellent
Expected Useful Life	20 Years
Remaining Useful Life	17 Years
Renewal Year	2039
Quantity / Unit of Measure	5 / Each
Unit Cost	$500.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$8,125.00

Description

Exterior lighting is provided by wall mounted light fixtures.

Condition Narrative

No significant deficiencies were observed or reported. The lighting was reportedly upgraded to LED in 2019.

Photos

Cochrane Powerhouse - D502041

Cochrane Powerhouse - D502041

Recommendations

Recommendations #1 - Exterior Lighting	
Type	Life Cycle Replacement
Year	2039
Cost	$8,125.00
Priority	Priority D: Building Functionality

Replace Exterior Lighting

Element Description	
Name	D509003 - Emergency Lighting (Battery Backup)
Installation Year	2018
Condition	2 - Good
Expected Useful Life	20 Years
Remaining Useful Life	16 Years
Renewal Year	2038
Quantity / Unit of Measure	1 / Each
Unit Cost	$500.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$1,625.00

Description

The emergency lighting system includes wall mounted battery pack emergency light fixtures.

Condition Narrative

No major deficiencies were observed or reported.

Photos

Cochrane Powerhouse - D509003

Recommendations

Recommendations #1 - Emergency Lighting (Battery Backup)	
Type	Life Cycle Replacement
Year	2038
Cost	$1,625.00
Priority	Priority D: Building Functionality

Replace Emergency Lighting (Battery Backup)

F Special Construction & Demolition
F20

Element Description	
Name	F202010 - Designated Substance Survey
Installation Year	1956
Condition	4 - Poor
Expected Useful Life	100 Years
Remaining Useful Life	50 Years
Renewal Year	2072
Quantity / Unit of Measure	1 / each
Unit Cost	$0.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$0.00

Description

Given the building year of construction (prior to 1985), hazardous building materials and designated substances are suspect either embedded within the building element (partition walls, wall, floor and ceiling finishes, etc.) or contained in the insulation provided external to the building element.

Condition Narrative

To minimize the health risk especially during either a demolition, construction or restoration project recommend a designated substance survey (DSS) be undertaken.

Recommendations

Recommendations #1 - Undertake a Designated Substance Survey	
Type	Environmental Study
Year	2022
Cost	$8,700.00
Priority	Priority F - Suspect Building Designated Substance

To minimize the health risk especially during a demolition, construction or restoration project recommend a designated substance survey (DSS) be undertaken, prior.

G Building Sitework
G20 Site Improvements

Element Description	
Name	G202003 - Parking Paved Surface
Installation Year	1956
Condition	4 - Poor
Expected Useful Life	30 Years
Remaining Useful Life	1 Year
Renewal Year	2023
Quantity / Unit of Measure	650 / SM
Unit Cost	$110.00
Difficulty / Regional / Soft Cost Factors	1.50 / 2.50000 / 1.30000
Replacement Cost	$348,562.50

Description
Asphalt-paved surfaces are constructed adjacent to the building perimeter. Unmarked parking spaces are located along the west elevation. Concrete flatwork is constructed to the north of the building; the flatwork facilitate access through the previous overhead door opening. The parking area is accessed from 2nd Street, which is located to the south of the building.

Condition Narrative
Deterioration in the form of raveling and potholes appears to be systemic to the asphalt paved surface. The potholes appear to impede efficient stormwater drainage from site. Cracks on the concrete flatwork was observed. Replacement of the paved surfaces is recommended. The replacement cost has been increased to accommodate expenditures to create a stormwater management plan and installation of catch basins.

Photos

Cochrane Powerhouse - G202003


Cochrane Powerhouse - G202003

Cochrane Powerhouse - G202003

Cochrane Powerhouse - G202003

Cochrane Powerhouse - G202003

Cochrane Powerhouse - G202003

Recommendations

Recommendations #1 - Parking Paved Surface	
Type	Life Cycle Replacement
Year	2023
Cost	$348,562.50
Priority	Priority D: Building Functionality

Replace Parking Paved Surface

Element Description	
Name	G204001 - Fences and Gates
Installation Year	1956
Condition	2 - Good
Expected Useful Life	30 Years
Remaining Useful Life	5 Years
Renewal Year	2027
Quantity / Unit of Measure	20 / LM
Unit Cost	$265.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$17,225.00

Description

A chain-link fence secures the natural gas meter and piping that is located on the east elevation.

Condition Narrative

No significant deficiencies were observed. Although it appears the chain-link fence has surpassed its expected useful life, based on current condition, lifecycle replacement may be deferred.

Photos

Cochrane Powerhouse - G204001

Cochrane Powerhouse - G204001

Recommendations

Recommendations #1 - Fences and Gates	
Type	Life Cycle Replacement
Year	2027
Cost	$17,225.00
Priority	Priority D: Building Functionality

Replace Fences and Gates

Element Description	
Name	G205004 - Grassed Surfaces
Installation Year	1956
Condition	3 - Fair
Expected Useful Life	50 Years
Remaining Useful Life	2 Years
Renewal Year	2024
Quantity / Unit of Measure	100 / SM
Unit Cost	$20.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$6,500.00

Description

The landscaping consists of lawn spaces and vegetation near the building.

Condition Narrative

The landscaping is generally unkempt. A cost allowance for refurbishment is provided.

Photos

Cochrane Powerhouse - G205004

Cochrane Powerhouse - G205004

Recommendations

Recommendations #1 - Grassed Surfaces	
Type	Life Cycle Replacement
Year	2024
Cost	$6,500.00
Priority	Priority D: Building Functionality

Replace Grassed Surfaces

G30 Site Mechanical Utilities

Element Description	
Name	G301002 - Potable Water Distribution
Installation Year	1956
Condition	3 - Fair
Expected Useful Life	50 Years
Remaining Useful Life	3 Years
Renewal Year	2025
Quantity / Unit of Measure	80 / LM
Unit Cost	$153.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$39,780.00

Description

The underground water supply line is assumed to be equivalent to 4 inch copper piping in a 8 foot trench from the municipality water supply to the service room.

Condition Narrative

The infrastructure service is underground and cannot be fully assessed. However the system appears to be original to building construction and can experience pipe fatigue over time which can result in failure. Lifecycle replacement is recommended. The underground pipe route could not be confirmed during the site assessment. The length is estimated. There does not appear to be a fire hydrant near the building. According to the Ontario Building Code, for a building that is not sprinklered, a fire department pumper vehicle can be located in the access route so that the unobstructed path of travel for the firefighter is not more than 45 m from the hydrant to the vehicle. The installation of a compliant fire hydrant to the building is recommended.

Recommendations

Recommendations #1 - Potable Water Distribution	
Type	Major Repair
Year	2022
Cost	$15,000.00
Priority	Priority C: Code Compliance

According to the Ontario Building Code, for a building that is not sprinklered, a fire department pumper vehicle can be located in the access route so that the unobstructed path of travel for the firefighter is not more than 45 m from the hydrant to the vehicle. The installation of a fire hydrant nearer to the building is recommended.

Recommendations #2 - Potable Water Distribution	
Type	Life Cycle Replacement
Year	2025
Cost	$39,780.00
Priority	Priority D: Building Functionality

Replace Potable Water Distribution

Element Description	
Name	G302001 - Sanitary Sewer System
Installation Year	1956
Condition	3 - Fair
Expected Useful Life	50 Years
Remaining Useful Life	3 Years
Renewal Year	2025
Quantity / Unit of Measure	80 / LM
Unit Cost	$200.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$52,000.00

Description

The underground sanitary sewer line is assumed to be equivalent to 6 inch cast iron piping in a 8 foot trench from the service room to the municipality sewer system.

Condition Narrative

The infrastructure service is underground and cannot be fully assessed. However the system appears to be original to building construction and can experience pipe fatigue over time which can result in failure. Lifecycle replacement is recommended. The underground pipe route could not be confirmed during the site assessment. The length is estimated.

Recommendations

Recommendations #1 - Sanitary Sewer System	
Type	Life Cycle Replacement
Year	2025
Cost	$52,000.00
Priority	Priority D: Building Functionality

Replace Sanitary Sewer System

G40 Site Electrical Utilities

Element Description	
Name	G401011 - Electrical Service
Installation Year	2018
Condition	1 - Excellent
Expected Useful Life	50 Years
Remaining Useful Life	47 Years
Renewal Year	2069
Quantity / Unit of Measure	10 / LM
Unit Cost	$655.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$21,287.50

Description

The overhead electrical service is assumed to be equivalent to 800A 4 wire three phase from the utility transformer to the building electrical service equipment.

Condition Narrative

No significant deficiencies were observed reported. Replacement can be deferred.

G10

Element Description	
Name	G104001 - Potential Environmental Concern
Installation Year	1956
Condition	3 - Fair
Expected Useful Life	200 Years
Remaining Useful Life	50 Years
Renewal Year	2072
Quantity / Unit of Measure	1 / SM
Unit Cost	$0.00
Difficulty / Regional / Soft Cost Factors	1.00 / 2.50000 / 1.30000
Replacement Cost	$0.00

Description

A baseline screening checklist for potential environmental concern was completed at the time of the BCA site visit.

Condition Narrative

Potential environmental concerns were identified at the time of the site visit.

Photos

Cochrane Powerhouse - G104001

Cochrane Powerhouse - G104001

Cochrane Powerhouse - G104001

Cochrane Powerhouse - G104001

Recommendations

Recommendations #1 - Environment Site Assessment	
Type	Environmental Study
Year	2022
Cost	$300,000.00
Priority	Priority E: Potential Environmental Concern

Based on the baseline screening checklist (Potential Environmental Concerns) an Environmental Site Assessment is recommended to confirm, if any, impact to the environment (subsurface soil and groundwater). The cost, which includes potential remediation, is provisional (placeholder) needs to be confirmed by the environmental study.

APPENDIX B

Opinion of Probable Costs Table

OPINION OF PROBABLE COST TABLE

Client	Ontario Northland Transportation Commission
Building Name	Cochrane Powerhouse
Address	3268 Second Street (Drury Lane), Cochrane, Ontario
Current Replacement Value	$3,594,000
General Inflation Rate	0.0%
Regional Factor	2.50
Soft Cost Factor	1.30
Project No.	21096
Assessment Date	September 14, 2021

Element Name	Recommendation Description	Element Condition	Recommendation Type	Expected Useful Life (Years)	Recommendation Priority	Recommendation Year	Quantity	Unit Cost	Unit of Measure	Difficulty Factor	Recommendation Cost	Replacement Phases	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	Totals (2022 - 2041)
A - Substructure																																	
A101001 Standard Foundations	Replace Standard Foundations	2 - Good	Life Cycle Replacement	75	Priority D: Building Functionality	2031	65	$984	LM Footprint	1.00	$207,870	1										$207,870											$207,870
A103001 Slab on Grade	Replace Slab on Grade	2 - Good	Life Cycle Replacement	75	Priority D: Building Functionality	2031	247	$71	SM Footprint	1.00	$57,260	1										$57,260											$57,260
B - Shell																																	
B10 - Superstructure																																	
B103001 Structure	A study to check the condition of the exterior walls, which are load-bearing, is recommended. It is recommended that the study include remedial options, scope of work, and estimated repair costs.	4 - Poor	Engineering Study	75	Priority B: Structural Integrity	2022	N/A	N/A	N/A	1.00	$10,000	1	$10,000																				$10,000
B103001 Structure	Repairs as directed by the proposed study is recommended. The provided cost is for budgeting purposes only. More accurate costs are to be derived from the study.	4 - Poor	Major Repair	75	Priority B: Structural Integrity	2023	N/A	N/A	N/A	1.00	$100,000	1		$100,000																			$100,000
B103001 Structure	The R value of the exterior walls is reportedly very low. The installation of insulating foam during major repair of the walls is recommended.	4 - Poor	Major Repair	75	Priority G - Cost Effective Initiative	2023	N/A	N/A	N/A	1.00	$200,000	1		$200,000																			$200,000
B103001 Structure	Replace Structure	4 - Poor	Life Cycle Replacement	75	Priority D: Building Functionality	2031	247	$280	SM Building	1.00	$224,770	1										$224,770											$224,770
B20 - Exterior Enclosure																																	
B201021 Masonry	Replace Masonry	4 - Poor	Life Cycle Replacement	75	Priority D: Building Functionality	2031	310	$600	SM	1.00	$604,500	1										$604,500											$604,500
B203023 Exterior Single-Door - 1956	Replace Exterior Single-Door	4 - Poor	Life Cycle Replacement	30	Priority D: Building Functionality	2023	2	$1,600	Each	1.00	$10,400	1		$10,400																			$10,400
B30 - Roofing																																	
B301023 Conventional - Single Ply Membrane	Replace Conventional - Single Ply Membrane	2 - Good	Life Cycle Replacement	20	Priority D: Building Functionality	2036	247	$185	SM	1.00	$148,509	1														$148,509							$148,509
C - Interiors																																	
C101001 Fixed Partitions	Replace Fixed Partitions	2 - Good	Life Cycle Replacement	75	Priority D: Building Functionality	2031	247	$95	SM Building	1.00	$76,261	1										$76,261											$76,261
C201002 Exterior Stair Construction - Roof Ladder	Replace Exterior Stair Construction	4 - Poor	Life Cycle Replacement	40	Priority D: Building Functionality	2023	13	$1,000	Per Riser	1.00	$42,250	1		$42,250																			$42,250
C301023 Ceramic Wall Tile	Replace Ceramic Wall Tile	3 - Fair	Life Cycle Replacement	40	Priority D: Building Functionality	2025	420	$160	SM	1.25	$273,000	1				$273,000																	$273,000
C302001 Ceramic / Porcelain Tile Floor Cover	Replace Ceramic / Porcelain Tile Floor Cover	5 - Very Poor	Life Cycle Replacement	40	Priority D: Building Functionality	2022	205	$180	SM	1.00	$119,925	1	$119,925																				$119,925
D - Services																																	
D10 - Conveying																																	
D20 - Plumbing																																	
D202001 Domestic Water Pipes and Fittings	Replace Domestic Water Pipes and Fittings	3 - Fair	Life Cycle Replacement	40	Priority D: Building Functionality	2025	247	$40	SM Building	1.00	$32,110	1				$32,110																	$32,110
D202006 Domestic Hot Water Heaters	Replace Domestic Hot Water Heaters	2 - Good	Life Cycle Replacement	15	Priority D: Building Functionality	2027	284	$36	litre	1.00	$33,228	1						$33,228															$33,228
D30 - HVAC																																	
D301002 Gas Supply Systems	Replace Gas Supply Systems	4 - Poor	Life Cycle Replacement	35	Priority D: Building Functionality	2023	247	$20	SM	1.00	$16,055	1		$16,055																			$16,055
D304007 Exhaust Fans	Replace Exhaust Fans	2 - Good	Life Cycle Replacement	25	Priority D: Building Functionality	2035	1	$6,000	Each	1.00	$19,500	1														$19,500							$19,500
D305002 Suspended Unit Heaters	Replace Suspended Unit Heaters	2 - Good	Life Cycle Replacement	15	Priority D: Building Functionality	2027	1	$5,000	Each	1.00	$16,250	1						$16,250															$16,250
D40 - Fire Protection																																	
D409090 Fire Safety Plans	Allowance to update/prepare a Fire Safety Plan as requested in OFC Section 2.8 Emergency Planning.	4 - Poor	Fire Safety Plan	100	Priority C: Code Compliance	2022	N/A	N/A	N/A	1.00	$5,800	1	$5,800																			$5,800
D50 - Electrical																																	
D501005 Secondary Distribution Panelboards	Replace Secondary Distribution Panelboards	5 - Very Poor	Life Cycle Replacement	40	Priority D: Building Functionality	2022	2	$1,500	Each	4.00	$39,000	1	$39,000																			$39,000
D501005 Secondary Distribution Panelboards	To account for potential changes to the electrical distribution, recommend a Coordinated and Arc Flash Study be undertaken, every five years, prior to lifecycle replacement or major renovations.	5 - Very Poor	Arc Flash Study	40	Priority C: Code Compliance	2022	N/A	N/A	N/A	4.00	$28,800	1	$28,800																			$28,800
D501005 Secondary Distribution Panelboards	In anticipation of either a major repair or a lifecycle replacement, recommend the preparation of a single-line diagram.	5 - Very Poor	Single Line Diagram	40	Priority C: Code Compliance	2022	N/A	N/A	N/A	4.00	$9,600	1	$9,600																			$9,600
D502001 Branch Wiring and Devices	Replace Branch Wiring and Devices	5 - Very Poor	Life Cycle Replacement	40	Priority D: Building Functionality	2022	247	$95	SM Building	1.00	$76,261	1	$76,261																			$76,261
D502041 Exterior Lighting	Replace Exterior Lighting	1 - Excellent	Life Cycle Replacement	20	Priority D: Building Functionality	2039	5	$500	Each	1.00	$8,125	1																		$8,125		$8,125
D509003 Emergency Lighting (Battery Backup)	Replace Emergency Lighting (Battery Backup)	2 - Good	Life Cycle Replacement	20	Priority D: Building Functionality	2038	1	$500	Each	1.00	$1,625	1																	$1,625			$1,625
E - Equipment & Furnishings																																	
F - Special Construction & Demolition																																	
F202010 Designated Substance Survey	To minimize the health risk especially during a demolition, construction or restoration project recommend a designated substance survey (DSS) be undertaken, prior.	4 - Poor	Environmental Study	100	Priority F - Suspect Building Designated Substance	2022	N/A	N/A	N/A	1.00	$8,700	1	$8,700																			$8,700
G - Site Surfacing and Landscaping																																	
G104001 Potential Environmental Concern	Based on the baseline screening checklist (Potential Environmental Concerns) an Environmental Site Assessment is recommended to confirm, if any, impact to the environment (subsurface soil and groundwater). The cost, which includes potential remediation, is provisional (placeholder) needs to be confirmed by the environmental study.	3 - Fair	Environmental Study	200	Priority E: Potential Environmental Concern	2022	N/A	N/A	N/A	1.00	$300,000	1	$300,000																			$300,000
G202003 Parking Paved Surface	Replace Parking Paved Surface	4 - Poor	Life Cycle Replacement	30	Priority D: Building Functionality	2023	650	$110	SM	1.50	$348,563	1		$348,563																			$348,563
G204001 Fences and Gates	Replace Fences and Gates	2 - Good	Life Cycle Replacement	30	Priority D: Building Functionality	2027	20	$265	LM	1.00	$17,225	1						$17,225															$17,225
G205004 Grassed Surfaces	Replace Grassed Surfaces	3 - Fair	Life Cycle Replacement	50	Priority D: Building Functionality	2024	100	$20	SM	1.00	$6,500	1			$6,500																		$6,500
G301002 Potable Water Distribution	According to the Ontario Building Code, for a building that is not sprinklered, a fire department pumper vehicle can be located in the access route so that the unobstructed path of travel for the firefighter is not more than 45 m from the hydrant to the vehicle. The installation of a fire hydrant nearer to the building is recommended.	3 - Fair	Major Repair	50	Priority C: Code Compliance	2022	N/A	N/A	N/A	1.00	$15,000	1	$15,000																			$15,000
G301002 Potable Water Distribution	Replace Potable Water Distribution	3 - Fair	Life Cycle Replacement	50	Priority D: Building Functionality	2025	80	$153	LM	1.00	$39,780	1				$39,780																	$39,780
G302001 Sanitary Sewer System	Replace Sanitary Sewer System	3 - Fair	Life Cycle Replacement	50	Priority D: Building Functionality	2025	80	$200	LM	1.00	$52,000	1				$52,000																	$52,000
				Total Capital Renewals							$3,148,867		$613,086	$717,268	$6,500	$396,890	$0	$66,703	$0	$0	$0	$1,170,661	$0	$0	$0	$19,500	$148,509	$0	$1,625	$8,125	$0	$0	$3,148,867

OPINION OF PROBABLE COST TABLE

Client	Ontario Northland Transportation Commission
Building Name	Cochrane Powerhouse
Address	3268 Second Street (Drury Lane), Cochrane, Ontario
Current Replacement Value	$3,594,000
General Inflation Rate	3.0%
Regional Factor	2.50
Soft Cost Factor	1.30
Project No.	21096
Assessment Date	September 14, 2021

Element Name	Recommendation Description	Element Condition	Recommendation Type	Expected Useful Life (Years)	Recommendation Priority	Recommendation Year	Quantity	Unit Cost	Unit of Measure	Difficulty Factor	Recommendation Cost	Replacement Phases	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	Totals (2022 - 2041)
A - Substructure																																	
A101001 Standard Foundations	Replace Standard Foundations	2 - Good	Life Cycle Replacement	75	Priority D: Building Functionality	2031	65	$984	LM Footprint	1.00	$207,870	1										$271,223											$271,223
A103001 Slab on Grade	Replace Slab on Grade	2 - Good	Life Cycle Replacement	75	Priority D: Building Functionality	2031	247	$71	SM Footprint	1.00	$57,260	1										$74,712											$74,712
B - Shell																																	
B10 - Superstructure																																	
B103001 Structure	A study to check the condition of the exterior walls, which are load-bearing, is recommended. It is recommended that the study include remedial options, scope of work, and estimated repair costs.	4 - Poor	Engineering Study	75	Priority B: Structural Integrity	2022	N/A	N/A	N/A	1.00	$10,000	1	$10,000																				$10,000
B103001 Structure	Repairs as directed by the proposed study is recommended. The provided cost is for budgeting purposes only. More accurate costs are to be derived from the study.	4 - Poor	Major Repair	75	Priority B: Structural Integrity	2023	N/A	N/A	N/A	1.00	$100,000	1		$103,000																			$103,000
B103001 Structure	The R value of the exterior walls is reportedly very low. The installation of insulating foam during major repair of the walls is recommended.	4 - Poor	Major Repair	75	Priority G - Cost Effective Initiative	2023	N/A	N/A	N/A	1.00	$200,000	1		$206,000																			$206,000
B103001 Structure	Replace Structure	4 - Poor	Life Cycle Replacement	75	Priority D: Building Functionality	2031	247	$280	SM Building	1.00	$224,770	1										$293,274											$293,274
B20 - Exterior Enclosure																																	
B201021 Masonry	Replace Masonry	4 - Poor	Life Cycle Replacement	75	Priority D: Building Functionality	2031	310	$600	SM	1.00	$604,500	1										$788,735											$788,735
B203023 Exterior Single-Door - 1956	Replace Exterior Single-Door	4 - Poor	Life Cycle Replacement	30	Priority D: Building Functionality	2023	2	$1,600	Each	1.00	$10,400	1		$10,712																			$10,712
B30 - Roofing																																	
B301023 Conventional - Single Ply Membrane	Replace Conventional - Single Ply Membrane	2 - Good	Life Cycle Replacement	20	Priority D: Building Functionality	2036	247	$185	SM	1.00	$148,509	1															$224,633						$224,633
C - Interiors																																	
C101001 Fixed Partitions	Replace Fixed Partitions	2 - Good	Life Cycle Replacement	75	Priority D: Building Functionality	2031	247	$95	SM Building	1.00	$76,261	1										$99,504											$99,504
C201002 Exterior Stair Construction - Roof Ladder	Replace Exterior Stair Construction	4 - Poor	Life Cycle Replacement	40	Priority D: Building Functionality	2023	13	$1,000	Per Riser	1.00	$42,250	1		$43,518																			$43,518
C301023 Ceramic Wall Tile	Replace Ceramic Wall Tile	3 - Fair	Life Cycle Replacement	40	Priority D: Building Functionality	2025	420	$160	SM	1.25	$273,000	1				$298,314																	$298,314
C302001 Ceramic / Porcelain Tile Floor Cover	Replace Ceramic / Porcelain Tile Floor Cover	5 - Very Poor	Life Cycle Replacement	40	Priority D: Building Functionality	2022	205	$180	SM	1.00	$119,925	1	$119,925																				$119,925
D - Services																																	
D10 - Conveying																																	
D20 - Plumbing																																	
D202001 Domestic Water Pipes and Fittings	Replace Domestic Water Pipes and Fittings	3 - Fair	Life Cycle Replacement	40	Priority D: Building Functionality	2025	247	$40	SM Building	1.00	$32,110	1				$35,087																	$35,087
D202006 Domestic Hot Water Heaters	Replace Domestic Hot Water Heaters	2 - Good	Life Cycle Replacement	15	Priority D: Building Functionality	2027	284	$36	litre	1.00	$33,228	1						$38,520															$38,520
D30 - HVAC																																	
D301002 Gas Supply Systems	Replace Gas Supply Systems	4 - Poor	Life Cycle Replacement	35	Priority D: Building Functionality	2023	247	$20	SM	1.00	$16,055	1		$16,537																			$16,537
D304007 Exhaust Fans	Replace Exhaust Fans	2 - Good	Life Cycle Replacement	25	Priority D: Building Functionality	2035	1	$6,000	Each	1.00	$19,500	1														$28,636							$28,636
D305002 Suspended Unit Heaters	Replace Suspended Unit Heaters	2 - Good	Life Cycle Replacement	15	Priority D: Building Functionality	2027	1	$5,000	Each	1.00	$16,250	1						$18,838															$18,838
D40 - Fire Protection																																	
D409090 Fire Safety Plans	Allowance to update/prepare a Fire Safety Plan as requested in OFC Section 2.8 Emergency Planning.	4 - Poor	Fire Safety Plan	100	Priority C: Code Compliance	2022	N/A	N/A	N/A	1.00	$5,800	1	$5,800																				$5,800
D50 - Electrical																																	
D501005 Secondary Distribution Panelboards	Replace Secondary Distribution Panelboards	5 - Very Poor	Life Cycle Replacement	40	Priority D: Building Functionality	2022	2	$1,500	Each	4.00	$39,000	1	$39,000																				$39,000
D501005 Secondary Distribution Panelboards	To account for potential changes to the electrical distribution, recommend a Coordinated and Arc Flash Study be undertaken, every five years, prior to lifecycle replacement or major renovations.	5 - Very Poor	Arc Flash Study	40	Priority C: Code Compliance	2022	N/A	N/A	N/A	4.00	$28,800	1	$28,800																				$28,800
D501005 Secondary Distribution Panelboards	In anticipation of either a major repair or a lifecycle replacement, recommend the preparation of a single-line diagram.	5 - Very Poor	Single Line Diagram	40	Priority C: Code Compliance	2022	N/A	N/A	N/A	4.00	$9,600	1	$9,600																				$9,600
D502001 Branch Wiring and Devices	Replace Branch Wiring and Devices	5 - Very Poor	Life Cycle Replacement	40	Priority D: Building Functionality	2022	247	$95	SM Building	1.00	$76,261	1	$76,261																				$76,261
D502041 Exterior Lighting	Replace Exterior Lighting	1 - Excellent	Life Cycle Replacement	20	Priority D: Building Functionality	2039	5	$500	Each	1.00	$8,125	1																		$13,429			$13,429
D509003 Emergency Lighting (Battery Backup)	Replace Emergency Lighting (Battery Backup)	2 - Good	Life Cycle Replacement	20	Priority D: Building Functionality	2038	1	$500	Each	1.00	$1,625	1																	$2,608				$2,608
E - Equipment & Furnishings																																	
F - Special Construction & Demolition																																	
F202010 Designated Substance Survey	To minimize the health risk especially during a demolition, construction or restoration project recommend a designated substance survey (DSS) be undertaken, prior.	4 - Poor	Environmental Study	100	Priority F - Suspect Building Designated Substance	2022	N/A	N/A	N/A	1.00	$8,700	1	$8,700																				$8,700
G - Site Surfacing and Landscaping																																	
G104001 Potential Environmental Concern	Based on the baseline screening checklist (Potential Environmental Concerns) an Environmental Site Assessment is recommended to confirm, if any, impact to the environment (subsurface soil and groundwater). The cost, which includes potential remediation, is provisional (placeholder) needs to be confirmed by the environmental study.	3 - Fair	Environmental Study	200	Priority E: Potential Environmental Concern	2022	N/A	N/A	N/A	1.00	$300,000	1	$300,000																				$300,000
G202003 Parking Paved Surface	Replace Parking Paved Surface	4 - Poor	Life Cycle Replacement	30	Priority D: Building Functionality	2023	650	$110	SM	1.50	$348,563	1		$359,019																			$359,019
G204001 Fences and Gates	Replace Fences and Gates	2 - Good	Life Cycle Replacement	30	Priority D: Building Functionality	2027	20	$265	LM	1.00	$17,225	1						$19,968															$19,968
G205004 Grassed Surfaces	Replace Grassed Surfaces	3 - Fair	Life Cycle Replacement	50	Priority D: Building Functionality	2024	100	$20	SM	1.00	$6,500	1			$6,896																		$6,896
G301002 Potable Water Distribution	According to the Ontario Building Code, for a building that is not sprinklered, a fire department pumper vehicle can be located in the access route so that the unobstructed path of travel for the firefighter is not more than 45 m from the hydrant to the vehicle. The installation of a fire hydrant nearer to the building is recommended.	3 - Fair	Major Repair	50	Priority C: Code Compliance	2022	N/A	N/A	N/A	1.00	$15,000	1	$15,000																				$15,000
G301002 Potable Water Distribution	Replace Potable Water Distribution	3 - Fair	Life Cycle Replacement	50	Priority D: Building Functionality	2025	80	$153	LM	1.00	$39,780	1				$43,469																	$43,469
G302001 Sanitary Sewer System	Replace Sanitary Sewer System	3 - Fair	Life Cycle Replacement	50	Priority D: Building Functionality	2025	80	$200	LM	1.00	$52,000	1				$56,822																	$56,822
				Total Capital Renewals							$3,148,867		$613,086	$738,786	$6,896	$433,692	$0	$77,327	$0	$0	$0	$1,527,448	$0	$0	$0	$28,636	$224,633	$0	$2,608	$13,429	$0	$0	$3,666,541

APPENDIX C

Code Checklist

Building Code Checklist

Address	326B Second Street (Drury Lane), Cochrane, ON
Number of Storeys *(above grade)*	1
Number of Storeys *(below grade)*	0
Building Classification	F, Division 3 - Low Hazard Industrial
Building Area (m^2)	246.2
Assessor	Andrew Chow
Date	September 14, 2021

Uniformat	Code Description	Code Reference	Checklist Questions	Answers	Compliance
B202001 Exterior Windows	**Windows above the first floor,** located lower than 450mm above the floor require a guard preventing the window from opening more than 100mm.	3.3.4.8 3.3.4.8	Questions below are for windows above first floor: Height of operable window above finished floor > 1070 mm?	N/A	N/A
			Height of operable window from **ground on exterior side** < 1800 mm?	N/A	
			Is there a guard at the operable window (where the window is below 1070 mm)?	N/A	
			Unobstructed opening has any dimension > 380 mm?	N/A	
			If above answer is "yes", is there a dimension < 100 mm?	N/A	
B301002 - Coventional Roof Membrane	Worker has access to the perimeter or open side of a roof, and may be exposed to fall of 2.4 M or more.	OH&S O,Reg 213/91 S 26.3 (4)	At open side of the roof a guardrail system which has a top rail, an intermediate rail and toe board needs to be provided.	N/A	N/A
C1020 Interior Doors	Major occupancies shall be separated from adjoining major occupancies by fire separations having fire-resistance ratings conforming to Table 3.1.3.1. (fire separation door only)	3.1.3.1 3.1.8.4	Building Classification	F, Division 3 - Low Hazard Industrial	N/A
			Other type of major occupancy (select)	F, Division 2 - Medium Hazard Industrial	
			Required Rating of **Fire Separation** (based on selection of major occupancy)	N/A	
			Required Rating of Rating of **Door** (based on Fire Resistance Rating of Fire Separation)	N/A	
			Does fire resistance rating of the **door** meet the required rating above?	N/A	
C101001 Interior Partitions	Penetrations of a fire separation or a membrane forming part of an assembly required to have a fire-resistance rating shall be sealed by a fire stop.	3.1.9.1(1)(a)	**General:** Are there fire stops at locations where the fire separations have been penetrated?	N/A	N/A
C1020 Interior Doors	Every door in a fire separation shall be equipped with a self-closing device	3.1.8.11 (1)	At the fire separations, do doors have self-closing devices (i.e. door closers)?	N/A	N/A
C1020 Interior Doors	Fuel-fired appliances shall be installed in service rooms separated from the remainder of the building by fire separations having a fire-resistance rating not less than 1 h.	3.6.2.1	For service rooms, are the doors fire rated?	N/A	N/A
C1020 Interior Doors	A swing-type door from a service room containing a boiler or incinerator shall swing outward from the room, except that the door shall swing inward if the door opens onto a corridor or any room used for an assembly occupancy.	3.6.2.6 (1)	For service rooms with **a boiler or incinerator**, do doors swing outward (except if door open into corridor or any room for an assembly occupancy)?	N/A	N/A
C1020 Interior Doors	A door that opens into a corridor or other facility provided access to exit from a room or suite shall swing in the direction of travel to the exit, if the room or suite is used for a) an occupant load more than 60, b) a high hazard industrial occupancy	3.3.1.10 (2)	Do doors swing in the direction of travel to the exit?	N/A	N/A
C201001 Stair Construction	The height of guards for exit stairs shall be not less than 920 mm measured vertically to the top of the guard from a line drawn through the outside edges of the stair nosings and 1070 mm around landings.	3.4.6.6 (2)	Guard height > 1070 mm?	Yes	N/A
	General: Openings between guards/balustrades shall be a maximum of 100mm	3.4.6.6 (5)	**General:** Can a spherical object having a diameter of **100 mm** pass through the guards/balustrades?	N/A	
	Industrial Occupancy: Openings between guards/balustrades shall be a maximum of 200mm	3.4.6.6 (6)	**Industrial Occupancy:** Can a spherical object having a diameter of **200 mm** pass through the guards/balustrades?	No	
C201027 Access Ladder	Access ladder fixed in position	OH&S O,Reg 213/91 S 84 (1)(d)	Where a ladder extends 5.0 M above grade, floor or landing, shall have a safety cage commencing not more than 2.2 M above grade, floor or landing	Yes	Compliant
		OH&S O,Reg 213/91 S 84 (1)(e)	Shall have side rails that extend 90 cms above the landing	Yes	
		OH&S O,Reg 213/91 S 84 (1)(f)	Shall have rungs that are at least 15 centimetres from the wall and spaced at regular intervals	Yes	
		OH&S O,Reg 213/91 S 84 (1)(g)	Shall have adequate landing surface that is clear of obstruction at the top and bottom of the ladder access and egress	Yes	
D2020 Domestic Water Distribution	Every potable water system that supplies a fixture or tank that is not subject to pressures above atmospheric shall be protected against back-siphonage by a backflow preventer. Where a potable water supply is connected to a boiler, tank, cooling jacket, lawn sprinkler system or other device where a non-potable fluid may be under pressure that is above atmospheric or the water outlet may be submerged in the non-potable fluid, the water supply shall be protected against backflow by a backflow preventer.	7.6.2.2 (1) 7.6.2.2 (2)	Are there fixtures, tanks, or boiler systems connected to a potable water supply?	No	N/A
			Is there a backflow preventer?	N/A	
D304007 Exhaust Systems	Ventilation can be provided by natural ventilation or a combination of natural and mechanical ventilation in - buildings of industrial occupancy where the nature of the process contained in them permits or requires the use of large openings in the building envelope even during the winter or - seasonal buildings not intended to be occupied during the winter.	6.2.2.1 (1)(b)(c)	Building Classification	F	N/A
			Industrial Occupancy: Does the nature of the process contained in the building permit or require the use of large openings in the building envelope even during the winter?	N/A	
			Is this building a seasonal building that is not intended to be occupied in winter?	N/A	
			Is there a mechancal ventilation?	N/A	
D401001 Sprinklers	The fire department connection for a sprinkler system shall be located so that the distance from the fire department connection to a hydrant is not more than 45 m and is unobstructed.	3.2.5.16 (2)	Distance between the hydrant and fire department connection is less than 45m?	N/A	N/A
	The fire department connections provided with two 65 mm hose connections with female swivel hose couplings.	3.2.5.16 (3)(b)	The fire department connection is provided with two female swivel hose couplings?	N/A	
D401001 Sprinklers	Fire protection systems shall be protected by backflow preventers	7.6.2.4	Is there a backflow preventer for the fire protection system?	N/A	N/A
D402001 Standpipes	A standpipe system shall be installed in every building that, (a) is more than 3 storeys in building height, (b) is more than 14 m high measured between grade and the ceiling of the top storey, or (c) is not more than 14 m high measured between grade and the ceiling of the top storey but has a building area exceeding the area shown in Table 3.2.9.1. for the applicable building height if the building is not sprinklered	3.2.9.1	Number of storeys	1	N/A
			Building Classification	F	
			Area of building (m^2)	246.185	
			Height between grade and ceiling of top storey > 14m?	No	
			Is there a sprinkler system?	No	
D402001 Standpipes	The fire department connection for a standpipe system shall be located so that the distance from the fire department connection to a hydrant is not more than 45 m and is unobstructed.	3.2.5.16 (1)	Distance between the hydrant and fire department connection is less than 45m?	Yes	Compliant
	The fire department connections provided with two 65 mm hose connections with female swivel hose couplings.	3.2.5.16 (3)(b)	The fire department connection is provided with two female swivel hose couplings?	Yes	
D403001 Fire Extinguishers	Portable Fire Extinguishers are to be installed in all buildings other than single dwelling units (For buildings three or fewer storeys in height, building area not exceeding 600 m2, and major occupancy C, D, E, F-1,F-2)	9.10.20.4	Number of storeys	1	Compliant
			Building Classification	F	
			Area of building (m^2)	246.185	
			Are portable fire extinguishers installed?	Yes	
D503001 Fire Alarm System	Buildings require a fire alarm system when it: is sprinklered, is more than 3 storeys.	3.2.4.1	Is there an automatic sprinkler system?	No	N/A

Building Code Checklist

			Number of storeys (including storeys below the first storey)	1	
			Is there a fire alarm system?	N/A	
D503001 Fire Alarm System	Audible alarm systems are required in buildings 3 storeys and over (includes pull stations, visible strobes, audible ringer	3.2.4.18	Are there audible fire alarm systems?	Yes	Compliant
	Visual signal devices shall be installed in addition to audible signal devices in all buildings	3.2.4.19 (4)(b)	Are there visual signal devices (strobe lights) in public corridors for the fire alarm system?	N/A	N/A
D503001 Fire Alarm System	Carbon monoxide monitoring devices and nitrogen detectors are required in storage and repair garages **that are enclosed**.	6.2.2.3(1)(a) 6.2.2.3(2)	Is the building typically enclosed?	Yes	N/A
			Are there vehicles with **gasoline** fueled engines?	No	
			Are there carbon monoxide monitoring devices?	N/A	
			Is there a mechanical ventilation system controlled automatically by a carbon monoxide monitoring device?	N/A	
		6.2.2.3(1)(b) 6.2.2.3(2)	Is the building typically enclosed?	Yes	N/A
			Are there vehicles with **diesel** fueled engines?	No	
			Are there nitrogen dioxide detectors?	N/A	
			Is there a mechanical ventilation system controlled automatically by a nitrogen dioxide detector?	N/A	
D509003 Emergency Lighting (Backup)	Emergency lighting required to illuminate escape routes	3.2.7.3	Is there emergency lighting at the exits?	Yes	Compliant
			Is there emergency lighting principal routes providing access to an exit?	N/A	N/A
			Is there emergency lighting public corridors?	N/A	N/A
			Is there emergency lighting underground walkways?	N/A	N/A
D502051 Exit Lighting	Exit signs are required over every exit door in buildings greater than 2 storeys in height (For buildings with occupant load ≥ 150 persons) Internally illuminated exit signs shall be continuously illuminated.	3.4.5.1 9.9.11.3	Number of storeys	1	Compliant
			Occupant load (number of persons)	<150	
			Are internally illuminated exit signs lit?	Yes	
			Does every exit door have an exit sign placed over or adjacent to it?	Yes	
G2010 Roadways	Access routes for fire department vehicles shall be provided and shall be not less than 9 m wide.	3.10.4.5 (2)	Access routes for fire department vehicles have a width at least 9m wide?	Yes	Compliant
G3010 Water Supply	For a building that is not sprinklered, a fire department pumper vehicle can be located in the access route so that the unobstructed path of travel for the firefighter is not more than 45 m from the hydrant to the vehicle	3.10.4.5 (3) 3.10.3.4 (3)(b)(i)	Are hydrants located along the access routes, a maximum 45m from a fire department vehicle on the route?	No	Non-compliant

Ontario Northland Transportation Commission

Cochrane Powerhouse

2026-03-25/ Study

G architects
Kingston · London · Timmins · Toronto

Table of Contents

1.0 Introduction

1.1 Summary

G architect was retained by Ontario Northland Transportation Commission to provide an architectural and engineering study to define safe, code-compliant, and cost-effective upgrades to the Cochrane Powerhouse, a 2,650 sq. ft. industrial support facility adjacent to the Cochrane Diesel Shop. The facility houses oil/water separation equipment, battery storage and charging, heavy machinery, and electrical distribution systems, and is currently constrained by inadequate ventilation, deteriorated flooring, and compliance risks.

G architects, is supported by Quasar Consulting Group as the Mechanical and Electrical Engineering subconsultant for the study. Both parties have completed site reviews to document existing conditions related to ventilation, flooring, battery charging, fire safety, and electrical clearances. The observations, findings and recommendations within this report are based on the site reviews, relevant codes and standards, and best practices.

1.2 Available Information

- Building Envelope - Issued for Tender Drawings dated October 2023.
- Building Condition Assessment Report dated September 2022.

1.3 References

- Ontario Building Code (OBC)
- Ontario Fire Code (OFC)
- National Fire Code (NFC)
- National Fire Protection Association (NFPA)
- American Society of Heating, Refridgerating and Air Conditioning Engineers (ASHRAE)
- Occupational Safety and Health Administration (OHSA)
- Canadian Standards Association (CSA)
- Ontario Electrical Safety Code (OESC)
- Canadian Centre for Occupational Health and Safety (CCOHS)

1.4 Appendices

- Existing Floor Plan and Draft Conceptual Plans

2.0 Architectural

2.1 Summary

ONTC has indicated that they have concerns with potential fire safety issues and deteriorated flooring within the building. The following sections will outline observations related to fire safety and flooring condition, findings and recommendations for remedial action if required.

An Architectural site review was conducted by Holly Sutton of G architects on March 6th, 2026. The review was limited to a review of the condition of the existing flooring and the overall fire safety within the building. Below are the observations noted from the site review, along with further review of applicable codes.

2.2 Observations

1. **Fire Safety (Ontario Building Code)**
    1) Building Description
    The facility is a one storey building facing one access road, it contains no basement or mezzanine. The building is approximately 2,655sq.ft (247m2) in building area. The existing building is essentially one open room, the dividing interior wall shown in plan is partial height. The building is slab on grade, the structure appears to be a steel structure with no fire rating. The wall composition appears to be a combination of noncombustible materials (steel, tile, masonry, etc..). There were no visible fire alarms or sprinkler systems in place. There was one portable eyewash station, refer to existing plan for location.

    2) OBC Classification
    The existing building is classified as a Group F, Division 2 Medium Hazard Industrial Occupancy according to the Ontario Building Code.

    3) OBC Building Size and Construction
    The building would be considered a Group F, Division 2, up to 2 Storey (3.2.2.80). This section of the OBC allows for the building to be of combustible of noncombustible construction. There are no require fire resistance ratings to the roof or loadbearing walls columns and arches.

The use of the facility is understood to include the following functions/program:

- Storage of an assortment of batteries
- Charging station for the above-mentioned batteries
- Oil separation (engine oil & hydraulic oil)
- Miscellaneous tire storage

There is electrical equipment within the space.

2. Potential Hazards

1) Oil Separator
   ONTC identified the oil separator is used to separate a combination of engine oil (20 W40) & hydraulic oil. Exact make/model of oil was not provided. The oil is located on a platform at the center of the facility.

2) Battery Storage and Charging
   The following types of batteries were identified as being stored and/or charged within the facility:
   - Lead Acid Batteries (Sulfuric Acid)
   - Alkaline Batteries (Potassium Hydroxide)
   - Nickel Cadmium Batteries

   ONTC indicated that the large 8V Lead Acid Batteries will remain in the facility, all other batteries are to be relocated. There were no visible means for cleaning up spills related to the batteries.

3) Tire Storage
   The tire storage within the facility is well below the amount which would be considered a hazard.

4) Electrical Equipment
   The electrical equipment in the space is located adjacent to the battery storage and charging area. The electrical equipment could be considered a source of ignition should there be any failures, loose connections, or overheating. A full review of the condition of the electrical equipment was not completed as part of this study.

3. Portable Fire Extinguishers

There were three existing fire extinguishers (type ABC) noted on site as indicated in the existing plan.

4. Flooring Deterioration

1) The existing ceramic floor tile was noted to be missing and cracked at various locations at the North end of the existing facility (see Photo 2.1-2.3). The deterioration is likely caused by the use or heavy equipment (forklift or telehandler).
2) At one floor drain (Photo 2.1), it was noted that the concrete below the tile had deteriorated. Cause of concrete deterioration is unknown. The concrete slab appeared to be in good condition otherwise, no visible cracking was observed.
3) Some floor patching was observed at the South end of the existing facility (see Photo 1.8). Based on the rectangular shape of the patching there was likely a piece of equipment with a concrete housekeeping pad that was removed at this location. With the configuration of the space it is unlikely that heavy equipment can access the Central or South areas of the existing building.
4) Throughout the facility the ceramic tile grout appeared to be in relatively poor condition, the grout appeared to be stained and chipped in some locations. The ceramic tile appears to extend beneath the oil separator support structure.

2.3 Findings

1. <u>Potential Hazards (WHMIS/SDS, NFPA 400)</u>

1) Engine Oil

<u>Safety Data Sheet (SDS) for Red Giant Locomotive Engine Oil (20W-40).</u>
Engine Oil is not considered a physically hazardous substance under normal conditions. It has a flash point of 258 degrees Celsius and is considered to be a low fire hazard as it must be heated for ignition to occur. It is considered reactive with oxidizing agents such as acids and alkalis.
The following are handling and storage guidelines:

- Do not smoke, eat or drink while handling.
- Use only with adequate ventilation, wear respiratory equipment when there is insufficient ventilation.
- Keep away from heat and sources of ignition.
- Keep in a dry, cool and well-ventilated place.
- Storage guidelines are based on the condition of the product being stored in a closed container.

2) Hydraulic Oil

<u>Safety Data Sheet (SDS) for Mobil Hydraul 56.</u>
Hydraulic Oil is not considered a physically hazardous substance under normal conditions. It has a flash point of 200 degrees Celsius and is considered ignitable.
It is considered reactive with strong oxidizers. It is considered a static accumulator.
The following are handling and storage guidelines:

- Do not smoke, eat or drink while handling.
- Use only with adequate ventilation, wear respiratory equipment when there is insufficient ventilation.
- Keep away from heat and sources of ignition.
- Keep away from high energy sources of ignition.
- Keep in a dry, cool and well-ventilated place.
- Storage guidelines are based on the condition of the product being stored in a closed container.

3) Lead Acid Batteries (Sulfuric Acid)

Safety Data Sheet (SDS) for Rolls Battery Engineering (Flooded Lead acid battery, wet).
Lead Acid Batteries are considered an oxidizer in that they are known to intensify fire. When left to overcharge at a high current they can be a source of ignition. During charging they emit hydrogen gas. Contact with combustible and organic materials may cause fire or violent reaction. Contact with metals, water, strong acids and bases should also be avoided. Chemicals if swallowed are harmful, and exposure to skin can cause severe skin burns. Lead Acid Batteries are considered both a Physical and Health Hazards. The following are handling and storage guidelines:

- Do not breach casing or empty contents of the battery.
- Keep away from combustible materials, organic chemicals, reducing substances, metals, strong oxidizers and water.
- Do not smoke, eat or drink while handling.
- Charge only with adequate ventilation.
- Keep away from heat and sources of ignition.
- Keep in a dry, cool and well-ventilated place.

WHIMIS Hazard Class & Categories

- Oxidizing liquid, category 3;H272 May intensify fire; oxidizer.
- Acute toxicity(oral), category 4;H302 Harmful if swallowed.
- Lactation effect;H362 May cause harm to breast-fed children.
- Skin corrosion/irritation category 1A;H314 Causes severe skin burns and eye damage.
- Serious eye damage / eye irritation, category 1;H318 Causes serious eye damage.
- Reproductive toxicity, category 1;H360 May damage fertility or the unborn child.
- Specific target organ toxicity, repeated exposure category 1;H372 Causes damage to organs through prolonged or repeated exposure.
- Aquatic toxicity (acute), category 1;H400 Very toxic to aquatic life.
- Aquatic toxicity (chronic), category 1;H410 Very toxic to aquatic life with long lasting effects.

NFPA 400 Hazardous Materials Code

- As a class 3 Oxidizing Liquid, the batteries are considered a High-Hazard Level 2 Content according to NFPA 400.
- To be considered stored in a controlled area, the volume of hazardous material must abide by Table 5.2.1.5.3(a) Maximum Allowable Quantities (MAQ) per Indoor and Outdoor Control Area for Selected Hazard Categories in Mercantile, Storage, and Industrial Occupancies. This table permits the storage of 568L (converted to 681.6kgs) of class 3 Oxidizing Liquids in a controlled area.
- Exact amount of sulfuric acid per battery is not indicated in the documentation for the batteries. There are 16 batteries being stored (160kg each), assuming that each has +/-30-60% sulfuric acid content as per the SDS, they would each have an assumed 48-96kgs of sulfuric acid. In total there would be 768-1536kgs of sulfuric acid being stored, which is over the permitted 681.6kgs allowed in a control area.

2. Portable Fire Extinguishers

The three type ABC (dry chemical) fire extinguishers are suitable for use related to the hazards presented in the storage and oil separator area of the facility.

CO2 fire extinguishers (type BC) are recommended for extinguishing fires related to the battery area.

3. Flooring Deterioration

1) The deteriorated flooring at the North end of the facility presents a workplace safety risk in terms of slips trips and falls. The Central and South areas of the building presents a lesser hazard in terms of slips trips and falls.
2) Although the existing ceramic floor tile may have some chemical resistant properties, it cannot be determined if the current tile is suitable for chemical spills without knowing the origin of the tile. The condition and staining of the grout indicates high absorption which likely indicates that the current tile grout is cementitious and is not suitable for chemical spills.

2.4 Recommendations

1. <u>Oil Storage (Engine Oil & Hydraulic Oil)</u>

1) Storage
The SDS sheets for both types of oil indicate storage and handling requirements that assume the oil is stored in closed containers. This is not the case for the oil separating process being completed within the facility as the oil separator is open.
Both types of oil pose a low hazard on their own but are noted to be reactive if exposed to oxidizing agents. This is considered a concern in relation to the storage of batteries which are considered oxidizers next to open oil. Refer to the recommendations in the next section related to fire separations.

2) Ventilation
Both types of oil require storage and handling in a well-ventilated space. At the time of the site visit there was no ventilation system in place. Refer to Mechanical for recommendations related to ventilation.

2. <u>Lead Acid Batteries (Sulfuric Acid)</u>

1) Spills and Neutralization
The recommended measures for smalls spills include utilizing sand, earth or vermiculite. The recommended measures for neutralizing spilled electrolyte include lime, soda ash or bicarbonate. It is recommended that ONTC provide both a means for spill cleanup and neutralization adjacent to the battery charging areas.
It is also recommended that the batteries sit on a spill containment tray to prevent the potential spills from spreading.

2) First Aid Measures
The nearest eyewash station is located at the other end of the facility (+/-17m away), beyond a partition. CCOHS recommends installation of eyewash and emergency shower stations to be within 10 seconds (16-17m) of the hazard and within sight of the hazard. Due to the Health Hazards associated with exposure to the chemicals in the batteries, it is recommended that an eyewash station and emergency shower be located adjacent to the battery charging area.

3) Signage
It is recommended to provide signage at the entrance to each door leading to the battery charging area (total of 3).

4) Automatic Fire Protection
There is a higher hazard associated with the amount of stored sulfuric acid (oxidizer) content than is permitted in a controlled area for a medium hazard facility. As a result of exceeding the permitted amount of Hazardous Materials, the NFPA 400 requires the materials to either be located within a sprinklered building or located in a storage cabinet or enclosure.

It is understood that there is not adequate water supply available to provide a sprinkler system without significant infrastructure upgrades to the area. For this reason, this report outlines options for separation of batteries from other occupancies rather than automatic fire protection.

The Authorities Having Jurisdiction and the local Fire Department should be consulted further to discuss potential fire protection of the facility.

5) Ventilation
The batteries require proper ventilation, specifically during the charging process as they emit hydrogen gas. At the time of the site visit there was no ventilation system in operation. Refer to Mechanical for recommendations related to ventilation.

6) Separation of Batteries
It is recommended that the batteries be separated from the other uses within the facility. There are three potential options for providing this separation for the ONTC to consider below.

Option 1 - Fire Separation
Based on the information gathered related to relevant standards and codes, at the very minimum the batteries should be stored in an enclosed area away from the oil separator with a minimum of a 2hr fire separation between the two spaces. This recommendation aligns with the OBCs fire resistance rating as per Section 3.3.6.2 - Storage of Dangerous Goods.
It is recommended that a 2 hr fire separation at the existing partial height wall be constructed. The new 2 hr fire separation is to extend from finished floor to underside of roof deck. At openings between the two spaces, fire rated doors will be required. All penetrations through the fire rating will need to be fire stopped.
It should be noted that this option addresses physical hazards related to the batteries and oil separator but does not address any potential hazards related to the batteries and electrical equipment.

Option 2 – Battery Enclosure (Interior)

The electrical equipment adjacent to the batteries could be a source of ignition should there be a failure, overheating, or loose connections. A full review of the condition of the electrical equipment was not completed as part of this study.

To eliminate potential hazards associated with both the oil separator and the electrical equipment, the next option would be to fully separate the batteries from the remainder of the facility. It is recommended to provide an explosion proof battery enclosure for the storage of the batteries.

The enclosure would likely need to be provided by a specialized battery enclosure supplier to suit the quantity and size of the batteries. It would also require ventilation and explosion proof devices and fixtures rated for the hazard.

Option 3 – Battery Enclosure (Exterior)

Given the number of physical and health hazards associated with the batteries, the ONTC has indicated that they may consider a sea can style battery enclosure located outside of the existing facility.

The enclosure would require ventilation, heating, cooling, and power for battery charging.

The enclosure would likely need to be provided by a specialized battery enclosure supplier to suit the quantity and size of the batteries.

3. Portable Fire Extinguishers

It is recommended to relocate the type ABC (dry chemical) fire extinguisher to the oil separator and storage area and provide a type BC (CO_2) fire extinguisher to the battery area. See attached conceptual plan.

4. Flooring Deterioration

1) Flooring Removal

It is recommended to remove the existing ceramic tile flooring (approximately 1,780sq ft) down to the concrete slab. The following temporary removals will be required to complete the floor removals:

- Removal of tire storage.
- Removal of all batteries.
- Removal of compressors and other miscelleneous equipment not located on housekeeping pads.

All grout and mortar is to be removed completely from the slab. In some cases this process can damage the concrete control joints, it is recommended to carry an allowance for the repair of the control joints.

Where previous concrete patching has been completed some removals may be required to ensure that the existing slab surface is fully level.

2) New Flooring

It is recommended to provide a concrete skim coat throughout the entire slab to ensure that the slab is level to receive the new floor finish. Lastly, a new chemical and slip resistant epoxy floor finish is recommended, the epoxy flooring will need to have adequate strength support the heavy equipment. The following manufacturers are reputable suppliers:

- Stonehard (US company with offices in Canada)
- Sika (Swiss company with offices in Canada)

Typically epoxy flooring requires certain temperatures and ventilation requirements for curing, these requirements should be reviewed further if ONTC chooses to proceed with this option.

3) Extent of Removals

It is noted that removals under the existing oil separator are likely not feasible without extensive rework of the oil separator system and the support structure for the oil separator. Unless significant rework of this system is anticipated it is recommended that the flooring replacement is to exclude the cermaic tile below the oil separator.

3.0 Mechanical

3.1 Summary

ONTC has indicated that they have concerns with potential ventilation issues within the facility. The following sections outlines observations related to ventilation along with findings and recommendations for remedial action.

A mechanical site review was conducted by Quasar Consulting Group on March 17th, 2026. The review was limited to a review of the condition of the existing ventilation system, as well as a review of the facility's usage and equipment which might impact the ventilation requirements. Below are the observations noted from the site review, along with a further review of applicable codes.

3.2 Observations

1. **Oil Separator**

   The building is located next to the Cochrane Diesel Shop and one of its primary uses is to serve as an oil separation and storage facility. The floor drains in the adjacent diesel shop which have the potential of collecting oil terminate under the slab in the powerhouse into a pit where they are pumped into the oil separator. Once in the separator tanks (see Photo 3.1), the oil and contaminated water are separated, and the oil is stored in a large containment tank (see Photo 3.2). GFL Environmental Inc. remove the contaminated oil in the large containment tank from the site. ONTC do a daily inspection of the oil separator and GFL do a monthly inspection.

2. **Battery Storage and Charging**

   The facility also serves as a location for storage and charging of locomotive batteries. There were both lead-acid and nickel-cadmium (NiCd) batteries being stored at the time of the survey. Discussions with the ONTC have revealed that the NiCd (see Photo 3.3) are no longer being used or charged on site and are likely slated for disposal. Given this information, the further recommendations regarding battery ventilation are made referring only to the lead-acid batteries (see Photo 3.4). There were approximately 16 of these batteries being stored on site at the time of the survey. The facility is also equipped with two separate charging stations, although only one is now being used (see Photo 3.5).

3. **Ventilation**

   The only mechanical means of ventilation in the building is provided by an axial wall exhaust fan (see Photo 3.6). The fan is controlled only by an ON/OFF switch on the wall. This fan was installed in 2010 and was manufactured by CANARM, the capacity of the fan is not known. Building occupants have reported that the fan is incapable of removing odours originating from the oil separator.

   Currently, the only supply of fresh air to the building is the infiltration rate induced by the exhaust fan, as well as natural ventilation from the garage door being open.

3.3 Findings

1. **Ventilation Requirements**

   The standard referenced in the Ontario Building Code (OBC) to prescribe minimum outdoor air supply rates and exhaust rates in indoor spaces is ASHRAE 62.1. Since the building's purpose is primarily storage and oil separation and not intended for continuous occupancy, there is ASHRAE requirement to maintain a constant supply of fresh air to the space. However, the OBC does require air contaminants within buildings to be removed and not be permitted to accumulate in concentrations greater than those permitted by good engineering practices. The National Fire Code (NFC) and the Occupational Health and Safety Act (OSHA) also have variations of this requirement to prevent the accumulation of toxic vapours and promote health and safety.

2. **Oil Separator**

   The above-grade oil-water separator acts as a continuous source of airborne contaminants. Since the liquid surfaces of the interceptor are open, they are the primary source of contaminants. The contaminants include volatile organic compounds (VOCs), hydrocarbons and odours vapours.

   To maintain the concentration of contaminants below their acceptable thresholds, dilution of the ambient air with outdoor air is necessary. Replacing the air in the workshop on a cyclical basis will prevent the contaminants from accumulating to unsafe levels. Ideally, the ventilation sequence treating the contaminated air is automated without over-reliance on air monitoring sensors. The accuracy of air monitoring sensors will drift over time as they require calibration. Instead of relying on a continuous re-calibration schedule to achieve an acceptable level of air dilution, the sensors can serve as audible alarms for the occupants in the event of an upper limit detection. The air dilution should be implemented using a minimum level of baseline ventilation on a set schedule, as well as occupancy-driven ventilation.

3. **Battery Charging**

   The batteries which are stored and charged within the space emit hydrogen gas while they are charging, primarily at the end of the charging cycle. As per CSA C22.1, rooms that contain batteries that vent hydrogen to the atmosphere must be properly ventilated. Lead-acid batteries shall also not be subjected to ambient temperatures greater than 45°C or less than the freezing point of the electrolyte. When discharged, the freezing point of the electrolyte in lead-acid batteries can be as high as -7°C.

To calculate the hydrogen gas being generated, the following standard industry formula was used.

$$H = N \cdot \frac{C \cdot P \cdot G \cdot A}{R}$$

H: Hydrogen gas produced during the recharge of a lead-acid battery, ft3H/h

N: Number of batteries

C: Number of cells per battery

P: Percentage of overcharge during recharge

G: Volume of hydrogen produced by one amp hour of charging, ft3/Ah

A: 6 hour rated capacity of the battery in amp-hours, Ah

R: Number of hours the battery is overcharged, h

To halt the accumulation of hydrogen above the permitted threshold of 1% concentration, we divide the rate at which hydrogen is being generated by the permissible concentration to find our minimum exhaust rate.

F_{Ex}: Minimum exhaust rate, cfm

$$F_{Ex} \approx \pm 100\ cfm$$

3.4 Recommendations

1. **Oil Separator Ventilation**

   To dilute the airborne contaminants originating from the oil separator from the ambient air, we recommend the installation of a natural gas-fired Make-Up Air Unit (MUA). The unit can be installed outside of the building, on the roof. If the unit is located on or supported by the roof, a review of the existing structure will be required to determine if it can accommodate the weight of the unit. The incoming fresh air will be heated with a natural gas burner and assist the existing unit heater in maintaining the building's temperature setpoint as it provides fresh air.

   Since the building does not require a continuous supply of fresh air, the MUA can operate intermittently. To prevent the accumulation of VOCs and odour vapours from the oil separator, we recommend the unit be capable of providing an airflow rate of 4 air changes per hour (ACH). We recommend running the unit on a set schedule of 15 minutes every hour, or continuously under detection of occupants in the building. This sequence will reliably ensure a baseline level of dilution ventilation whenever someone enters the facility, and if they work within the facility for a continuous period, an adequate supply of fresh air is available.

   We also recommend replacing the existing exhaust fan with a new fan sized to work in conjunction with the new MUA. The wall opening for the existing exhaust fan can be re-used. The exhaust fan and the MUA will be controlled to work together.

2. **Battery Charging Ventilation**

   To limit the accumulation of hydrogen from the battery charging process inside the space, we recommend treating the battery area with the same strategy as the oil separation area. An exhaust duct can be installed above the battery charging station to ensure that all rising hydrogen is captured at the source. Since the rate at which the batteries are off gassing while they are charging is very low, the installation of an exhaust hood directly above the charging station is not required. The battery charger should be interconnected with the MUA and exhaust fan to automatically begin extracting contaminated air and delivering the fresh air required.

   For the safety of occupants, we also recommend installing a hydrogen gas detector near the ceiling of the battery room. Since hydrogen is less dense than air, it is more likely to accumulate at the ceiling. This detector can both serve as an audible alarm and as a signal to the new MUA to do a purge of the facility's ambient air.

   When the system is implemented, we recommend installing signage at the battery storage area indicating the maximum number and capacity of batteries for which the system was been designed.

Table 1. Summary of New Mechanical Equipment

Tag	Equipment Type	Heating Type	Conceptual Design Flow Rate (cfm)
MUA	Make-up Air Unit	Natural Gas	1,800
EF	Exhaust Fan	-	2,000

The flow rates and the control sequence described are intended to be used as a basis for design and for costing purposes only. Both the flow rates and the control sequence are expected to be revised and updated during the production of detailed construction documents.

4.0 Electrical

4.1 Summary

ONTC has indicated that they have concerns with the electrical installation, as well as the battery charging practice within the Cochrane Powerhouse facility.

An electrical site review was conducted by Quasar Consulting Group on March 17th, 2026. The review was limited to a review of the existing electrical panel installations, as well as a review of the facility's battery charging practice.

The building electrical equipment was reviewed for their installation as it pertains to the Ontario Electrical Safety Code 2024 (OESC) and Ontario Fire Code (OFC). The review of electrical equipment is limited to equipment clearances of permanently installed equipment as required by the OESC and it is assumed that the building does not contain any hazardous areas which would require installation to be completed per Section 18 of the OESC.

The following outlines observations related to electrical equipment installation and battery charging practice along with findings and recommendations for remedial action.

4.2 Observations

1. **Battery Charging**

   Lead-acid and NiCd batteries are stored and charged within the building placed on the floor, as well as on wooden pallets (see Photo 4.1 and Photo 4.2). Batteries are charged with a portable industrial battery charger, (see Photo 4.3), as well as a wall mounted battery charger "BATTERY CHARGER B" (see Photo 4.4)

2. **Electrical Equipment**

   The incoming utility power is provided by three, single-phase pole top transformers via an overhead line. The main switchboard is an 800A, 480V switchboard (see Photo 4.5).which provides power to the building as well as the "MAINS SHOP MCC" and "COACH SHOP" via sub distribution panels (see Photo 4.6). The main electrical switchboard is free-standing and installed on a concrete housekeeping pad. Electrical feeders within the building appear to primarily be TECK cable, with some armoured cable installation and cable in conduit.

4.3 Findings

1. **Battery Charging**

   In general, the OESC oversees installations of permanent electrical equipment installations. As such, loose low-voltage batteries are not governed by the OESC. Although the OFC covers "Battery-powered industrial trucks" and their charging, there are no electrical specific requirements under this section.

2. **Electrical Equipment:**

   The OESC governs electrical equipment clearance requirements in the province of Ontario. These requirements are dependant on equipment voltage rating, as well as the equipment amperage nameplate rating. Electrical equipment with a voltage rated at over 750 V, or with an equipment nameplate rating of 1200 A or more, requires 1.5 m of clearance in front of the equipment. This clearance requires secure footing.
   It was observed that existing equipment ratings within the building do not exceed either the 750 V voltage rating, nor the 1200 A nameplate rating. As such, all permanently installed electrical equipment require 1 m clearance of secure footing in front of the equipment.

   It was observed that most installed electrical equipment meets this 1 m requirement. However, it was observed that "BATTERY CHARGER B" fails to meet this requirement due to the installation of a concrete pad where a worker may accidentally step off the pad while working on the charger. (see Photo 4.7). This concrete pad fails the need for secure footing.

   A minimum clearance width of 1 m is required for all electrical equipment, or the width of the equipment, which ever is greater. Where a piece of equipment is less than 1 m wide, the clearance width does not have to be centre with the equipment.
   It was observed that the existing electrical equipment meet the minimum clearance width of 1 m, or the width of the equipment.

4.4 Recommendations

1. **Battery Charging**

   No electrical recommendations.

2. **Electrical Equipment Clearances:**

   It is recommended that the concrete pad in front of "BATTERY CHARGER B" be demolished to provide 1 m clearance of secure footing to eliminate the hazard of stepping off the concrete pad accidentally.

5.0 Conclusion

5.1 Summary and Next Steps

1. <u>Architectural</u>

The following is a summary of the recommendations related to the Architectural portion of this study (refer to Architectural section for full description):

1) Spills and Neutralization – ONTC to provide a means for spill cleanup and neutralization adjacent to the battery charging area.

2) First Aid Measures – ONTC to provide an eyewash and emergency shower adjacent to the battery charging area.

3) Signage – ONTC to provide signage outside of battery charging area indicating use of space.

4) Automatic Fire Protection – ONTC to consult the Authorities Having Jurisdiction and the local Fire Department to discuss potential fire protection of the facility.

5) Separation of Batteries
Option 1 Fire Separation - Provide a 2 hr fire separation at the existing partial height wall to separate the battery storage and charging and the remainder of the facility.
Option 2 Battery Enclosure (Interior) - Provide a specialized battery storage enclosure within the existing facility.
Option 3 Battery Enclosure (Exterior) - Provide a specialized battery storage enclosure within the existing facility.

ONTC to internally review hazards and risks associated with the batteries and determine which separation option aligns best with ONTC's standards and budget.
- Option 1 will require ONTC to acquire the services of an Architect.
- Option 2 & 3 will require ONTC to consult with a specialized battery enclosure supplier.

6) Portable Fire Extinguishers – ONTC to relocate the type ABC (dry chemical) fire extinguishers to the oil separator and storage area and provide a type BC (CO2) fire extinguisher to the battery area.

7) Flooring Deterioration – ONTC to remove existing floor tile (including mortar and grout), prepare floor to receive new epoxy floor finish (approximately 1,780sq ft of floor area).

2. Mechanical

The following is a summary of the recommendations related to the Mechanical portion of this study (refer to Mechanical section for full description):

1) Installation of a new gas-fired Make-Up Air Unit (MUA) to be installed on the roof or at grade outside the building.
   ONTC will need to retain a Structural Engineer to assess if the existing structure can accommodate the weight of the MUA. Depending on the location of the MUA on the roof, roof guards for working at heights may be required. Once the structure has been assessed and it has been determined if any structural reinforcements are required, ONTC will need to retain engineering services for the design of the MUA (Mechanical, Electrical, and possible Structural). Some minor architectural details may be required as well.

2) Replacement of the existing exhaust fan with a new fan to work in conjunction with the new MUA to remove contaminants.

3) Installation of ductwork, sensors and centralized control panel as required for the new ventilation equipment system.

3. Electrical

The following is a summary of the recommendations related to the Electrical portion of this study (refer to Electrical section for full description):

1) Electrical Equipment - Demolish the concrete pad in front of “BATTERY CHARGER B” to provide 1 m clearance requirement.

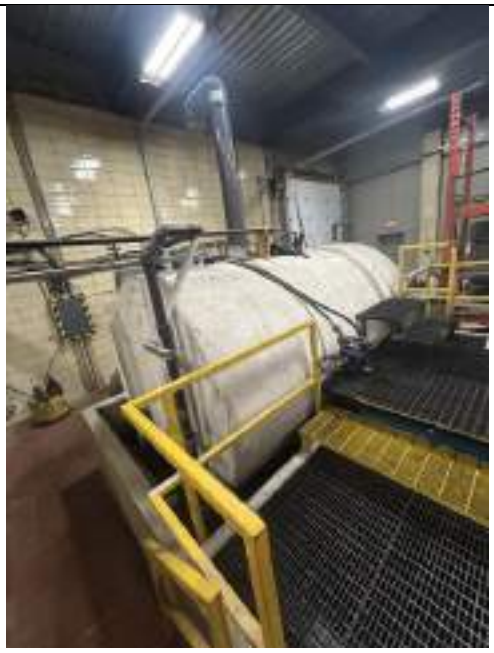
6.0 Photos

6.1 Overall Interior Photos

Picture 1.1 – Overall Photo (Building North)

Picture 1.2 – Overall Photo (Building North)

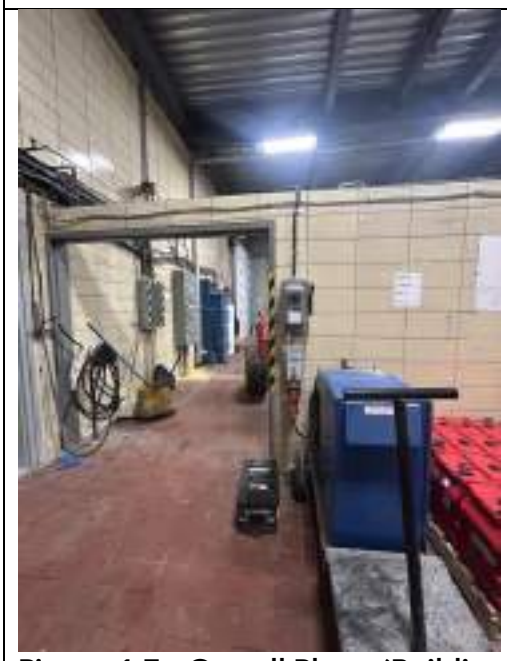
Picture 1.3 – Overall Photo (Building Central)



Picture 1.4 – Overall Photo (Building Central)

Picture 1.5 – Overall Photo (Building Central)

Picture 1.6 – Overall Photo (Building Central)



Picture 1.7 – Overall Photo (Building South)

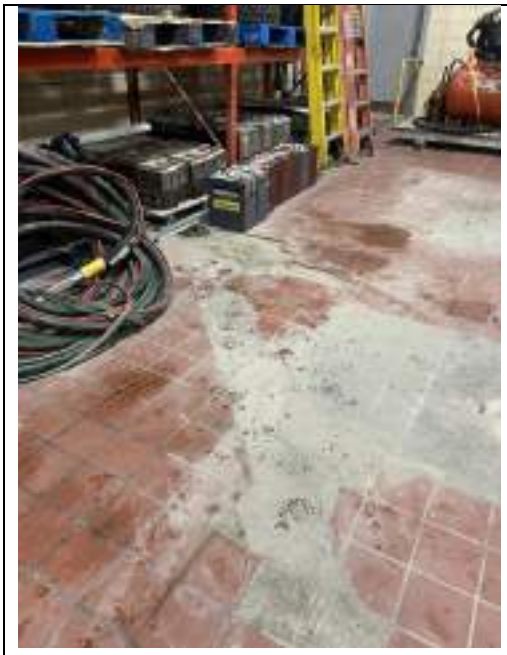
Picture 1.8 – Overall Photo (Building South)

Picture 1.9 – Overall Photo (Building South)

6.2 Architectural Photos

Picture 2.1 – Existing Flooring (Building North)

Picture 2.2 – Existing Flooring (BuildinNorth)



Picture 2.3 – Existing Flooring (Building North)

Picture 2.4 – Fire Extinguisher (Building Central)

Picture 2.5 – Eyewash Station (Building North)

6.3 Mechanical Photos

Picture 3.1 – Oil Separator

Picture 3.2 – Containement Tank

Picture 3.3 – Nickel-cadmium (NiCd) batteries

Picture 3.4 – Lead-acid batteries

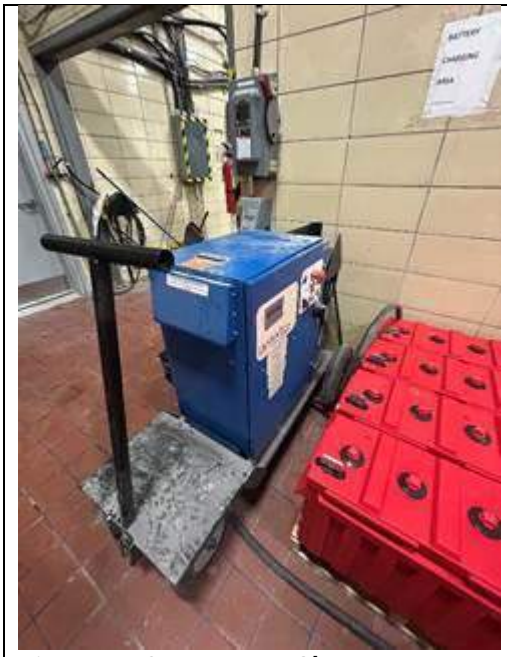
Picture 3.5 – Charging station being used

Picture 3.6 – Existing exhaust fan

6.4 Electrical Photos

Picture 4.1 – Batteries

Picture 4.2 – Batteries



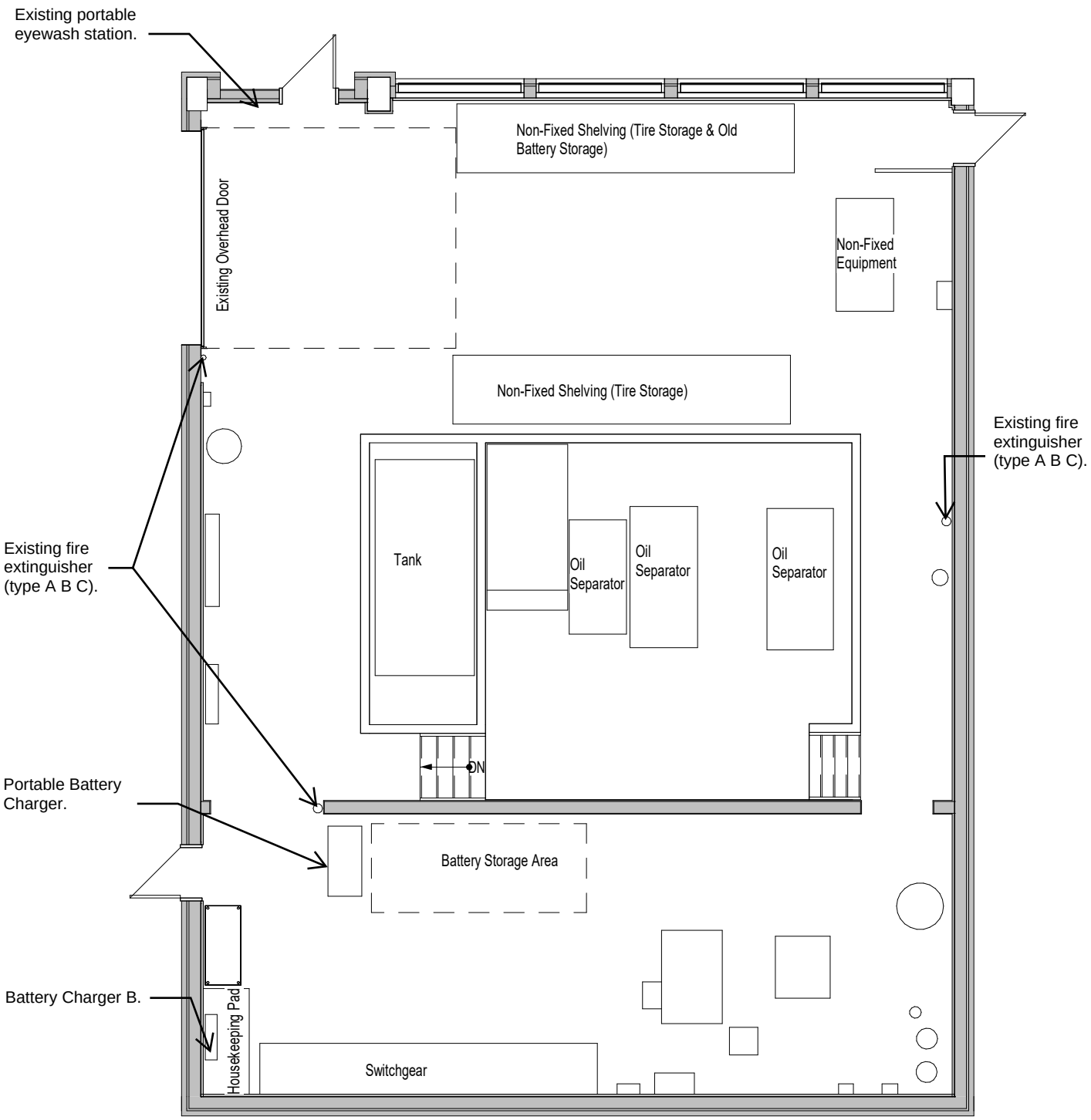
Picture 4.3 – Battery Charger

Picture 4.4 – Battery Charger B

Picture 4.5 – Main Switchboard

Picture 4.6 – Distribution Panels

Picture 4.7 – Concrete Pad



ONTC Cochrane Powerhouse Ventilation Study

326 Second Street (Drury Lane), Cochrane, ON P0L 1C0

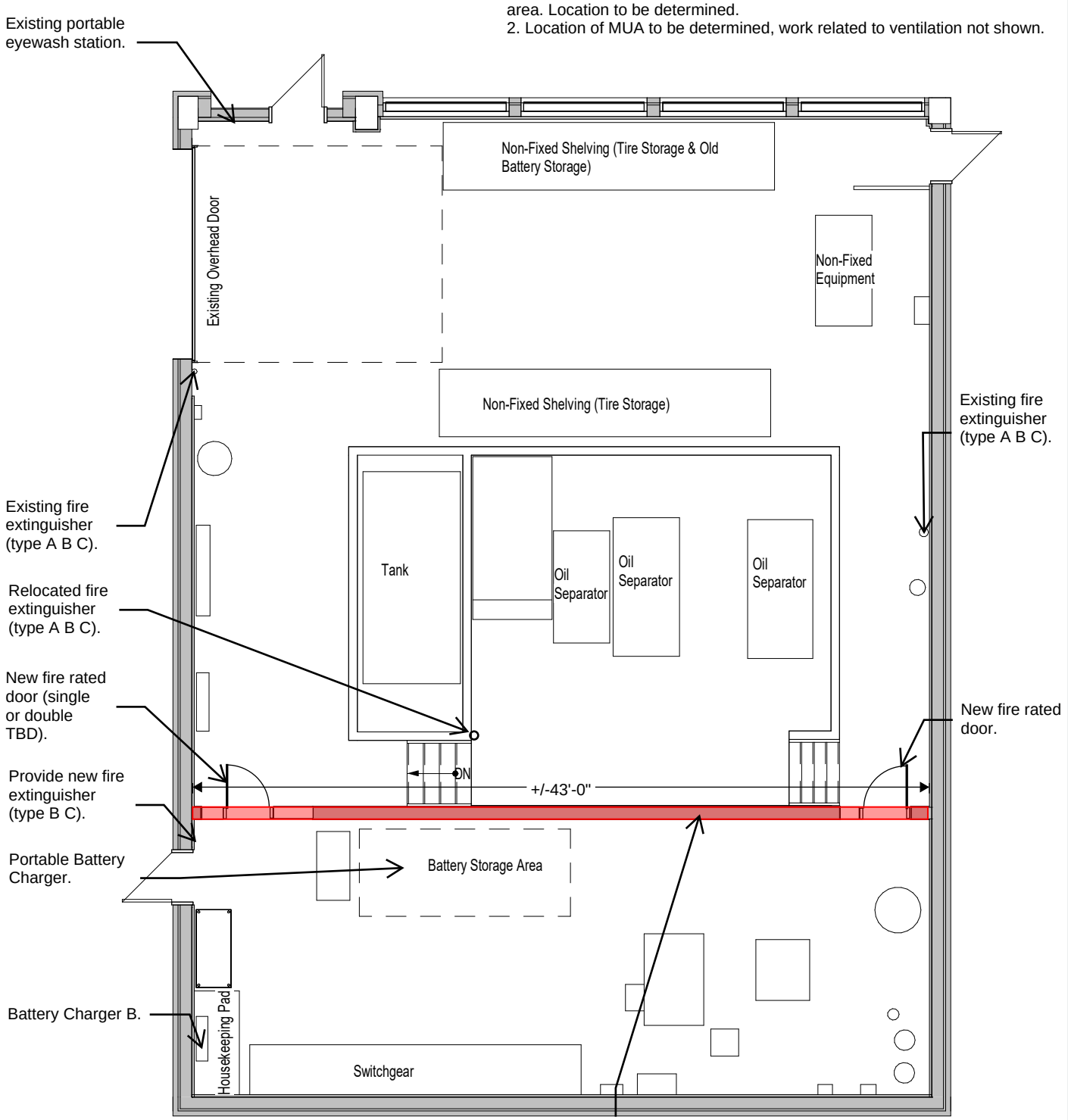
Project No. 26021

FLOOR PLAN - EXISTING

Scale	1 : 100
Drawn By	IG
Reviewed By	HS
Dwg. Ref. No.	

Plot Date	2026-03-17
Sheet No.	SKA-01

Notes:
1. Provide eyewash and emergency shower adjacent to battery charging area. Location to be determined.
2. Location of MUA to be determined, work related to ventilation not shown.



Red hatch indicates new 2hr fire separation above existing concrete block wall (height of new partition to be +/- 10-11 feet in height. Construction of new partition is as follows:
-Two (2) layers of 5/8" type X gypsum board
-Non-loadbearing metal stud (width to match existing wall below), mineral fibre batt insulation
-Two (2) layers of 5/8" type X gypsum board

ONTC Cochrane Powerhouse Ventilation Study

326 Second Street (Drury Lane), Cochrane, ON P0L 1C0

Project No. 26021

FLOOR PLAN - CONCEPTUAL FIRE SAFETY

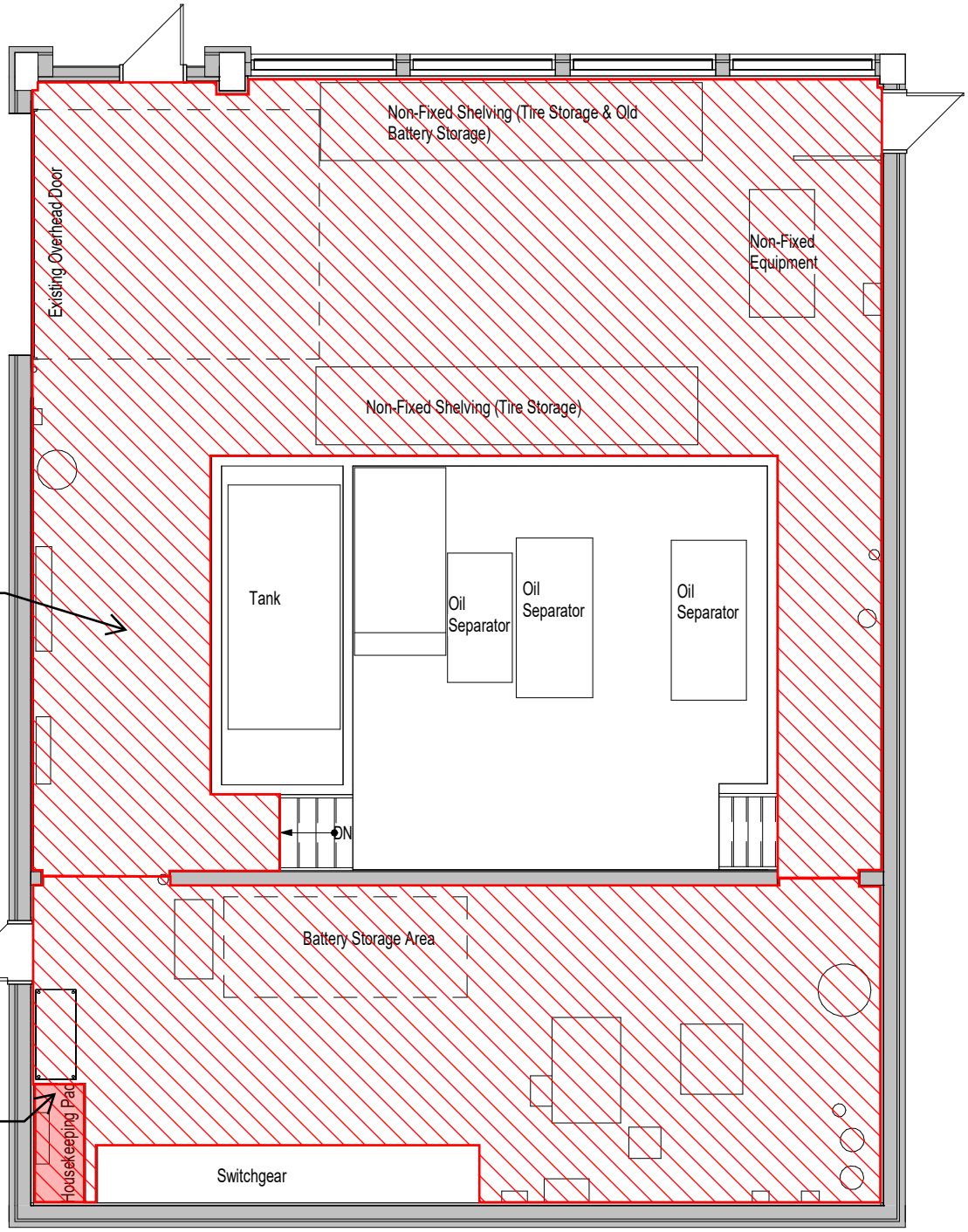
Scale	1 : 100
Drawn By	IG
Reviewed By	HS
Dwg. Ref. No.	

Plot Date 2026-03-17

Sheet No.

SKA-02

Notes:
1. All non-fixed equipment must be removed to complete flooring works.
2. Ceramic tile flooring extends underneath the Oil Separator area, this flooring is not included in the scope of work.



This diagonal hatch indicates area of ceramic tile flooring to be demolished, prepare existing floor in this area to receive new epoxy floor finish (+/-1,780 sq.ft).

Red diagonal hatch denotes existing Concrete Housekeeping Pad to be demolished. New floor finish is to extend over this area.

ONTC Cochrane Powerhouse Ventilation Study

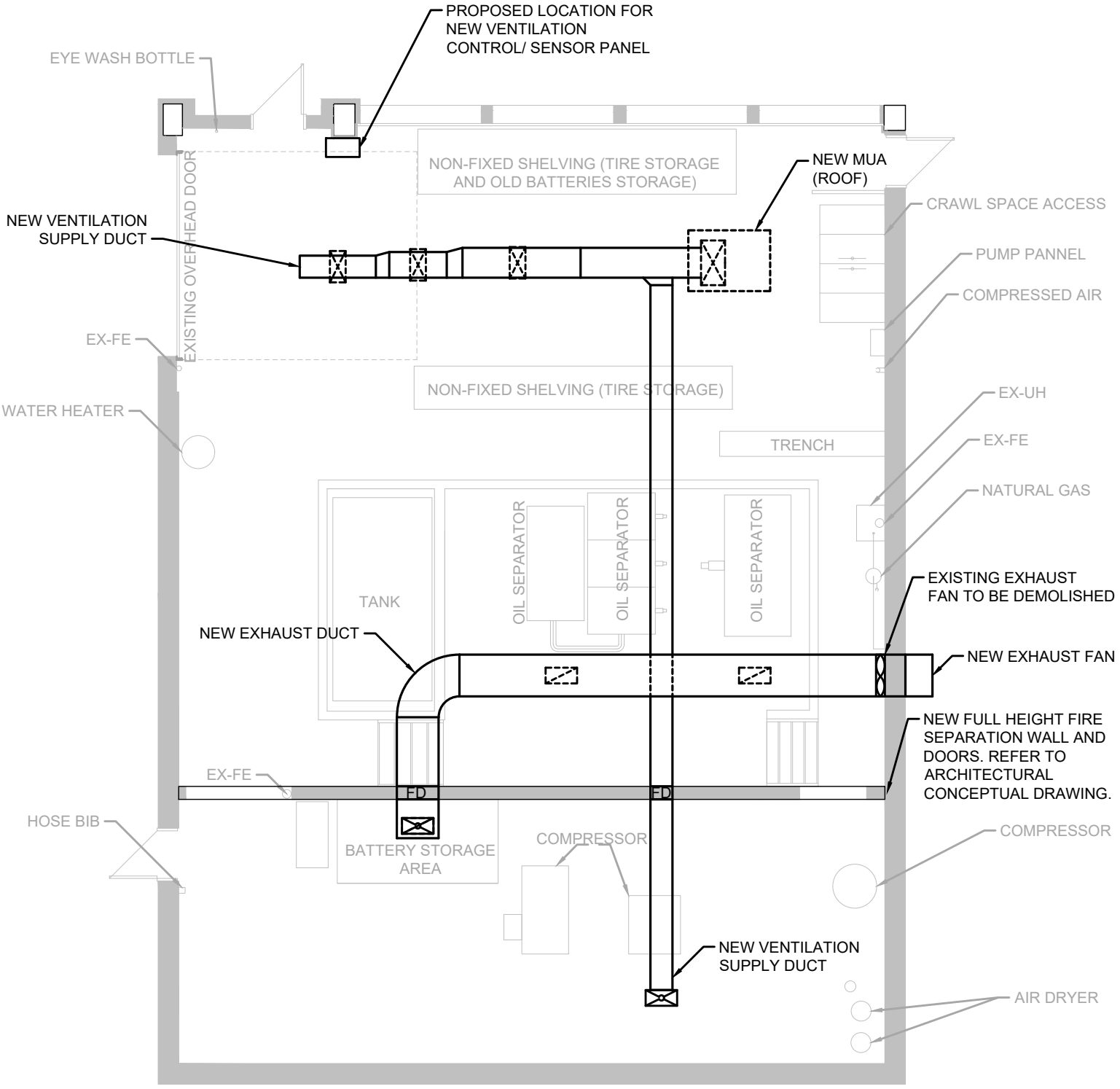
326 Second Street (Drury Lane), Cochrane, ON P0L 1C0

Project No. 26021

FLOOR PLAN - CONCEPTUAL FLOORING WORK

Scale	1 : 100
Drawn By	IG
Reviewed By	HS
Dwg. Ref. No.	

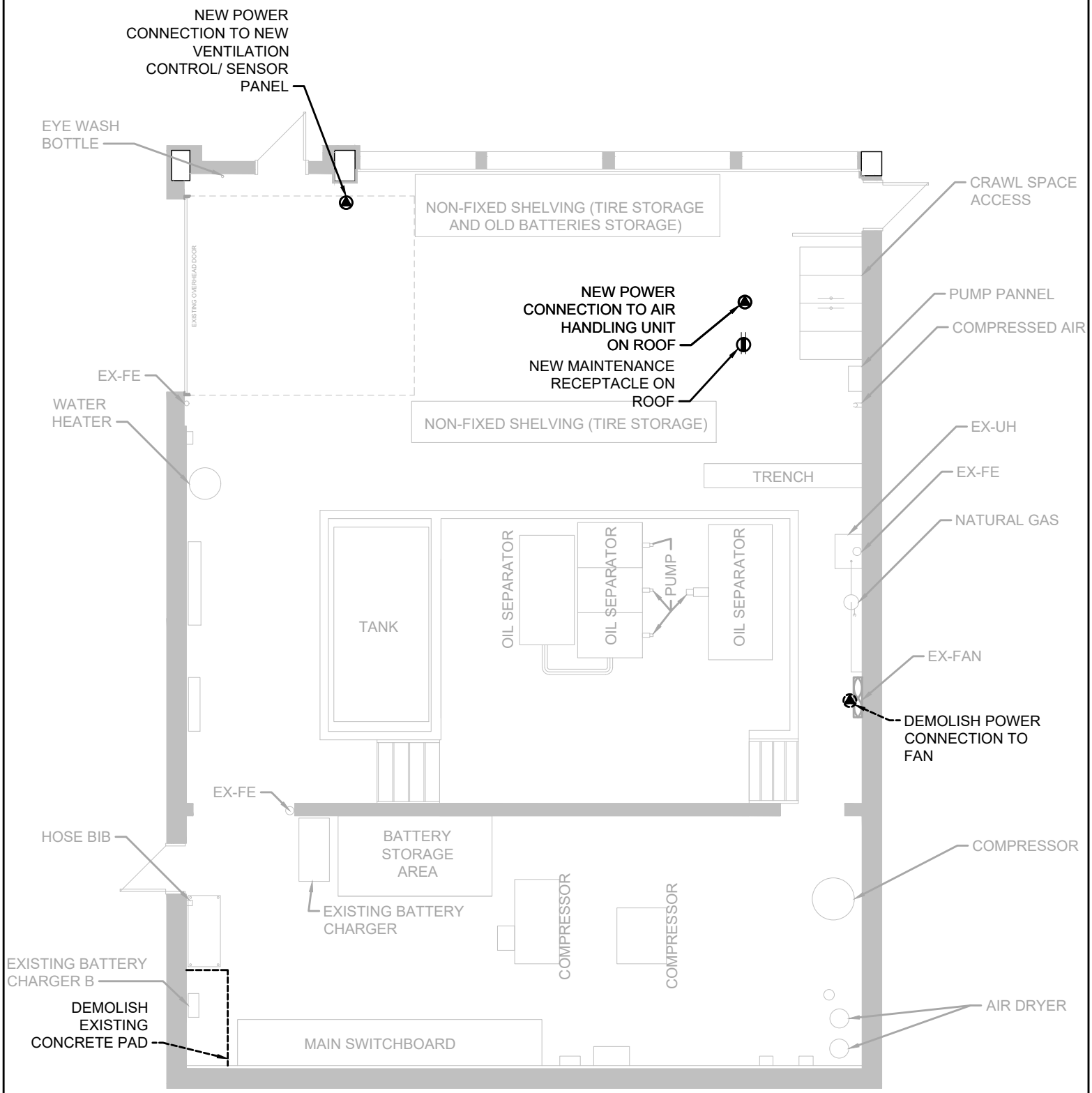
Plot Date	2026-03-17
Sheet No.	SKA-03



QUASAR CONSULTING GROUP

TITLE
MECHANICAL - VENTILATION - CONCEPTUAL

DRAWN	CHECKED	PROJECT No.
KK	JR	NOR-26-TT-003
SCALE 1 : 100		DRAWING No. M-001
DATE MAR 25 2026		OF 1 of 1



QUASAR CONSULTING GROUP

TITLE

ELECTRICAL CONCEPTUAL

DRAWN	CHECKED	PROJECT No.
RT	RT	NOR-26-TT-003
SCALE 1:100		DRAWING No. E-001
DATE MAR 25 2026		OF 1 of 1