

The following revisions are herewith incorporated into the Tender Documents and shall be included in the Tender Price. Where a revision is called for in one drawing or section of the Specification, it shall be considered revised for all related drawings and sections of the Specification. This Addendum shall be returned with other Tender Documents at the time of submission.

This addendum (109 pages) shall form a part of and be included in the Contract Documents for the above titled project and no consideration will be entertained for extras to the Contract due to failure of the contractor to become thoroughly familiar with this addendum.

Signify that Addendum has been received by listing the Addendum number and date in the appropriate spaces on the Tender Form.

### **GENERAL**

1. See attached for virtual tender walkthrough sign in sheet from October 29<sup>th</sup> and 30<sup>th</sup> (1 page).

### **BIDDER QUESTIONS AND RESPONSES**

- .1 Q: *“Do you anticipate that the IST and subsequent re-test (most likely required) will be conducted after construction is completed across all sites and packages, or will IST and re-test be completed separately for each site?”*

A: [SMS] IST and re-tests are expected to be completed separately for each site.

- .2 Q: *“If IST is to be completed per site, can the ITC perform the initial systems and existing building condition assessments for all buildings across all sites in one visit to northern area, or would you prefer separate assessments per site?”*

A: [SMS] Initial systems and building condition assessments can be performed in one visit to the northern area.

- .3 Q: *“Is there an existing emergency power single-line diagram available for Thompson General Hospital? Does the adjacent Burntwood facility share the emergency power with Thompson General Hospital? or should these be investigated onsite during ITC assessment?”*

A: [SMS] Existing single line diagram is enclosed for contractor’s reference. Information has not been verified for correctness or completeness and shall be confirmed on site by the successful bidder.

- .4 Q: *“For Thompson General Hospital and Northern Spirit Manor] could you please advise whether the IST for these two buildings could be conducted together? This would help reduce travel and overall IST costs.”*

A: [SMS] Refer to response to question 1. IST and re-tests are expected to be completed separately for each site.

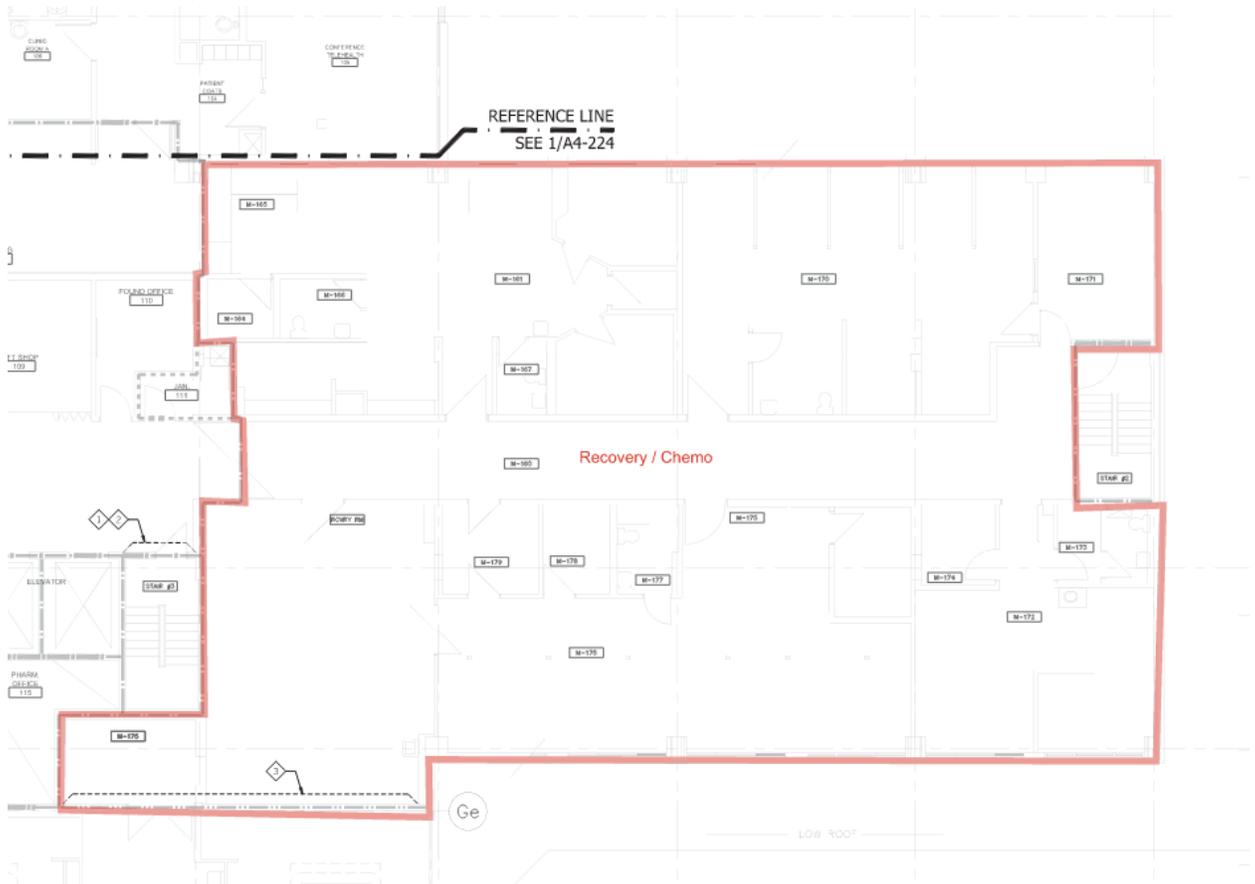
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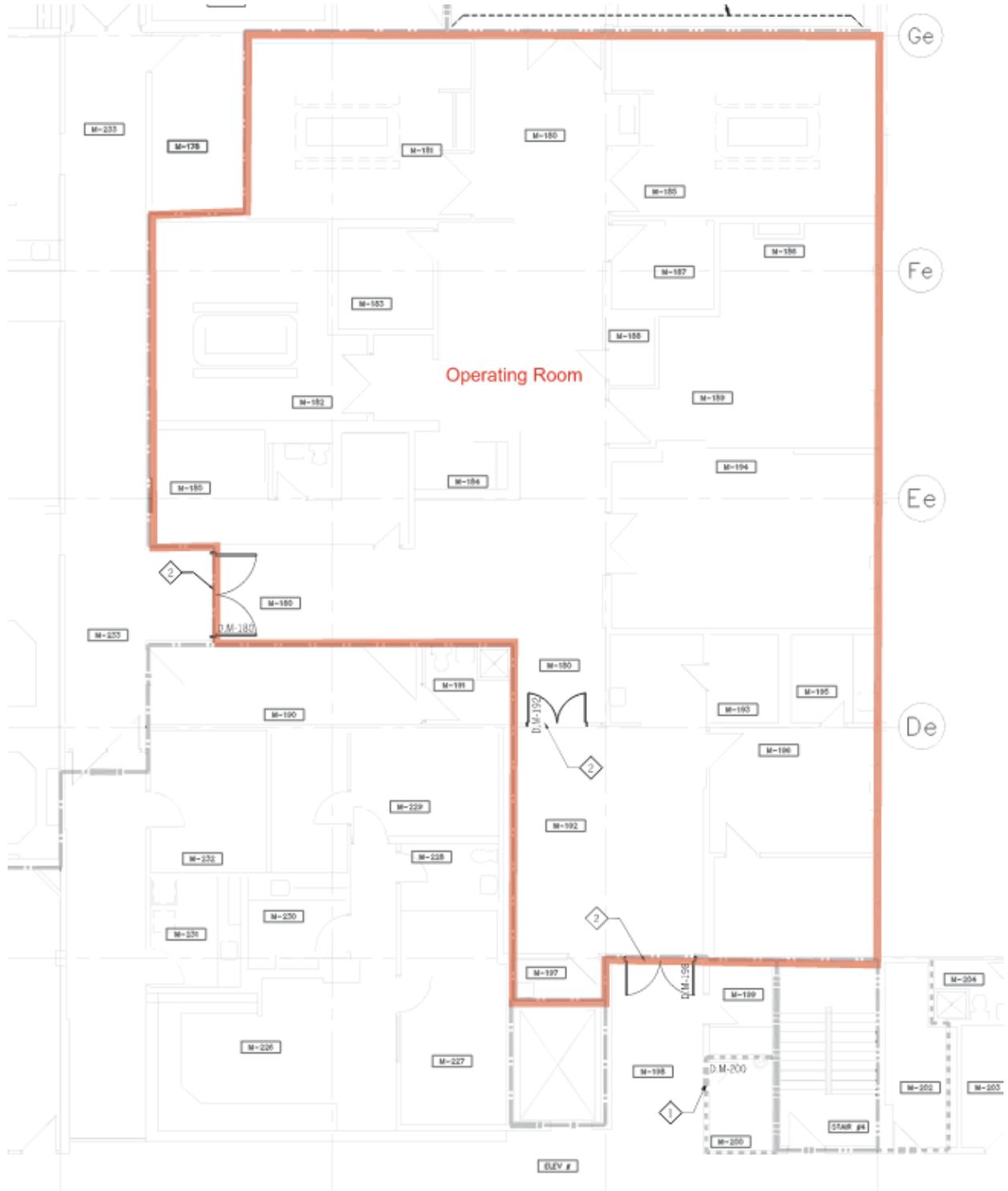
.5 Q: “[For Northern Spirit Manor] there is a fire alarm relay for smoke dampers. Is there a record or drawing indicating the number and locations of the smoke dampers controlled by this relay?”

A: [SMS] Record drawings indicate 8 smoke dampers within the crawlspace including two along gridline 5, four along gridline C, and two along gridline 17.

.6 Q: “[For Thompson General Hospital] are there any details available regarding the room used as areas of refuge?”

A: [ft3] [Please see following sketch showing areas] of refuge at Thompson General Hospital.





.7 Q: *“Could you please confirm if any phased IST is expected at these sites, particularly for Thompson Hospital?”*

A: [SMS] No phased IST is expected at these sites.

.8 Q: *“Do you have a detailed drawing for the Fire Water Cistern Tank(s) for the Lynn Lake Hospital that you can provide? There is some discrepancies between the specs and the drawings that were provided.”*

A: [SMS] In general, above ground fire water reservoir tanks are used to support the new sprinkler system. Refer to mechanical specifications and drawings for fire water reservoir tanks. Requirements clarified in addendum as follows.

.9 Q: *“Continuing with the evaluation of the documents and the process of submitting our offer for this project, we would like to request your consideration to allow us to submit the subcontractor list and their pricing within 24 hours after the tender closes.”*

A: This is acceptable. In general, these sections should be submitted at tender close as part of a complete bid package, but Bid Form Appendix B sections and Pricing Form Appendix C sections may simply note that completed Appendix B and Appendix C forms will be submitted to follow. Submissions should follow via email to [mborovytsky@smseng.com](mailto:mborovytsky@smseng.com). Refer to specification revisions in this addendum as follows.

.10 Q: *“In the spec 26 32 10 Generator Walk-in enclosure the sound spec clause 2.7.1.1 calls for 55 dBa at the nearest property line we could not find any property line distance in the tender package can you please confirm these distances or would the 55dBa @ 7 M which is used often is spec be acceptable. This would be for both the Lynn- Lake and Gillam locations.”*

A: [SMS] Yes, both generator enclosures will be required to provide a maximum of 55dBa 7 meters. Refer to specification revisions in this addendum as follows.

#### FRONT END SPECIFICATION REVISIONS

.1 Refer to Section 00 21 13 Instruction to Bidders

.1 Revise paragraph 1.6.3.1 to read as follows:

.1 Bids must be submitted in their entirety via MERX E-Bid Submission on or before the submission deadline. Bid Form Appendix B sections noting subcontractor list and Pricing Form Appendix C sections noting subcontractor list and pricing may be submitted within 24 hours after tender close. In this case, Appendix B sections and Appendix C sections should be submitted via MERX as part of complete bid package and note that completed forms will follow. Completed Appendix B sections and Appendix C sections may then be submitted within 24 hours after tender close via email to [mborovytsky@smseng.com](mailto:mborovytsky@smseng.com).

.2 Refer to Section 00 80 00 Pricing Form – Stipulated Price

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- .1 Refer to attached revised section 00 80 00 Pricing Form - Stipulated Price (changes shown in red).
- .3 Refer to Section 01 11 00 – Summary of Work.
  - .1 Add paragraph 1.5.8.1.3.3 to read as follows:
    - .3 New fire-rated wall partition and double door installed as shown on architectural drawings A3-211 to be completed in two separate phases to maintain access to Corridor 135 throughout construction.
  - .2 Add paragraph 1.5.8.1.3.4 to read as follows:
    - .4 New fire-rated wall partition and double door installed as shown on architectural drawings A3-212 to be completed in two separate phases to maintain access to Corridor 146 throughout construction.
- .4 Refer to Section 01 21 00 – Allowances.
  - .2 Refer to attached revised section 01 21 00 – Allowances (changes shown in red).
- .5 See attached added appendix as follows:
  - .1 Lynn Lake Hospital Pump House & Cistern Geotechnical Investigation Report (28 pages)

#### PHASING DRAWING REVISIONS

- .1 Refer to attached drawing G1-000 Phasing Plan for Lynn Lake Hospital.

#### ARCHITECTURAL

- .1 Refer to attached architectural Addendum AD01 (13 pages).

#### MECHANICAL

##### MECHANICAL SPECIFICATION REVISIONS

- .1 See attached for the following added mechanical specification sections:
  - .1 23 07 19 – HVAC Piping Insulation
  - .2 23 08 02 – Cleaning and Start-up of Mechanical Piping Systems
  - .3 23 21 13 – Hydronic Piping
  - .4 23 21 14 - Hydronic Specialties
- .2 Refer to Section 21 05 00 – Common Work Results for Fire Suppression
  - .1 Revise clause 2.2.5.1.1 as follows:
    - .1 Lynn Lake Hospital: To NFPA 14: Storz Type
  - .2 Add clause 2.2.5.1.2 as follows:
    - .2 Gillam Hospital: To NFPA 14: Siamese Type.

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- .3 Refer to Section 22 11 15 – Domestic Water Piping Specialties
  - .1 Revise section 2.1 to read as follows:
    - .1 Fire Water Reservoir Tanks
  - .2 Revise section 2.1.3.2.1 to read as follows:
    - .1 System capacity to be 20,000 gallons total. Each tank to be sized for 10,000 gallons.

#### MECHANICAL DRAWING REVISIONS

- .2 Refer to attached revised drawing M1-222 – Fire Pumphouse Plan & Details – Fire Protection – New Construction with clouded revisions.
    - .1 Location of tamper switches is clarified on domestic water fill line.
    - .2 Extent of domestic water fill line is clarified.
  - .3 Refer to attached revised drawing M1-223 – Section & Schematics – Fire Protection – New Construction with clouded revisions.
    - .1 Fire pump system schematic is clarified including the following:
      - .1 Tamper switch locations and labelling
      - .2 Domestic water fill line
      - .3 Reservoir tank venting
      - .4 Fire pump test loop piping
  - .4 Refer to drawing M2-211 – BASEMENT/CRAWLSPACE PLAN – FIRE PROTECTION – DEMOLITION
    - .1 Remove demolition keynote 5. Jockey pump serves the town water supply recirculation loop. Jockey pump to be relocated adjacent to the existing housekeeping pad. Temporarily shut off water supply to the pump during relocation. Provide new 19mm pump outlet connection to the new double check valve assembly. Confirm existing pipe diameter on site.
  - .5 Refer to drawing M2-401 – DETAILS – MECHANICAL
    - .1 Detail 5/M2-401: Adjust air compressor equipment tag from FAC-01 to FAC-2-01.
    - .2 Detail 4/M2-401: Adjust detail to say ‘Fire Dept. Siamese Pumper Connection’
  - .6 Refer to drawing M1-221 – MAIN FLOOR PLAN – FIRE PROTECTION – NEW CONSTRUCTION
    - .1 Change room name/number ‘Office 89’ to ‘Morgue Cooler 89’. Provide dry pendent sprinkler head in this room in place of the concealed sprinkler head.
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.7 Refer to drawing M4-211 – PARTIAL CRAWLSPACE PLAN – FIRE PROTECTION – NEW CONSTRUCTION

- .1 Change location of dry zone valve and associated air compressor described in Separate Price Keynotes 1, 2, and 3, to room M-137 on the main floor, see below image:



## ELECTRICAL

### ELECTRICAL SPECIFICATION REVISIONS

- .1 Refer to Section 26 32 14 – Power Generation Diesel

- .1 Revise clause 2.2.2 to read as follows, add wording as underlined below:

*“Rating: prime power rated, 3phase, 4 wire, voltage as shown on drawings, engine size as noted on drawings, alternator size as noted below, 60Hz, at 0.8PF, continuous duty, 125 deg. C temperature rise as outlined in CSA Z32.*

- 1. Lynn Lake Hospital, E1 Series: upsized 250kW alternator.*
- 2. Gillam Hospital, E2 Series: upsized 600kW alternator.”*

- .2 Refer to Section 26 32 18 – Generator Walk-In Enclosure

- .1 Revise clause 2.7.1.1 to read as follows: “55 dBA at 7 meters distance in any direction.”

- .3 Refer to Section 26 53 00 – Exit Signs

- .1 Revise clause 2.1.1 to read as:  
*“Housing shall be extruded aluminium construction.”*

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- .2 Revise clause 2.1.4 to read as:  
*“Exit signs shall be one of the two following types, as identified on drawings:*
  - .1 *Full height green running man symbol on white door background in an overall green background with full height directional white arrow in front of the running man on the same overall green background in compliance with the National Building Code requirements.*
  - .2 *Red letter sign on white background with “exit” lettering, c/w directional arrow(s) as indicated on drawings, to match existing where applicable.*
- .3 Provide new clause 2.1.11 to read as: *“Exit signs installed in existing buildings shall have operating voltage to match existing exit lighting circuit.”*
- .4 Refer to Section 28 31 01 – Fire Alarm System (Addressable, Two Stage)
  - .1 Provide new clause 2.19 to read as follows:  
**“AUTO DIALER**
    - .1 *Allow for connections (on-board dry contacts (Form "C")) to the offsite monitoring contacts on the fire alarm panel.*
    - .2 *Auto dialer c/w two communication methods to be supplied and installed by the contractor. Communication methods to be in compliance with ULC, GSM/cellular, VOIP/network connection, analog telephone line and AES radio. Locate auto dialer in the telephone room, unless noted otherwise. Confirm preferred monitoring agency or contact details for local volunteer fire department with Owner.*
    - .3 *Costs for auto dialer demarcation enclosure (demarcation terminal box) and auto dialer communication methods to be carried by the Electrical Contractor.*
      - .1 *The interconnection wiring from the fire alarm control unit or transponder to the fire signal receiving centre shall comply with CAN/ULC-S561, Standard for Installation and Services for Fire Signal Receiving Centres and Systems.*
      - .2 *Where an interconnection between a fire alarm control unit and a separate fire signal receiving centre transmitter is provided, a demarcation terminal box with a minimum of 12 terminal shall be installed.*
      - .3 *The fire alarm demarcation terminal box shall be labelled “FIRE ALARM DEMARCATION”.*
    - .4 *Confirm operation during the fire alarm verification. Provide report.*
    - .5 *Provide and install one empty 3/4" conduit (c/w pull string) to exterior from local/auto dialer for cell antenna. Seal and fire stop all penetrations. Conduit to terminate in a weatherproof junction box. Coordinate exact conduit termination point with Service Provider.*
    - .6 *Where a new auto dialer is specified, arrange and pay for existing building communications Service Provider to provide and install one new dedicated voice line (in conduit) to new local/auto dialer. Contact Owner to obtain Service Provider contact name and number. Coordinate with Owner.*

- .7 Auto Dialer communication to be active type or passive type. An active system would be IP based monitoring where an alternate route is not required. The passive type requires two types of communication and requires two or more separate communication channels.*

*.1 ACTIVE COMMUNICATION SYSTEMS*

- .1 Any fault of an active communication system shall be annunciated and recorded at the fire signal receiving centre within 180 s of the occurrence of the fault.*
- .2 Protected premises that are unable to communicate signals to the fire signal receiving centre as a result of a fault of an active communication system shall be indicated at the fire signal receiving centre.*

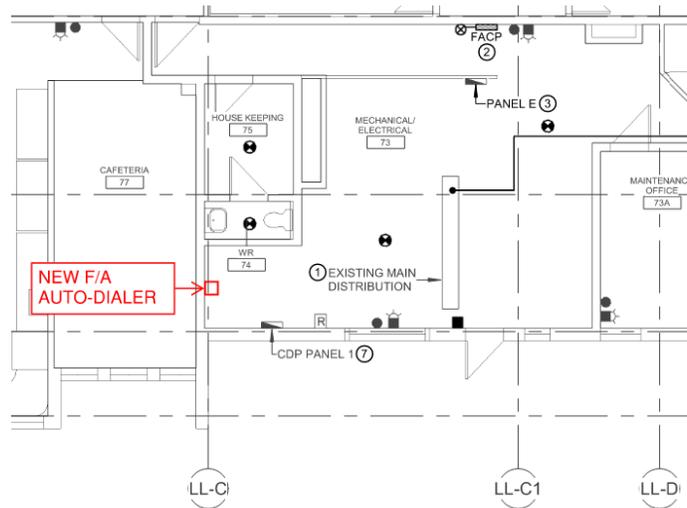
*.2 PASSIVE COMMUNICATION SYSTEMS*

- .1 Where passive communication systems are used there shall be two or more separate communication channels and at least two of the passive communication channels shall use non-interdependent types of communications. A communication channel is a path extending from the protected premises. Exception: If only one type of passive communication is available at the protected premises, there shall be two channels provided. Separate paths throughout the protected premises and through any common carrier or third party communications network to the fire signal receiving centre shall be provided for each communication channel.*
- .2 Passive communication systems may use one or more communication types in tandem to form a communication system.*
- .3 Passive communication systems for fire signal receiving centre service shall not share a common communication channel from the protected premises.*
- .4 Each communication channel shall be supervised for faults, which prevent the communications between the protected premises and the fire signal receiving centre.*
- .5 Alarm signals shall be transmitted simultaneously over all communication channels. Trouble and supervisory signals may be transmitted over one channel. If the signal is not received and acknowledged, it shall be transmitted over an alternative channel.*
- .6 Each communication channel shall be tested at intervals not exceeding 24 h.*
- .7 The failure of any communication channel shall cause the communication system to send a trouble signal on another communication channel within 180 s.*
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- .8 *In the event that the failure of any of the communication channels cannot be transmitted to the fire signal receiving centre within 180 s of the detection of the failure, the failure shall be indicated locally within 15 min. The 15 min delay allows for self-restoration of the failure.”*

### ELECTRICAL DRAWING REVISIONS

- .1 Provide new drawings as follows:
- .1 E1-000 - Drawing List, Symbol Legend, General Notes and Electrical Details (enclosed).
  - .2 E2-000 - Drawing List, Symbol Legend, General Notes and Electrical Details (enclosed).
  - .3 E3-000 - Drawing List, Symbol Legend and General Notes (enclosed).
  - .4 E4-000 - Drawing List, Symbol Legend and General Notes (enclosed).
- .2 Refer to drawing E0-001 Electrical Details and General Notes
- .1 Delete drawing from contract documents. Refer to new drawings E1-000, E2-000, E3-000 and E4-000 for drawing list, symbol legend, general notes and electrical details for each respective site.
- .3 Refer to E1 series drawings.
- .1 Revise all references to detail 1 / E0-001 on plans and in key notes to instead reference detail 1 / E1-000.
  - .2 Revise all references to detail 2 / E0-001 on plans and in key notes to instead reference detail 2 / E1-000.
  - .3 Revise all references to detail 4 / E0-001 on plans and in key notes to instead reference detail 3 / E1-000.
- .4 Refer to drawing E1-001 Site Plan – Electrical
- .1 Replace drawing with re-issued drawing (enclosed).
- .5 Refer to drawing E1-221 Main Floor Plan – Electrical – New Construction
- .1 Provide new fire alarm auto-dialer in Mechanical/Electrical room 73, refer to below sketch for approximate location:
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.6 Refer to drawing E1-301 Partial Single Line Diagram – New Construction and Electrical Schedules

.1 Replace drawing with re-issued drawing (enclosed).

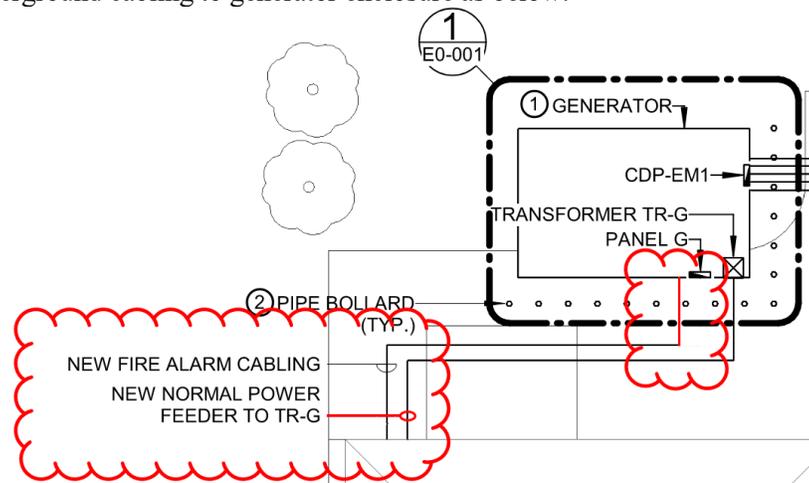
.7 Refer to E2 series drawings.

.1 Revise all references to detail 1 / E0-001 on plans and in key notes to instead reference detail 1 / E2-000.

.2 Revise all references to detail 3 / E0-001 on plans and in key notes to instead reference detail 2 / E2-000.

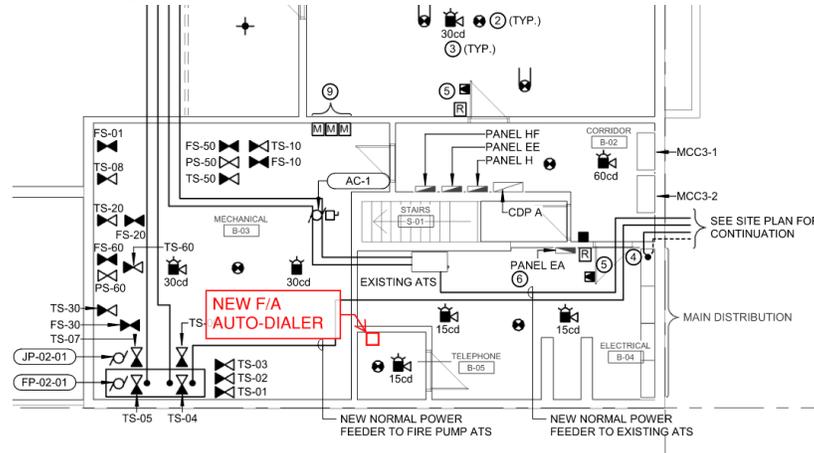
.8 Refer to drawing E2-001 Site Plan – Electrical

.1 Revise underground cabling to generator enclosure as below:



.9 Refer to drawing E2-211 Basement/Crawlspace Plan – Electrical – New Construction

- .1 Provide new fire alarm auto-dialer in Telephone room B-05, refer to below sketch for approximate location:

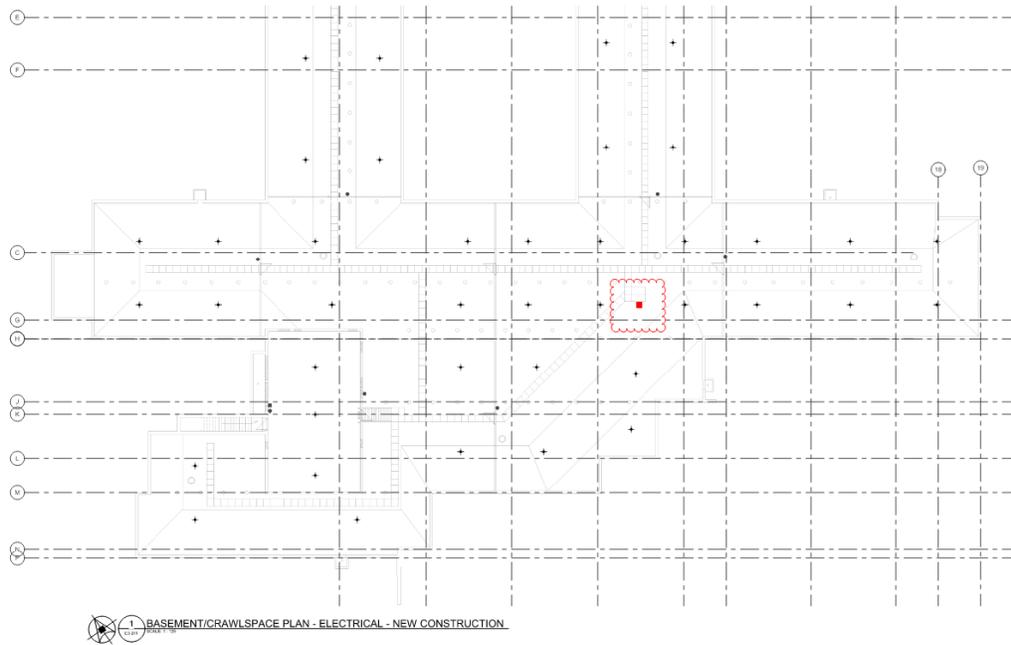


- .10 Refer to drawing E2-301 Partial Single Line Diagram – Demolition and New Construction, Fire Alarm Riser Diagram and Motor Schedule

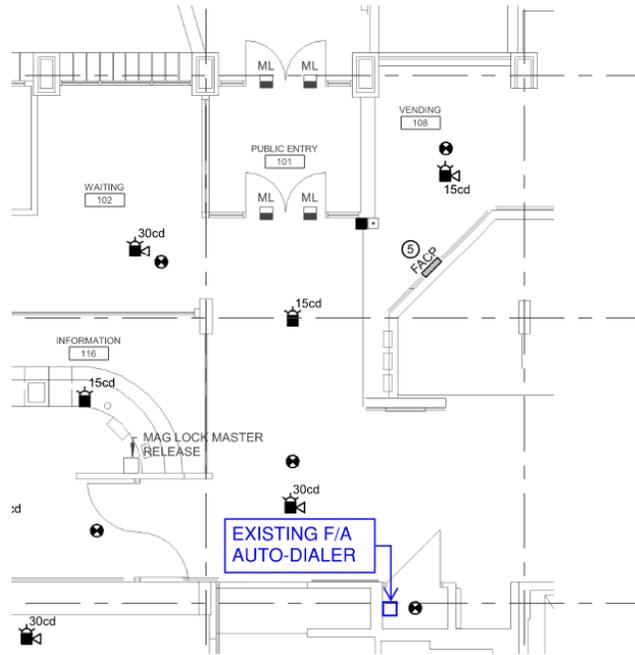
- .1 Revise normal power fire pump ATS breaker in CDP NP-1 (for FP-02-01) to 225AT, rather than 250AT. Breaker shall remain three pole, LSI type, 400AF.
- .2 Provide spaces for future breakers in CDP-NP1 as follows:
  - .1 3 x 400AF.
- .3 Provide spaces for future breakers in CDP-EM1 as follows:
  - .1 3 x 400AF.
- .4 Revise generator apparent power rating to 625kVA, rather than 600kVA. Real power rating shall remain as 500kW.
- .5 Call up new key note #12 at generator to read as: *“Provide upsized alternator as identified in specifications.”*

- .11 Refer to drawing E3-211 Crawspace Plan – Electrical – New Construction

- .1 Provide new fire alarm pull station at existing crawspace access hatch into main floor Storage room 154. Mount pull station to underside of structure in crawspace. Wire and connect to existing initiating loop serving area with capacity. See below sketch for approximate location:



- .12 Refer to drawing E4-211 Ground Floor Plan – Block 1 – Fire Alarm – New Construction
  - .1 Replace drawing with re-issued drawing (enclosed).
- .13 Refer to drawing E4-221 First Floor Plan – Block 1 – Fire Alarm – New Construction
  - .1 Call up existing key note #6 at new annunciator in “Information”, room 116.
  - .2 Wire and connect existing fire alarm auto-dialer to new fire alarm system. Coordinate with monitoring agency for monitoring of trouble and alarm signals from new fire alarm system. Refer to below sketch for location of existing auto-dialer:



- .14 Refer to drawing E4-223 First Floor Plan – Block 3 – Fire Alarm – New Construction
  - .1 Call up existing key note #6 at new annunciator in room M-180.
- .15 Refer to drawing E4-224 First Floor Plan – Block 4 – Fire Alarm – New Construction
  - .1 Replace drawing with re-issued drawing (enclosed).
- .16 Refer to drawing E4-233 Second Floor Plan – Block 3 – Fire Alarm – New Construction
  - .1 Replace drawing with re-issued drawing (enclosed).



Mechanical Engineer's Seal



Electrical Engineer's Seal



Name	Company	Email	Pre Walkthrough Meeting - Attended	Gillam - 10 am AM - Attended	Lynn Lake - 1 pm PM - Attended	Northern Spirit - 10 am AM - Attended	Thompson GH - 1 pm PM - Attended
Jing Wei Xie	JWX Fire Consulting Ltd	<a href="mailto:jing@jwxfire.ca">jing@jwxfire.ca</a>	x	x	x	x	x
Andy Dyck	U Build Construction	<a href="mailto:andy@ubuildconstruction.ca">andy@ubuildconstruction.ca</a>	x	x	x	x	x
Marcel Labelle	Bison Fire Protection Inc	<a href="mailto:mlabelle@bisonfire.com">mlabelle@bisonfire.com</a>	x	x		x	x
Jorge Lopez	Parkwest Projects Ltd.	<a href="mailto:jlopez@parkwestprojects.ca">jlopez@parkwestprojects.ca</a>	x	x	x	x	x
Brad Evenson	A & B Builders Ltd	<a href="mailto:brad@abbuilders.ca">brad@abbuilders.ca</a>	x*	x	x	x	x
Kevin Patrick	ACON Electric	<a href="mailto:k.patrick@aconelectric.com">k.patrick@aconelectric.com</a>	x				
Tom Vankosh	Bison Fire Protection Inc	<a href="mailto:tvankosh@bisonfire.com">tvankosh@bisonfire.com</a>	x	x	x	x	x
Wesley Penner	CW2 Construction & Design	<a href="mailto:wesley@cw2construction.ca">wesley@cw2construction.ca</a>	x	x	x	x	x
Paul Boulette	Classic Fire & Life Safety	<a href="mailto:pboulette@classicfls.com">pboulette@classicfls.com</a>	x	x	x	x	
Gerald Patrick	ACON Electric	<a href="mailto:geraldp@aconelectric.com">geraldp@aconelectric.com</a>		x	x	x	x
Randy Skromeda	Classic Fire & Life Safety	<a href="mailto:rskromeda@classicfls.com">rskromeda@classicfls.com</a>					x

\* Due to host technical difficulty, A&B attempted to join the pre-bid meeting after the call was ended. A&B was provided with the pre-bid meeting transcript to ensure that all bidders receive the same information.

**Part 1            General**

**1.1                BIDDER'S INFORMATION – PRICING FORM**

Date \_\_\_\_\_

Submitted by: \_\_\_\_\_  
(name of bidder)

\_\_\_\_\_  
(address)

To:                SMS Engineering Ltd. (as per Section 00 21 13)

Project:         Provincial Fire and Life Safety Project- Lynn Lake, Gillam, and Thompson Sites

Locations:       Lynn Lake Hospital  
64 Camp Street  
Lynn Lake, MB, R0B 0W0

Gillam Hospital  
115 Gillam Drive  
Gillam, MB, R0B 0L0

Northern Spirit Manor Personal Care Home  
879 Thompson Drive  
Thompson, MB, R8N 0A9

Thompson General Hospital  
871 Thompson Drive South  
Thompson, MB R8N 0C8

**OFFER**

.1                Having examined all matters referred to in the Instructions to Bidders and the Contract Documents prepared by the Consultant, and having attended the mandatory site visit or having otherwise ascertained the full extent of the Work, we, the undersigned, hereby offer to enter into a contract using CCDC 2, 2008 Contract form with Supplementary Conditions, to perform the Work for the price of:

.2                Lynn Lake Hospital – I/O 23-001-22

\$ \_\_\_\_\_  
dollars, in lawful money of Canada (the Base Bid).

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Value Added Tax (GST): the following is the amount of Value Added Tax (GST), payable in the Province of Manitoba, on our Base Bid listed above. This amount for Value Added Tax is not included in our Base Bid.

\$ \_\_\_\_\_

Applicable Provincial Sales Tax (PST/RST) and payable in Manitoba is included in the Bid Price.

Cash Allowances described in Appendix F – Cash Allowances are included in the Base Bid.

.3 Gillam Hospital – I/O 25-001-16

\$ \_\_\_\_\_

dollars, in lawful money of Canada (the Base Bid).

Value Added Tax (GST): the following is the amount of Value Added Tax (GST), payable in the Province of Manitoba, on our Base Bid listed above. This amount for Value Added Tax is not included in our Base Bid.

\$ \_\_\_\_\_

Applicable Provincial Sales Tax (PST/RST) and payable in Manitoba is included in the Bid Price.

Cash Allowances described in Appendix F – Cash Allowances are included in the Base Bid.

.4 Northern Spirit Manor Personal Care Home – I/O 25-001-17

\$ \_\_\_\_\_

dollars, in lawful money of Canada (the Base Bid).

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Value Added Tax (GST): the following is the amount of Value Added Tax (GST), payable in the Province of Manitoba, on our Base Bid listed above. This amount for Value Added Tax is not included in our Base Bid.

\$

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Applicable Provincial Sales Tax (PST/RST) and payable in Manitoba is included in the Bid Price.

Cash Allowances described in Appendix F – Cash Allowances are included in the Base Bid.

- .5 Thompson General Hospital – I/O 25-001-18

\$

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dollars, in lawful money of Canada (the Base Bid).

Value Added Tax (GST): the following is the amount of Value Added Tax (GST), payable in the Province of Manitoba, on our Base Bid listed above. This amount for Value Added Tax is not included in our Base Bid.

\$

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Applicable Provincial Sales Tax (PST/RST) and payable in Manitoba is included in the Bid Price.

Cash Allowances described in Appendix F – Cash Allowances are included in the Base Bid.

## **1.2 TIME**

- .1 Refer to Section 00 21 13 – Instructions to Bidders, Paragraph 1.18 Duration of Offer for the time that the bids must remain open after the bid closes.

## **1.3 PRICING FORM SUBMISSIONS**

- .1 The following documents (1-5) are to be included in the submission of this PRICING Form:
- .1 Pricing Form Submission:
    - .1 Section 00 80 00 – Pricing Form – Stipulated Price.
    - .2 Appendix C –1: List of Sub Contractors: Lynn Lake Hospital
    - .3 Appendix C –2: List of Sub Contractors: Gillam Hospital
    - .4 Appendix C –3: List of Sub Contractors: Northern Spirit Manor Personal Care Home

- .5 Appendix C –4: List of Sub Contractors: Thompson General Hospital
- .6 Appendix D – Itemized Values
- .7 Appendix E – Approved Substitutions
- .8 Appendix F – Cash Allowances
- .9 Appendix G – Unit Prices.
- .10 Appendix H – Alternate Prices

**1.4 SIGNATURE(S)**

\_\_\_\_\_, by its authorized signing officers,  
(Name of Bidder)

have signed this Bid on the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
Authorized signing officer (print name and sign) Title

\_\_\_\_\_  
Authorized signing officer (print name and sign) Title

**Appendix C-1  
 List of Sub Contractors – Lynn Lake Hospital**

Project: Provincial Fire and Life Safety Project – Lynn Lake Hospital

Bidder: \_\_\_\_\_

The following is the list of Subcontractors that the Bidder intends to engage, and the amount of each subcontract. The subcontract amounts do not include the GST, but do include any applicable PST.

Division or Section of Work	Name of Subcontractor	Value (\$)
General Conditions		
Infection Control (CSA 317.13)		
Asbestos Abatement		
Selective Demolition		
Rough Carpentry		
Finish Carpentry		
Firestopping and Smoke Seals		
Joint Sealants		
Doors and Frames		
Door Hardware		
Steel Stud and Gypsum Board		
Painting and Coating		
Div 21 – Fire Suppression		
Div 22 - Plumbing		
Div 23 - HVAC		
Div 26 – Electrical		
Generator including all distribution, pad and site work and all cabling.		
Div 28 – Safety & Security		
Integrated Life Safety Testing Coordinator		
Civil work		

**Appendix C-2  
 List of Sub Contractors – Gillam Hospital**

Project: Provincial Fire and Life Safety Project – Gillam Hospital

Bidder: \_\_\_\_\_

The following is the list of Subcontractors that the Bidder intends to engage, and the amount of each subcontract. The subcontract amounts do not include the GST, but do include any applicable PST.

Division or Section of Work	Name of Subcontractor	Value (\$)
General Conditions		
Infection Control (CSA 317.13)		
Asbestos Abatement		
Selective Demolition		
Rough Carpentry		
Finish Carpentry		
Firestopping and Smoke Seals		
Joint Sealants		
Doors and Frames		
Door Hardware		
Steel Stud and Gypsum Board		
Painting and Coating		
Div 21 – Fire Suppression		
Div 22 - Plumbing		
Div 23 - HVAC		
Div 26 – Electrical		
Generator including all distribution, pad and site work and all cabling.		
Div 28 – Safety & Security		
Integrated Life Safety Testing Coordinator		
Civil work		

**Appendix C-3**  
**List of Sub Contractors – Northern Spirit Manor Personal Care Home**

Project: Provincial Fire and Life Safety Project – Northern Spirit Manor Personal Care Home

Bidder: \_\_\_\_\_

The following is the list of Subcontractors that the Bidder intends to engage, and the amount of each subcontract. The subcontract amounts do not include the GST, but do include any applicable PST.

Division or Section of Work	Name of Subcontractor	Value (\$)
General Conditions		
Infection Control (CSA 317.13)		
Asbestos Abatement		
Selective Demolition		
Rough Carpentry		
Finish Carpentry		
Firestopping and Smoke Seals		
Joint Sealants		
Doors and Frames		
Door Hardware		
Steel Stud and Gypsum Board		
Painting and Coating		
Div 21 – Fire Suppression		
Div 22 - Plumbing		
Div 23 - HVAC		
Div 26 – Electrical		
Div 28 – Safety & Security		
Integrated Life Safety Testing Coordinator		

**Appendix C-4  
 List of Sub Contractors – Thompson General Hospital**

Project: Provincial Fire and Life Safety Project – Thompson General Hospital

Bidder: \_\_\_\_\_

The following is the list of Subcontractors that the Bidder intends to engage, and the amount of each subcontract. The subcontract amounts do not include the GST, but do include any applicable PST.

Division or Section of Work	Name of Subcontractor	Value (\$)
General Conditions		
Infection Control (CSA 317.13)		
Asbestos Abatement		
Selective Demolition		
Rough Carpentry		
Finish Carpentry		
Firestopping and Smoke Seals		
Joint Sealants		
Doors and Frames		
Door Hardware		
Steel Stud and Gypsum Board		
Painting and Coating		
Div 21 – Fire Suppression		
Div 22 - Plumbing		
Div 23 - HVAC		
Div 26 – Electrical		
Div 28 – Safety & Security		
Integrated Life Safety Testing Coordinator		



**Appendix E  
 Approved Alternatives**

Project: Provincial Fire and Life Safety Project – Lynn Lake, Gillam, and Thompson Sites

Bidder: \_\_\_\_\_

The following are Approved Alternatives, which were approved by the Prime Consultant in accordance with Substitution Procedures 00 26 00. The amounts indicated are an addition to, a deletion from, or no change to the Base Bid. Identify the project by the I/O number provided in Section 00 23 13, Paragraph 1.1

Amounts do not include the GST, but do include any applicable PST.

Description of Approved Alternative (refer to Section 00 26 00)	Effect on Base Bid (\$)		
	Addition	Deletion	No Change
(If no Approved Alternatives, put "Not Applicable" and initial bottom of page)			

**Appendix F  
 Cash Allowances**

Project: Provincial Fire and Life Safety Project – Lynn Lake, Gillam, and Thompson Sites

Bidder: \_\_\_\_\_

Any additional work will be issued through the Change Order system in accordance with the CCDC 2 Contract General Conditions. The Stipulated Price includes the Contractor's overhead and profit.

Indicate the Cash Allowance on the Contractor monthly Progress Claim, listed after the totals, indicating the Contract Amount, Completed to Date, Percent Complete, Previously Progressed and Amount This Progress. Review with the Consultant prior to this first progress billing.

Amounts do not include the GST, but do include any applicable PST.

Include all Cash Allowances in the base bid.

Description of Item	Amount (\$)
Cash Allowance No. 1 – Additional Fire Stopping – Lynn Lake Hospital	\$10,000.00
Cash Allowance No. 2 – Asbestos Air Sample Testing - Lynn Lake Hospital	\$119,000.00
Cash Allowance No. 3 – Integrated Systems Testing – Trade time on Site – Lynn Lake Hospital	\$5,000.00
Cash Allowance No. 4 – Additional Fire Stopping – Gillam Hospital	\$10,000.00
Cash Allowance No. 5 – Asbestos Air Sample Testing – Gillam Hospital	\$65,000.00
Cash Allowance No. 6 – Integrated Systems Testing – Trade time on Site – Gillam Hospital	\$5,000.00
Cash Allowance No. 7 – Additional Fire Stopping – Northern Spirit Manor Personal Care Home	\$5,000.00
Cash Allowance No. 8 – Asbestos Air Sample Testing – Northern Spirit Manor Personal Care Home	\$5,000.00
Cash Allowance No. 9 – Integrated Systems Testing – Trade time on Site – Northern Spirit Manor Personal Care Home	\$5,000.00
Cash Allowance No. 10 – Additional Fire Stopping – Thompson General Hospital	\$15,000.00
Cash Allowance No. 11 – Asbestos Air Sample Testing – Thompson General Hospital	\$100,000.00
Cash Allowance No. 12 – Integrated Systems Testing – Trade time on Site – Thompson General Hospital	\$10,000.00
Cash Allowance No. 13 – Additional Drywall Patching and Access Doors – Lynn Lake Hospital	\$15,000.00
Cash Allowance No. 14 – Additional Drywall Patching and Access Doors – Gillam Hospital	\$15,000.00
Cash Allowance No. 15 – Additional Drywall Patching and Access Doors – Northern Spirit Manor	\$15,000.00

Cash Allowance No. 16 – Additional Drywall Patching and Access Doors – Thompson General Hospital	\$15,000.00
---	-------------

**Appendix G  
Unit Prices**

Project: Provincial Fire and Life Safety Project – Lynn Lake, Gillam, and Thompson Sites

Bidder: \_\_\_\_\_

The following are our UNIT PRICES for the Units of Work listed hereunder. The Unit Prices apply to performing the Units of Work only during the time schedule for such work in the project schedule.

Amounts do not include the GST, but do include any applicable PST.

Unit Price	Amount (\$)
Site Supervisor Hourly Rate during Integrated Life Safety Systems Testing(\$/hr)	
Fire Alarm Contractor Hourly Rate during Integrated Life Safety Systems Testing (\$/hr)	
Mechanical Contractor Hourly Rate during Integrated Life Safety Systems Testing (\$/hr)	
Electrician Hourly Rate during Integrated Life Safety Systems Testing (\$/hr)	

**Appendix H  
 Alternative Prices**

Project: Provincial Fire and Life Safety Project – Lynn Lake, Gillam, and Thompson Sites  
 Bidder: \_\_\_\_\_

We, the above-named bidder, offer below the requested alternative prices. The amount to be added to, or deducted from, our base bid price (as entered in the Bid Form) is entered for each requested alternative.

All alternative prices exclude Value Added Taxes. If there is no change to the base bid price for an alternative we have so indicated. It is understood that:

1. The Owner may accept any of the alternatives and corresponding alternative prices in any order or combination, including all or none,
2. The lowest bidder will be determined solely from the base bid, without considering any alternative prices,
3. Alternatives and alternative prices are open for acceptance by the owner for the same period as the base bid price,
4. The Work of the Contract and the Contract Price will reflect the alternatives and alternative prices, if any, accepted by the Owner at the time of contract award, and
5. Acceptance of any alternatives will not affect the base bid contract completion time, unless we have specifically indicated an increase or decrease in time, in number of days, on account of a particular alternative.

Alternative No. 1 – Lynn Lake – Fire Rate  
 Underside Floor Assembly

**Effect on Base Bid Price**

	<b><u>Add</u></b>	<b><u>Deduct</u></b>
1. Provide spray-applied fire resistive material (SFRM) onto U/S of existing deck and steel joists, conforming UL Design No. I800 (similar), to achieve a minimum .75 hr fire resistance rating. Refer to Architectural Plans.	\$ _____	\$ _____

Alternative No. 2 – Lynn Lake - New Wall  
 Insulation

**Effect on Base Bid Price**

	<b><u>Add</u></b>	<b><u>Deduct</u></b>
1. Install new mineral wool insulation boards to achieve minimum R-26 at wall above ACT ceiling. Approximately 6000mm x 500mm. Refer to Architectural Plans.	\$ _____	\$ _____

Alternative No. 3 – Northern Spirit Manor –  
 Replace Existing Glycol Sprinkler System  
 Serving Outdoor Activity Area

**Effect on Base Bid Price**

	<b><u>Add</u></b>	<b><u>Deduct</u></b>
1. Disconnect and remove existing	\$ _____	\$ _____

glycol mix sprinkler system  
serving Outdoor Activity area  
and provide new dry system  
complete with new zone valving  
routed from main in crawlspace.  
Refer to mechanical drawings

Alternative No. 4 – Thompson General  
Hospital – Underside Floor Repair

**Effect on Base Bid Price**

1. Cover the opening at the underside of the floor above with type “X” gypsum board (1 h). Patch and make good (total area = 4 sm). Refer to architectural drawings.

	<b><u>Add</u></b>	<b><u>Deduct</u></b>
	\$ _____	\$ _____

Alternative No. 5 – Thompson General  
Hospital – Replace Existing Glycol Sprinkler  
System Serving Ambulance Garage

**Effect on Base Bid Price**

1. Disconnect and remove existing glycol mix sprinkler system serving Ambulance Garage and provide new dry system complete with new zone valving routed from main in crawlspace. Refer to mechanical drawings.

	<b><u>Add</u></b>	<b><u>Deduct</u></b>
	\$ _____	\$ _____

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCES**

- .1 Canadian Construction Documents Committee (CCDC)
  - .1 CCDC 2-2008, Stipulated Price Contract.
- .2 Project Supplementary Conditions

**1.2 CASH ALLOWANCES**

- .1 Refer to CCDC 2, GC 4.1.
- .2 Where costs under a cash allowance exceed amount of allowance, Contractor will be compensated for excess incurred and substantiated plus allowance for overhead and profit as set out in Contract Documents.
- .3 Include progress payments on accounts of work authorized under cash allowances in Consultant's monthly certificate for payment.
- .4 Prepare schedule jointly with Consultant, Owner and Contractor to show when items called for under cash allowances must be authorized by Owner for ordering purposes so that progress of Work will not be delayed.
- .5 Scope of work specified in the drawings is as follows. Refer to pricing form Section 00 80 00 for value.
  - .1 Cash Allowance No. 1 – Additional Fire Stopping – Lynn Lake Hospital
    - .1 Allowance for additional small conduit/pipe/cable penetrations through fire separations beyond the quantity noted in the drawings.
  - .2 Cash Allowance No. 2 – Asbestos Air Sample Testing - Lynn Lake Hospital
    - .1 Test samples prior to construction work. Air samples to be taken at the beginning of the testing and at the end to confirm compliance for all asbestos abatement hoardings.
  - .3 Cash Allowance No. 3 – Integrated Systems Testing – Trade time on Site – Lynn Lake Hospital
    - .1 This cash allowance is for the applicable trades related to the integrated systems testing scope of work to be present on site during the testing. Hourly rates are to be noted in the unit price section of the pricing form and shall be used to determine number of hours on site based on a blended rate.
  - .4 Cash Allowance No. 4 – Additional Fire Stopping – Gillam Hospital
    - .1 Allowance for additional small conduit/pipe/cable penetrations through fire separations beyond the quantity noted in the drawings.
  - .5 Cash Allowance No. 5 – Asbestos Air Sample Testing – Gillam Hospital
    - .1 Test samples prior to construction work. Air samples to be taken at the beginning of the testing and at the end to confirm compliance for all asbestos abatement hoardings.

- .6 Cash Allowance No. 6 – Integrated Systems Testing – Trade time on Site – Gillam Hospital
  - .1 This cash allowance is for the applicable trades related to the integrated systems testing scope of work to be present on site during the testing. Hourly rates are to be noted in the unit price section of the pricing form and shall be used to determine number of hours on site based on a blended rate.
- .7 Cash Allowance No. 7 – Additional Fire Stopping – Northern Spirit Manor Personal Care Home
  - .1 Allowance for additional small conduit/pipe/cable penetrations through fire separations beyond the quantity noted in the drawings.
- .8 Cash Allowance No. 8 – Asbestos Air Sample Testing – Northern Spirit Manor Personal Care Home
  - .1 Test samples prior to construction work. Air samples to be taken at the beginning of the testing and at the end to confirm compliance for all asbestos abatement hoardings.
- .9 Cash Allowance No. 9 – Integrated Systems Testing – Trade time on Site – Northern Spirit Manor Personal Care Home
  - .1 This cash allowance is for the applicable trades related to the integrated systems testing scope of work to be present on site during the testing. Hourly rates are to be noted in the unit price section of the pricing form and shall be used to determine number of hours on site based on a blended rate.
- .10 Cash Allowance No. 10 – Additional Fire Stopping – Thompson General Hospital
  - .1 Allowance for additional small conduit/pipe/cable penetrations through fire separations beyond the quantity noted in the drawings.
- .11 Cash Allowance No. 11 – Asbestos Air Sample Testing – Thompson General Hospital
  - .1 Test samples prior to construction work. Air samples to be taken at the beginning of the testing and at the end to confirm compliance for all asbestos abatement hoardings.
- .12 Cash Allowance No. 12 – Integrated Systems Testing – Trade time on Site – Thompson General Hospital
  - .1 This cash allowance is for the applicable trades related to the integrated systems testing scope of work to be present on site during the testing. Hourly rates are to be noted in the unit price section of the pricing form and shall be used to determine number of hours on site based on a blended rate.
- .13 Cash Allowance No. 13 – Additional Drywall Patching and Access Doors – Lynn Lake Hospital
  - .1 This cash allowance for additional drywall patching and/or addition of access doors required to facilitate scope of work beyond quantity noted in the drawings required to facilitate scope of work.
- .14 Cash Allowance No. 14 – Additional Drywall Patching and Access Doors – Gillam Hospital

- .1 This cash allowance for additional drywall patching and/or addition of access doors required to facilitate scope of work beyond quantity noted in the drawings required to facilitate scope of work.
- .15 Cash Allowance No. 15 – Additional Drywall Patching and Access Doors – Northern Spirit Manor
  - .1 This cash allowance for additional drywall patching and/or addition of access doors required to facilitate scope of work beyond quantity noted in the drawings required to facilitate scope of work.
- .16 Cash Allowance No. 16 – Additional Drywall Patching and Access Doors – Lynn Lake Hospital
  - .1 This cash allowance for additional drywall patching and/or addition of access doors required to facilitate scope of work beyond quantity noted in the drawings required to facilitate scope of work.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**



Quality Engineering | Valued Relationships

SMS Engineering

## **Lynn Lake Hospital Pump House & Cistern Geotechnical Investigation Report**

**Prepared for:**

Peter Golt, Junior Mechanical EIT  
Partner, Senior Mechanical Engineer  
SMS Engineering Ltd.  
770 Bradford St., Winnipeg, MB  
R3H 0N3

**Project Number:** 0579-007-00

**Date:** November 6, 2025



Quality Engineering | Valued Relationships

November 6, 2025

Our File No. 0579-007-00

Peter Golt, Junior Mechanical EIT  
Partner, Senior Mechanical Engineer  
SMS Engineering Ltd.  
770 Bradford St., Winnipeg, MB  
R3H 0N3

**RE: Lynn Lake Hospital Pump House & Cistern  
Geotechnical Investigation Report**

---

TREK Geotechnical Inc. is pleased to submit our final geotechnical investigation report for the above-noted project.

Please contact the undersigned should you have any questions.

Sincerely,

**TREK Geotechnical Inc.**

**Per:**

A handwritten signature in blue ink, appearing to read "Kent Bannister".

**Kent Bannister, M.Sc., P.Eng.**  
Senior Geotechnical Engineer

Encl.

## Revision History

Revision No.	Author	Issue Date	Description
0	Sapumal Rupasinghe	November 6, 2025	Final Report

## Authorization Signatures

Prepared By:



For: 

Sapumal Rupasinghe, El  
Geotechnical Engineering Intern



Reza Jamshidi Chenari, Ph.D., P. Eng.  
Geotechnical Engineer

Reviewed By:



Kent Bannister, M.Sc., P.Eng.  
Senior Geotechnical Engineer



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## **1.0 Introduction**

This report provides geotechnical design recommendations prepared by TREK Geotechnical Inc. (TREK) for SMS Engineering. (the Client) for a new cistern and generator house at the Lynn Lake Hospital, 640 Camp Street, Lynn Lake, Manitoba. The terms of reference for this work are included in our contract dated July 16, 2025. TREK's scope of work includes a sub-surface investigation, laboratory testing, provision of recommendations for foundations, concrete slabs, buried walls, temporary excavations, drainage and backfill materials.

## **2.0 Background**

### **2.1 Project Description**

Lynn Lake Hospital, located at 640 Camp Street in Lynn Lake, Manitoba, sits within the central portion of the town. The proposed fire-water infrastructure consists of a new exterior fire-pump house and an underground water-storage cistern adjacent to the existing hospital building. According to the plan, the pump house will be a single-storey structure on a 3 m × 4 m reinforced structural slab. The cistern will be located approximately 5–6 m below grade with a footprint of approximately 3 m × 11 m, providing the required fire-water storage capacity. Drawings were not available for review but based on discussion with site personnel TREK understands that the original hospital building is founded on bedrock. The building includes a crawlspace, and the bedrock has been blasted to a depth of approximately 7 ft to accommodate water and service lines along the adjacent street. Toward the back area where the proposed pumphouse will be located, the bedrock is shallower, with several exposed rock outcrops observed around the northern corner. Lynn Lake lies within Canada's discontinuous permafrost region (typical ice content < 20 %).

## **3.0 Field Program**

### **3.1 Sub-surface Investigation**

A sub-surface investigation was completed on September 30 and October 1, 2025, under the supervision of TREK personnel to better delineate the soil stratigraphy and groundwater conditions relative to the proposed building construction. Four test holes (TH25-01 to TH25-04) were drilled to power auger refusal, occurring at depths ranging from 0.5 m to 0.9 m below ground surface. Bedrock coring was conducted following power auger refusal in TH25-04, and advanced to a depth of 2.9 m below ground surface. Test hole locations are shown on Figure 01.

The test holes were drilled by Paddock Drilling Ltd. using a mobile B57 track mounted geotechnical drilling rig equipped with 125 mm solid stem augers and HQ coring. All test holes were backfilled with auger cuttings and bentonite chips to surface.

Sub-surface soils encountered during drilling were visually classified based on the Unified Soil Classification System (USCS). Disturbed (auger grab and split spoon) samples were obtained at regular

intervals.

All samples retrieved during drilling were transported to TREK's testing laboratory in Winnipeg, Manitoba. Laboratory testing consisted of moisture content determination on all samples. Bedrock core was visually inspected and logged by a professional geoscientist. Laboratory testing results are included in Appendix A.

The test hole locations were established using a handheld GPS. Test hole elevations were surveyed using a rod and level, relative to a temporary benchmark (TBM) located at the north corner of the generator concrete slab (UTM Zone 14V, 375421 m E, 6303379 m N). The TBM was assigned a local elevation of 100.0 m. The TBM and test hole locations are shown on Figure 01.

Test hole logs describing the soil units encountered and other pertinent information, such as test hole location (UTMs coordinates), elevation (local), groundwater conditions, and a summary of the laboratory testing results are also attached to this report.

### **3.2 Soil Stratigraphy**

A brief description of the stratigraphy and groundwater conditions encountered during drilling are provided below. All interpretations of soil stratigraphy for the purposes of design should refer to the detailed information provided on the attached test hole logs.

The stratigraphy at the site consists predominantly of poorly graded fine to coarse grained sand containing trace silt and trace gravel, which is brown to blackish brown, moist, and compact. This sand was encountered in test holes TH25-01 to TH25-03. In test hole TH25-04, the upper deposit consists of sand and silt with trace gravel, which is also brown, moist, compact, and poorly graded.

Power auger refusal was observed on suspected bedrock in TH25-01 to 04 at depths ranging from 0.5 to 0.9 m. Bedrock was confirmed through coring in TH25-04. The bedrock observed in TH25-04 consists of slightly weathered, very strong, dark grey gneiss tonalite of the Lynn Lake Greenstone Belt, exhibiting minor foliation and tight, closed to moderately spaced discontinuities with no evidence of water inflow. Rock quality designation (RQD) and core recovery could not be recorded for the final core run, as approximately 0.6 m of the core sample could not be retrieved from the core barrel. For core run 1, an RQD and recovery of 100% were measured, while for core run 2, both RQD and recovery were 83%, likely due to the presence of a suspected sand seam. Photos of the rock core samples are provided in Appendix B.

### **3.3 Power Auger Refusal**

Power auger refusal was observed in all four test holes ranging 0.5 m to 0.9 m depth below ground surface on granite bedrock.

### **3.4 Groundwater Conditions**

Groundwater seepage and sloughing/caving were not observed in any of the four test holes during drilling. Furthermore, no accumulated water was observed in the test holes, which remained open and dry to the maximum depth of exploration immediately after drilling.

These observations are short-term and should not be considered reflective of static groundwater levels at the site, which would require monitoring over an extended period to determine. It is important to recognize that groundwater conditions may vary seasonally, annually, or as a result of construction activities.

### **3.5 Frost Depth and Frost Susceptibility**

Based on TREK's experience in the area, the expected depth of frost for the Lynn Lake area is 3.0 m below ground surface. Various methods are available to determine the frost susceptibility of a soil based on gradation and plasticity. These methods typically rank the severity of frost susceptibility based on these index properties. Due to the presence of bedrock at or near-surface across the site, frost depth and susceptibility are not of major concern.

### **3.6 Frozen Ground Conditions**

Permafrost is defined as soil or rock that remains at or below 0°C for at least two consecutive years. The site lies within Canada's discontinuous permafrost region, where typical ice contents are less than 20%. Discontinuous permafrost (i.e., isolated pockets of frozen ground distributed sporadically across a region) is relatively common in the Lynn Lake area. Where present, permafrost in this zone can generally be expected to thaw over the long term once surface conditions are altered by development or as a result of climate change. If the permafrost-affected soils have a high-water content or contain visible ice, long-term settlement can occur due to thaw-related consolidation. Given the discontinuous nature of frozen ground, these settlements are often differential.

No permafrost was observed in the overburden soils and bedrock during the subsurface investigation, and permafrost degradation is not expected to be an issue due to the presence of bedrock at or near the ground surface.

## **4.0 Foundation Recommendations**

Based on the sub-surface conditions encountered during the investigation and the anticipated loading conditions, the preferred foundation alternative for the cistern, pumphouse, and generator house is a shallow foundation bearing on bedrock. As bedrock was encountered at a shallow depth (less than 1 m), excavation for the cistern to its design depth of 5 to 6 m is likely not cost-effective, and consideration should be given to an above-ground water storage option.

Recommendations for this foundation type according to the Manitoba Building Code (MBC 2024) which is based on the National Building Code of Canada (NBCC, 2020) are provided in the following sections.

## 4.1 Limit States Design

The foundation recommendations provided in this report are based on limit state design. The National Building Code of Canada (NBCC, 2020), the Canadian Highway Bridge Design Code (CHBDC, 2019), and the American Association of State Highway and Transportation Officials (AASHTO, 2024) require the use of limit state design that utilize load and resistance factor design (LRFD) methodology. CHBDC (2019) also incorporates a consequence factor for geotechnical systems while NBCC (2020) does not.

Table 1 of this report summarizes the recommended ULS geotechnical resistance factors that can be used for the design of foundations based on the degree of understanding (low, typical and high) of the site subsurface conditions and models used to predict geotechnical resistance. Depending on the relevant Code, resistance factors may depend upon the degree of understanding and verification testing completed during construction.

The following definitions from the 5<sup>th</sup> Ed. of the Canadian Foundation Engineering Manual (CFEM, 2023) are provided with additional notes to assist the reader with the limit state design terminology used in the building foundation recommendations.

**Limit states:** conditions beyond which a geotechnical system or component ceases to meet the criteria for which it was designed. The main ones are:

**Serviceability limit states (SLS)** – states corresponding to behaviour of the ground that causes unacceptable serviceability performance conditions, such as deformations, that restrict the intended use of the supported structure and (or) geotechnical system. Recommendations in this report are provided for evaluating the SLS that are developed based on limiting settlement to 25 mm or less. If a more stringent settlement tolerance is required, detailed settlement analysis should be conducted to refine the estimated settlement and/or adjust our recommendations.

**Ultimate limit states (ULS)** – states corresponding to a loss of stability of the geotechnical system and (or) failure of the supported structure.

**Load factor** – factor used to modify (usually increase) the characteristic load acting on and from a structure, for the limit state being considered.

**Geotechnical resistance factor ( $\phi$ )**– multiplicative value that accounts for uncertainty in the geotechnical resistance to produce an acceptable and reliable geotechnical system.

**Ultimate geotechnical resistance factor** – resistance factor to be used at the ULS.

**Characteristic (Nominal) geotechnical parameter** – an appropriately conservative estimate of the mean value of a geotechnical parameter for individual strata within the zones of influence of applied loads.

**Consequence factor ( $\Psi$ )** - multiplicative factor applied to ultimate and serviceability geotechnical resistances, which accounts for consequences of exceeding the limit state under consideration.

**Geotechnical resistance** – load that the ground can support at a limit state. Different resistances can be defined, including:

**Characteristic (nominal) ultimate geotechnical resistance** – maximum load that the ground can support at the ULS, estimated using characteristic (nominal) geotechnical parameters.

**Factored ultimate (ULS) geotechnical resistance** – product of the consequence factor, the ultimate geotechnical resistance factor, and the characteristic (nominal) ultimate geotechnical resistance.

**Table 1. Ultimate Geotechnical Resistance Factors for Shallow Foundations**

Shallow Foundations	Resistance Factors ( $\phi$ ) <sup>(Note 1)</sup>	
Limit State: Test Method / Model	Degree of Understanding	
	Typical	High
Bearing: Analysis	0.5	n/a
Sliding (frictional): Analysis	0.8	n/a

<sup>1</sup> Based on a consequence factor of 1.0

## 4.2 Shallow Foundations on Bedrock

Footings founded directly on sound, un-weathered, intact bedrock can be designed based on an SLS bearing resistance of 1000 kPa and a factored ULS bearing resistance of 1500 kPa. The SLS bearing resistance provided is based on limiting differential and total settlement to 6 mm and the factored ULS bearing resistance was calculated using a resistance factor of 0.5.

The bedrock contact varies across the site and may be sloping across the footprint of the proposed structures. In this regard, footings may need to be dowelled into the bedrock and/or levelling of the bedrock surface may be required. The potential variability of the bedrock across the site should be considered when estimating bedrock levelling quantities. Uplift loading may also require that dowels are installed.

### Additional Design and Construction Recommendations:

1. Footings should be designed by a structural engineer to resist axial, lateral, and bending loads from the structure and seasonal movements.
2. All soil and other deleterious material should be completely removed (including cobbles to large boulders) such that the bearing surface consists of a cleaned surface of sound, intact, unweathered bedrock.
  1. Footings should have a minimum base width of 0.6 m. However, the NBCC may require a larger minimum footing width which should be verified by the structural engineer.
  2. Footings should not be founded on bedrock with slopes greater than 20%. Where the bedrock slopes are greater than 20%, levelling of the bedrock surface will be necessary. For bedrock slopes between 10 and 20%, the footing base should be dowelled into the bedrock.

3. The uplift capacity of dowels should be based on the uplift resistance of the grout-rock interface, although the capacity of the dowel-grout interface should also be checked by a structural engineer. The uplift capacity of the grout-rock interface can be calculated on a factored ULS bond stress of  $0.015f'_c$ , where  $f'_c$  is the compressive strength of the grout.
4. The bedrock bearing surface should be hand-cleaned to remove any loosened, disturbed, highly fractured or nuggety materials. If rock blasting is required to meet design grades, careful inspection of the finished bedrock surface should be made to identify any induced bedrock fracturing which may have resulted from blasting activities.
5. If zones of weathered rock are present, either at surface or suspected during drilling, that cannot practically be removed, the anchors will need to be extended as directed by TREK.
6. The bearing surface and anchor holes should be observed and documented by TREK prior to concrete placement to verify the rock conditions (e.g. presence of discontinuities) and proper installation of the shallow foundation(s). Visual inspection should be completed using a downhole camera to identify fractures and competency within the entire socket depth.
7. Where required, granular fill may be placed as a levelling course or to raise grades. The granular should have a minimum thickness of 100 mm in all locations and be in accordance with Manitoba Infrastructure (MI) GSB-C or MI GBC II. The granular base and sub-base should be placed in lifts no greater than 150 mm and compacted to 98% of the SPMDD Alternatively, a concrete mud slab with a minimum compressive strength of 2 MPa may be used.
8. All sub-base and base materials should be in accordance with MI Standard Construction Specification No.901.
9. In areas where sufficient resistance to uplift or overturning cannot be developed (e.g. where bedrock is relatively shallow), dowelling of the footing into bedrock will be required. Additional recommendations are provided in Section 4.3 below.

### **4.3 Resistance to Overturning, Uplift and Sliding**

Footings will be subject to lateral and overturning loads for this application. In this regard, the maximum applied pressure should not exceed the ULS unit bearing resistance and the uplift and overturning forces should be resisted by steel anchors socketed into bedrock, the weight of the concrete footing, backfill above footings (if present), and the structure.

Sliding will be resisted by the weight of concrete and backfill materials above bedrock/soil, passive earth pressure, shear resistance provided by dowels, and resistance of the mass of soil perpendicular to the direction of sliding. A unit weight of 24 kN/m<sup>3</sup>, 20 kN/m<sup>3</sup> and 17 kN/m<sup>3</sup> is suitable for use for concrete, well-compacted granular (i.e. min 98% SPMDD), and native soils used as backfill, respectively. When calculating sliding resistance, an interface friction angle of 35° and 30° degrees, for concrete to rock and concrete/rock to soil are appropriate for use, respectively. Once the backfill types and dimensions are determined, TREK can provide further design values if a more rigorous analysis is required.

Based on the identification of the bedrock at the site, the uplift capacity of anchors socketed into bedrock will be governed by the bond strength of the grout-socket interface, the strength of which is

dependent upon the compressive strength of the grout ( $f'_c$ ). In this regard, the uplift capacity of the grout-socket interface can be calculated based on factored bond strength of  $0.015f'_c$  along the perimeter of the rock socket within intact bedrock. Anchor embedment should be a minimum of 2.0 m, and the length should be confirmed by the structural engineer based on the recommendations provided below.

Additional recommendations are provided below:

1. Anchors should be installed in sockets advanced into competent bedrock with a minimum embedment of 2 m. Resistance within lower quality rock should be neglected based on field observations. For design purposes, the upper 0.3 m should be neglected. The rock should be evaluated during construction using a downhole camera to identify fractures and anchor lengths may be increased. The contractor should be prepared to install longer anchors if needed.
2. The sockets into bedrock should be drilled by an air track drill or down-the-hole air hammer.
3. Loose and broken rock should be removed from the rock sockets with compressed air prior to placing and grouting the anchor. The socket should be kept clean and dry.
4. Care must be taken to ensure that the anchors are seated securely on the base of the socket, that the anchor is centered in the socket and that the annular space between the anchor and
5. socket wall is filled with grout.
6. The cementitious grout should be of adequate strength and durability to transfer the footing loads into the bedrock and should meet the minimum CSA standards for foundation concrete.
7. The anchors should be designed by a qualified structural engineer to resist all axial, bending, and shear forces.
8. Anchors must be ribbed (smooth bars shall not be used), free of paint, oil, or dirt, and vibrated into the grout filled socket.
9. Socket diameters should be a minimum of 25 mm larger than the anchor diameter.

Inspection of all rock-anchor installations should be performed by TREK Geotechnical personnel to confirm that the pile installation has been completed according to the design.

#### **4.4 Footing Insulation Recommendations**

In areas where footings are installed above the depth of seasonal frost and flat lying polystyrene insulation is being considered, the following recommendations apply to footings along exterior walls of structures that will be heated year-round:

1. Rigid extruded polystyrene insulation (e.g. Styrofoam Highload™) should be placed at a minimum depth of 0.4 m and extended 1.2 m horizontally in all directions from the building foundation according to manufacturers specifications.
2. Insulation should be a minimum of 50 mm thick. Joints between insulation layers should be staggered.
3. For heated structures, insulation should be fastened to exterior walls up from the horizontal insulation to a level coincident with the insulation of the interior wall.

Insulation should be sloped away from the structure to promote runoff.

## 4.5 Foundation Inspection Requirements

In accordance with Section 4.2.2.3 *Field Review* of the NBCC (2020), the designer or other suitably qualified person shall carry out a field review on:

- a) as-required, unless otherwise directed by the *authority having jurisdiction*,
  - i. in the construction of all *shallow foundation units*, and
  - ii. in excavating, dewatering and other related works

In accordance with Engineers and Geoscientists of Manitoba, a Professional Engineer or delegated staff responsible to them must perform site reviews for the work presented in the documents they've sealed.

For conformance with the NBCC and EGM requirements, TREK should be retained to observe and document the installation of all foundations, shoring or engineered fills supporting the structure, and other components such as subgrade inspections and compaction testing. TREK is familiar with the geotechnical conditions present and the underlying design assumptions of our foundation recommendations. TREK is therefore solely qualified to evaluate any design modifications deemed to be necessary should altered subsurface conditions be encountered.

## 5.0 Site Drainage

Drainage adjacent to structures and exterior slabs should promote run-off away from the structures and slabs. A minimum gradient of about 2% should be used for both landscaped and paved areas and maintained throughout the life of the structures. All paved areas should be provided with minimum slopes of 2% to improve long-term drainage. The water discharge from roof leaders and run-off from exposed slabs should be directed away from the structures.

## 6.0 Seismic Site Classification

The site classification for seismic site response was determined based on Table 4.1.8.4.-B in Section 4.1.8 *Earthquake Load and Effects* of the NBCC (2020). Site Class A applies to this site. The seismic site classification could possibly be improved by undertaking a geophysical site survey to measure shear wave velocities in the upper 30 m of the soil profile.

## **7.0 Closure**

The geotechnical information provided in this report is in accordance with current engineering principles and practices (Standard of Practice). The findings of this report were based on information provided (field investigation and laboratory testing). Soil conditions are natural deposits that can be highly variable across a site. If sub-surface conditions are different than the conditions previously encountered on-site or those presented here, we should be notified to adjust our findings if necessary.

All information provided in this report is subject to our standard terms and conditions for engineering services, a copy of which is provided to each of our clients with the original scope of work or standard engineering services agreement.

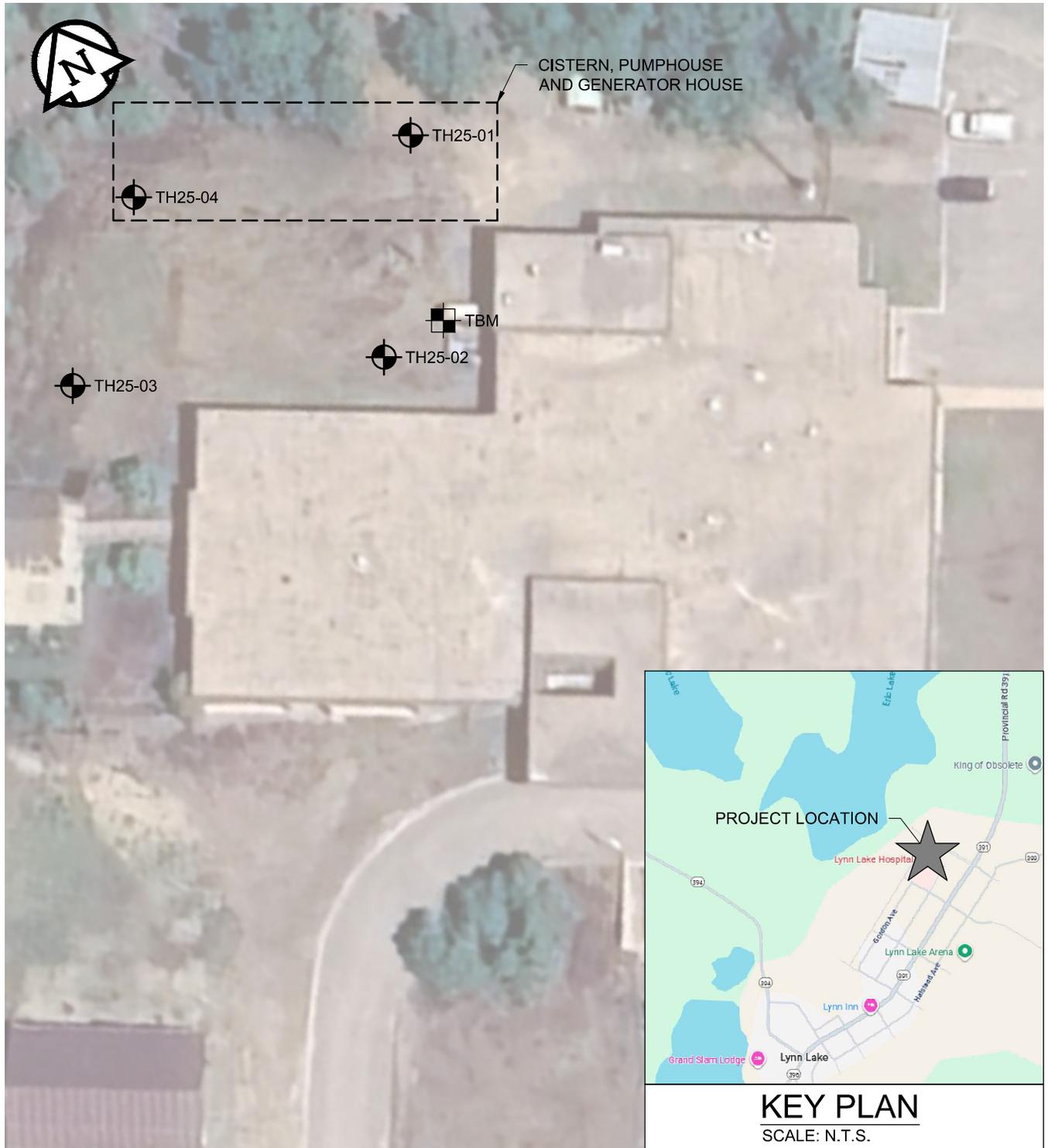
If these conditions are not attached, and you are not already in possession of such terms and conditions, contact our office and you will be promptly provided with a copy.

This report has been prepared by TREK Geotechnical Inc. (the Consultant) for the exclusive use of SMS Engineering (the Client) and their agents for the work product presented in the report. Any findings or recommendations provided in this report are not to be used or relied upon by any third parties, except as agreed to in writing by the Client and Consultant prior to use.

**Figure**

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Z:\Projects\0579 SMS Engineering\0579 007 00 Lynn Lake Hospital Pump House & Cistern\3 Survey and Dwg\3.4 CAD\3.4.3 Working Folder\Fig 2025-10-29 Lynn Lake Hospital\_0\_B 0579-007-00.dwg, 2025-10-29 4:40:01 PM

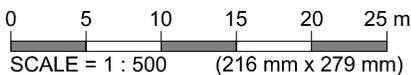


**LEGEND:**

- TEST HOLE (TREK, 2025)
- TEMPORARY BENCHMARK

**NOTES:**

1. AERIAL IMAGERY FROM GOOGLE EARTH (2024).
2. TEST HOLE LOCATIONS WERE RECORDED USING CONTEXT CAM APP.
3. TEST HOLE ELEVATIONS WERE SURVEYED RELATIVE TO A TBM (ASSIGNED LOCAL ELEVATION 100.0 m) LOCATED AT THE NORTH CORNER OF THE GENERATOR CONCRETE SLAB (UTM 14U, 6303379 m N, 375421 m E).



**Figure 01**  
Test Hole Location Plan

## Test Hole Logs

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## GENERAL NOTES

- Classifications are based on the Unified Soil Classification System and include consistency, moisture, and color. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate.
- Descriptions on these test hole logs apply only at the specific test hole locations and at the time the test holes were drilled. Variability of soil and groundwater conditions may exist between test hole locations.
- When the following classification terms are used in this report or test hole logs, the primary and secondary soil fractions may be visually estimated.

Major Divisions	USCS Classification	Symbols	Typical Names	Laboratory Classification Criteria	Particle Size	Material				
Coarse-Grained soils (More than half the material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than 4.75 mm)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain size curve, depending on percentage of fines (fraction smaller than No. 200 sieve) coarse-grained soils are classified as follows:  Less than 5 percent..... GW, GP, SW, SP More than 12 percent..... GM, GC, SM, SC 6 to 12 percent..... Borderline cases requiring dual symbols*	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	ASTM Sieve sizes #10 to #4 #40 to #10 #200 to #40 < #200				
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines				Not meeting all gradation requirements for GW			
		GM	Silty gravels, gravel-sand-silt mixtures		Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols				
		GC	Clayey gravels, gravel-sand-silt mixtures		Atterberg limits above "A" line or P.I. greater than 7					
	Sands (More than half of coarse fraction is smaller than 4.75 mm)	Clean sands (Little or no fines)	SW		Well-graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	mm 2.00 to 4.75 0.425 to 2.00 0.075 to 0.425 < 0.075			
			SP		Poorly-graded sands, gravelly sands, little or no fines			Not meeting all gradation requirements for SW		
		Sands with fines (Appreciable amount of fines)	SM		Silty sands, sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols			
			SC		Clayey sands, sand-clay mixtures	Atterberg limits above "A" line or P.I. greater than 7				
			Fine-Grained soils (More than half the material is smaller than No. 200 sieve size)		Sils and Clays (Liquid limit less than 50)	ML		Inorganic silts and very fine sands, rock floor, silty or clayey fine sands or clayey silts with slight plasticity	<b>Plasticity Chart</b> 	mm > 300 75 to 300 19 to 75 4.75 to 19
						CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
OL	Organic silts and organic silty clays of low plasticity									
Sils and Clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or distomaceous fine sandy or silty soils, organic silts		Material Boulders Cobbles Gravel Coarse Fine						
	CH	Inorganic clays of high plasticity, fat clays								
	OH	Organic clays of medium to high plasticity, organic silts								
	Pt	Peat and other highly organic soils								
Highly Organic Soils				Von Post Classification Limit	Strong colour or odour, and often fibrous texture					

\* Borderline classifications used for soils possessing characteristics of two groups are designated by combinations of groups symbols. For example; GW-GC, well-graded gravel-sand mixture with clay binder.

## Other Symbol Types

	Asphalt		Bedrock (undifferentiated)		Cobbles
	Concrete		Limestone Bedrock		Boulders and Cobbles
	Fill		Cemented Shale		Silt Till
			Non-Cemented Shale		Clay Till

### LEGEND OF ABBREVIATIONS AND SYMBOLS

LL - Liquid Limit (%)	VW - Vibrating Wire Piezometer
PL - Plastic Limit (%)	SI - Slope Inclinator
PI - Plasticity Index (%)	∇ Water Level at Time of Drilling
MC - Moisture Content (%)	▼ Water Level at End of Drilling
SPT - Standard Penetration Test	▼ Water Level After Drilling as Indicated on Test Hole Logs
RQD- Rock Quality Designation	
Qu - Unconfined Compression	
Su - Undrained Shear Strength	

### FRACTION OF SECONDARY SOIL CONSTITUENTS ARE BASED ON THE FOLLOWING TERMINOLOGY

TERM	EXAMPLES	PERCENTAGE
and	and CLAY	35 to 50 percent
"y" or "ey"	clayey, silty	20 to 35 percent
some	some silt	10 to 20 percent
trace	trace gravel	1 to 10 percent
with *	with silt, with sand	> 35 percent

\* Used when the material is classified based on behaviour as a cohesive material

### TERMS DESCRIBING CONSISTENCY OR COMPACTION CONDITION

The Standard Penetration Test blow count (N) of a non-cohesive soil can be related to compactness condition as follows:

<u>Descriptive Terms</u>	<u>SPT (N) (Blows/300 mm)</u>
Very loose	< 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very dense	> 50

The Standard Penetration Test blow count (N) of a cohesive soil can be related to its consistency as follows:

<u>Descriptive Terms</u>	<u>SPT (N) (Blows/300 mm)</u>
Very soft	< 2
Soft	2 to 4
Firm	4 to 8
Stiff	8 to 15
Very stiff	15 to 30
Hard	> 30

The undrained shear strength (Su) of a cohesive soil can be related to its consistency as follows:

<u>Descriptive Terms</u>	<u>Undrained Shear Strength (kPa)</u>
Very soft	< 12
Soft	12 to 25
Firm	25 to 50
Stiff	50 to 100
Very stiff	100 to 200
Hard	> 200





# Sub-Surface Log

Test Hole TH25-02

1 of 1

Client: SMS Engineeng Project Number: 0579-007-00  
 Project Name: Lynn Lake Hospital Pump House and Cistern Location: UTM 14V: 375415 m E, 6303379  
 Contractor: Paddock Drilling Ltd. Ground Elevation: 99.95 m (local datum)  
 Method: 125 mm solid stem auger / HQ Coring B-57 track mounted rig Date Drilled: 30 September 2025

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS) / SPT  Split Barrel (SB) / LPT  Core (C)

Particle Size Legend:  Fines  Clay  Silt  Sand  Gravel  Cobbles  Boulders

Elevation (m)	Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Recovery %	Bulk Unit Wt (kN/m <sup>3</sup> )					Undrained Shear Strength (kPa)						
							16	17	18	19	20	21	Test Type					
							Particle Size (%)					<input checked="" type="checkbox"/> Torvane <input type="checkbox"/> <input checked="" type="checkbox"/> Pocket Pen. <input type="checkbox"/> <input type="checkbox"/> Qu <input type="checkbox"/> <input type="checkbox"/> Field Vane <input type="checkbox"/>						
							0	20	40	60	80	100	0	50	100	150	200	250
			SAND - trace silt - brown - moist, compact - poorly graded - fine to coarse grained sand		G02													
			- dark brown, trace gravel (< 10 mm diam.) below 0.8 m		G03													

END OF HOLE AT 0.9 m IN SAND

Notes:

1. Power auger refusal at 0.9 m depth.
2. Seepage or sloughing not observed.
3. Test hole dry and open to 0.9 m depth immediately after drilling.
4. Test hole backfilled with auger cuttings to surface.
5. Test hole elevation surveyed relative to a temporary benchmark (TBM), located at the north corner of the generator concrete slab (UTM 14 V 375421 m E, 6303379 m N). TBM was assigned an elevation of 100.0 m (local).

SUB-SURFACE LOG LOGS 2024-11-06 LYNN LAKE HOSPITAL PUMPHOUSE 0\_D\_RJC 0579-007-00.GPJ TREK.GDT 6/11/25

Logged By: Jashandeep Singh Bhullar Reviewed By: Kent Bannister Project Engineer: Reza Jamshidi Chenari



# Sub-Surface Log

Test Hole TH25-03

1 of 1

**Client:** SMS Engineeng **Project Number:** 0579-007-00  
**Project Name:** Lynn Lake Hospital Pump House and Cistern **Location:** UTM 14V: 375391 m E, 6303391  
**Contractor:** Paddock Drilling Ltd. **Ground Elevation:** 99.91 m (local datum)  
**Method:** 125 mm solid stem auger / HQ Coring B-57 track mounted rig **Date Drilled:** 30 September 2025

**Sample Type:**  Grab (G)  Shelby Tube (T)  Split Spoon (SS) / SPT  Split Barrel (SB) / LPT  Core (C)

**Particle Size Legend:**  Fines  Clay  Silt  Sand  Gravel  Cobbles  Boulders

Elevation (m)	Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Recovery %	Bulk Unit Wt (kN/m <sup>3</sup> )		Undrained Shear Strength (kPa)				
							16	17					
							Particle Size (%)		Test Type				
							0	20	40	60	80	100	<input checked="" type="checkbox"/> Pocket Pen. <input checked="" type="checkbox"/>
							0	20	40	60	80	100	<input type="checkbox"/> Qu <input type="checkbox"/>
							0	20	40	60	80	100	<input type="checkbox"/> Field Vane <input type="checkbox"/>
99.5			SAND - trace silt, trace gravel (< 15 mm diam.) - brown - moist, compact - poorly graded - fine to coarse grained sand		G04								

END OF HOLE AT 0.5 m IN SAND

Notes:

1. Power auger refusal at 0.5 m depth.
2. Seepage or sloughing not observed.
3. Test hole dry and open to 0.5 m depth immediately after drilling.
4. Test hole backfilled with auger cuttings to surface.
5. Test hole elevation surveyed relative to a temporary benchmark (TBM), located at the north corner of the generator concrete slab (UTM 14 V 375421 m E, 6303379 m N). TBM was assigned an elevation of 100.0 m (local).

**Logged By:** Jashandeep Singh Bhullar **Reviewed By:** Kent Bannister **Project Engineer:** Reza Jamshidi Chenari



# Sub-Surface Log

Test Hole TH25-04

1 of 1

Client: SMS Engineeng Project Number: 0579-007-00  
 Project Name: Lynn Lake Hospital Pump House and Cistern Location: UTM 14V: 375404 m E, 6303402  
 Contractor: Paddock Drilling Ltd. Ground Elevation: 100.00 m (local datum)  
 Method: 125 mm solid stem auger / HQ Coring B-57 track mounted rig Date Drilled: 30 September 2025 - 1 October 2025

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS) / SPT  Split Barrel (SB) / LPT  Core (C)

Particle Size Legend:  Fines  Clay  Silt  Sand  Gravel  Cobbles  Boulders

Elevation (m)	Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Recovery % (FGD %)	Bulk Unit Wt (kN/m <sup>3</sup> )					Undrained Shear Strength (kPa)	
							16	17	18	19	20		21
							Particle Size (%)					Test Type Δ Torvane Δ ⊕ Pocket Pen. ⊕ ⊠ Qu ⊠ ○ Field Vane ○	
							0	20	40	60	80		100
							0	20	40	60	80		100
99.5	-0.5		SAND AND SILT - trace gravel (< 5 mm diam.) - brown - moist, compact - poorly graded - fine to coarse grained sand	<input checked="" type="checkbox"/>	G05								
				<input checked="" type="checkbox"/>	G06								
	-0.5		GNEISS TONALITE (100%)-(LYNN LAKE GREENSTONE BELT) - dark grey - fresh (W1) slightly weathered (W2) , medium to coarse - minor foliation parallel to core axis - very strong (R5) - Lynn Lake Greenstone Belt - discontinuities smooth, closed to gapped aperture - no evidence of water flow or infilling, close to moderately close spacing		C07	100 (100)							
	-1.0				C08	83 (83)							
	-1.5				C09								
	-2.0												
	-2.5												
97.0	-2.9		END OF HOLE AT 2.9 m IN GNEISS TONALITE										

- Notes:
- Power auger refusal at 0.5 m depth.
  - Seepage or sloughing not observed.
  - Drilling method switched to HQ coring below 0.5 m depth.
  - Test hole backfilled with bentonite chips to surface.
  - Test hole elevation surveyed relative to a temporary benchmark (TBM), located at the north corner of the generator concrete slab (UTM 14 V 375421 m E, 6303379 m N). TBM was assigned an elevation of 100.0 m (local).

Logged By: Jashandeep Singh Bhullar Reviewed By: Kent Bannister Project Engineer: Reza Jamshidi Chenari

**Appendix A**  
**Laboratory Testing**

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Quality Engineering | Valued Relationships

## MEMORANDUM

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**Date** October 6, 2025  
**To** Jashandeep Singh Bhullar, TREK Geotechnical  
**From** Angela Fidler-Kliwer, TREK Geotechnical  
**Project No.** 0579-007-00  
**Project** Lynn Lake Hospital Pump House & Cistern  
**Subject** Laboratory Testing Results – Lab Req. R25-438

---

**Distribution** Reza Jamshidi

---

Attached are the laboratory testing results for the above noted project. The testing included moisture content determinations.

Regards,

Angela Fidler-Kliwer, C.Tech.

Attach.

*Review Control:*

<i>Prepared By:</i> EG	<i>Reviewed By:</i> AFK	<i>Checked By:</i> NJF
------------------------	-------------------------	------------------------



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1712 St. James Street  
Winnipeg, MB R3H 0L3  
Tel: 204.975.9433 Fax: 204.975.9435

## Moisture Content Report ASTM D2216-98

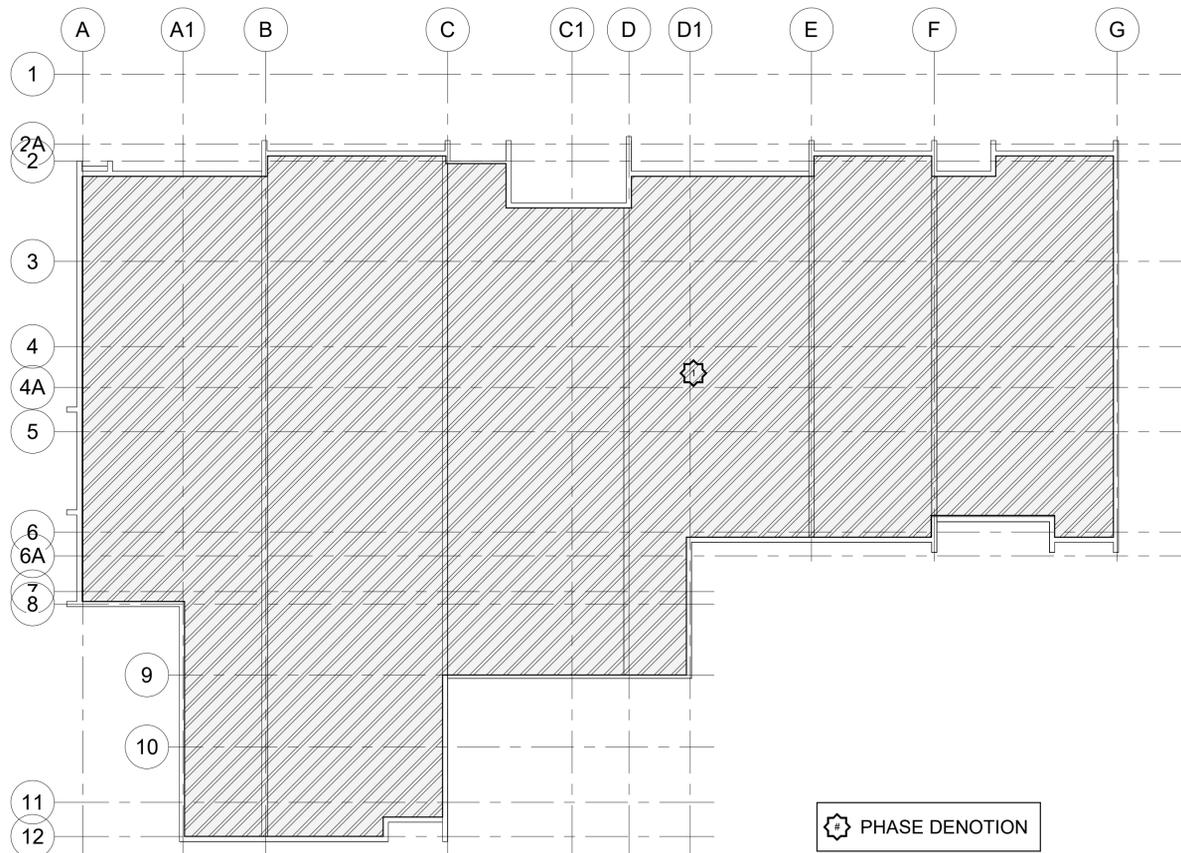
**Project No.** 0579-007-00  
**Client** SMS Engineering Ltd.  
**Project** Lynn Lake Hospital Pump House & Cistern  
  
**Sample Date** 30-Sep-25  
**Test Date** 03-Oct-25  
**Technician** M. Gatdula

Test Hole	TH25-01	TH25-02	TH25-02	TH25-03	TH25-04	TH25-04
Depth (m)	0.0 - 0.6	0.0 - 0.6	0.8 - 0.9	0.0 - 0.5	0.0 - 0.3	0.3 - 0.5
Sample #	G01	G02	G03	G04	G05	G06
Tare ID	F13	H20	N59	Z132	M10	E25
Mass of tare	7.0	7.2	8.5	9.1	6.9	7.0
Mass wet + tare	161.5	173.9	167.3	163.7	160.8	161.9
Mass dry + tare	134.0	155.6	148.2	118.6	136.4	138.4
Mass water	27.5	18.3	19.1	45.1	24.4	23.5
Mass dry soil	127.0	148.4	139.7	109.5	129.5	131.4
Moisture %	21.7%	12.3%	13.7%	41.2%	18.8%	17.9%

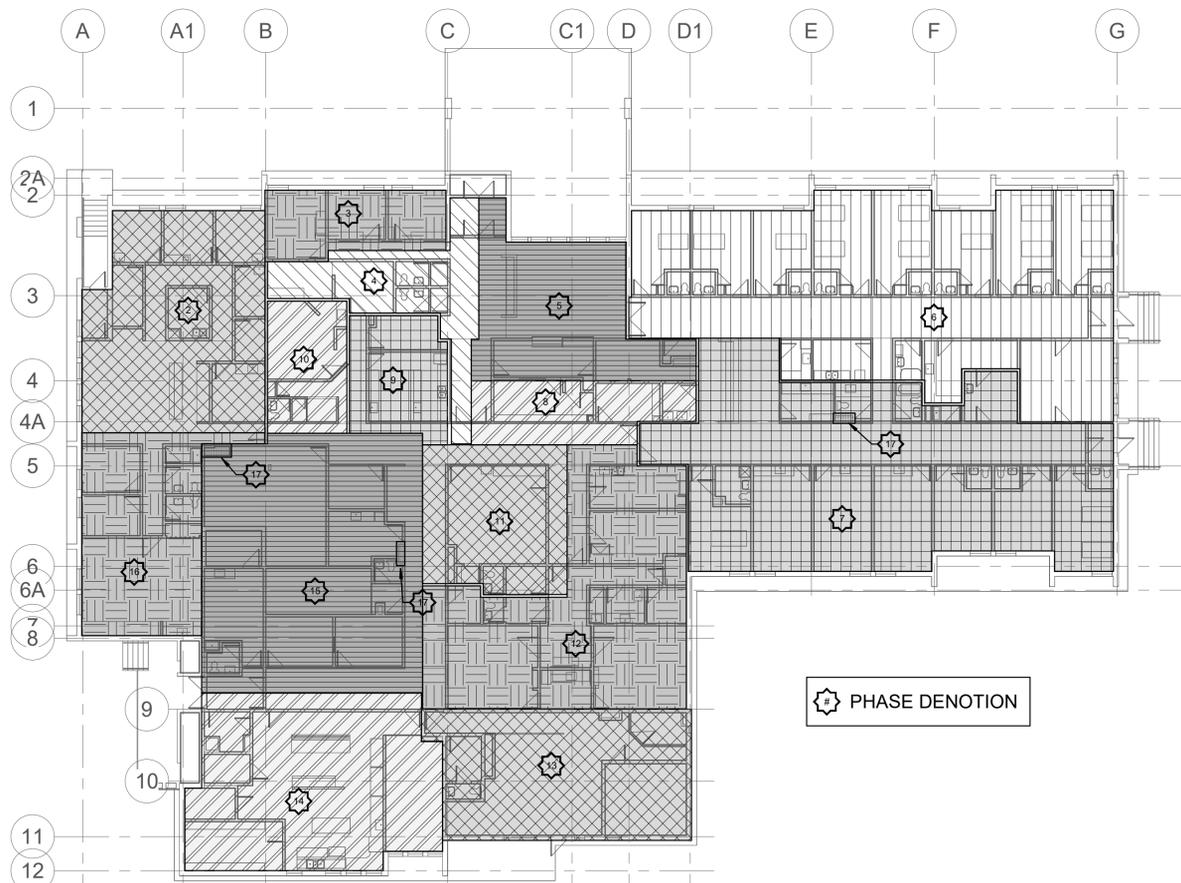
**Appendix B**  
**Rock Core Photos**

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**2 CRAWLSPACE - PHASING PLAN**  
 G1-000 SCALE: 1:200



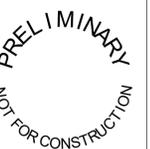
**1 MAIN FLOOR - PHASING PLAN**  
 G1-000 SCALE: 1:200

**GENERAL NOTES**

- A. NOTIFY AND COORDINATE WITH THE FACILITY TO CAUSE THE LEAST IMPACT TO BUILDING OPERATION.
- B. PERFORM SITE VISIT DURING BIDDING PERIOD AND VERIFY ALL EXISTING SERVICES ON SITE PRIOR TO SUBMITTING BID. REPORT ANY DISCREPANCIES TO CONSULTANT DURING BID PERIOD.
- C. THE FOLLOWING AREA SPECIFIC WORK RESTRICTIONS MUST BE INCORPORATED INTO THE PROPOSED SCHEDULE:
  - a. MORGUE ACCESS TO BE MAINTAINED AT ALL TIMES.
  - b. CONTENTS OF CLEAN UTILITY TO BE MOVED TO ROOM 161 PRIOR TO CONSTRUCTION. COORDINATE WITH FACILITY STAFF.
  - c. LAB PHASE: PRIORITY PHASE. WORK TO BE COMPLETED BETWEEN 2:00 PM ON FRIDAY AND BE COMPLETE BY MONDAY MORNING AT 6:00 AM. EMERGENCY ACCESS FOR CRITICAL ER PATIENTS MUST BE MAINTAINED. LAB EQUIPMENT TO BE COVERED. COORDINATE CLOSELY WITH FACILITY STAFF.
  - d. MAINTAIN ACCESS TO OFFICES THROUGHOUT CONSTRUCTION.
  - e. CONTENTS OF DRUG ROOM TO BE RELOCATED PRIOR TO CONSTRUCTION. COORDINATE WITH FACILITY STAFF.
  - f. CONTENTS OF EMERGENCY ROOM TO BE RELOCATED PRIOR TO CONSTRUCTION. CONSTRUCTION IN EMERGENCY ROOM TO BE EXPEDITED. COORDINATE WITH FACILITY STAFF.
  - g. ENSURE ALL EXIT SIGNS ARE VISIBLE AT ALL TIMES.
  - h. CONTENTS OF KITCHEN TO BE RELOCATED PRIOR TO CONSTRUCTION. COORDINATE WITH FACILITY STAFF.
  - i. CONTENTS OF GENERAL STORAGE TO BE RELOCATED PRIOR TO CONSTRUCTION. COORDINATE WITH FACILITY STAFF.
  - j. MAINTAIN HALF HALLWAY ACCESS IN CORRIDORS AT ALL TIMES. CORRIDORS NEED TO BE HOARDED. NEGATIVE AIR UNITS AND WALK-OFF MATS INSTALLED AS WELL AS REMOVAL AND CLEANING PRIOR TO END OF SHIFT. HOARDING SHALL LEAVE 1200 MM OF OPEN CORRIDOR WIDTH SO THAT ACCESS TO EXISTS AND ESSENTIAL SERVICES ARE MAINTAINED. WORK IN CORRIDORS MAY NEED TO BE DONE AFTER HOURS. COORDINATE WITH FACILITY.
  - k. ACCESS TO THE MECHANICAL ROOM SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.
  - l. REMOVAL OF FIRE HOSE CABINETS TO BE COMPLETED IN A SINGLE PHASE AT THE END OF THE PROJECT. IF REMOVAL MUST OCCUR PRIOR, A 24-HR FIRE WATCH WILL BE MANDATORY UNTIL NEW SPRINKLER SYSTEM HAS BEEN CERTIFIED BY ENGINEER TO BE IN OPERATION.

Consultant

ISSUE / REVISION	DESCRIPTION	BY	DDMMYY
0	ISSUED FOR CONSTRUCTION	MAB	2025-10-09



Project Title  
**PROVINCIAL FIRE AND LIFE SAFETY PROJECT - LYNN LAKE, GILLAM, AND THOMPSON SITES**

**LYNN LAKE HOSPITAL**

64 CAMP STREET, LYNN LAKE, MB R0B 0W0

Drawing Title  
**PHASING PLAN**

Drawn By	Checked By	Approved By
RP	MAB	JRB
Scale	Start Date	Project No.
AS SHOWN	MAY 2025	23-001-22

Revision Number	Drawing Number
0	G1-000



Architecture  
Landscape  
Interior Design

Suite 200, 300 Waterfront Drive  
Winnipeg, MB Canada R3B 0G5  
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## ADDENDUM AD 01

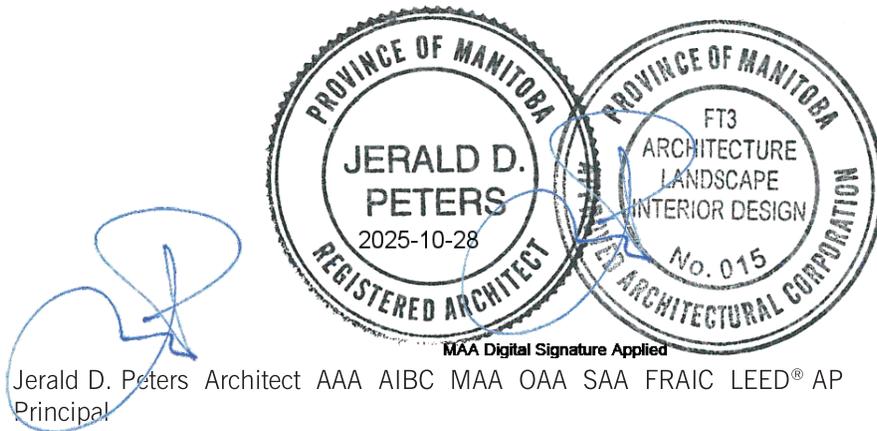
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<b>Project:</b>	Provincial Fire Life Safety – Lynn Lake, Gillam, and Thompson Sites	
<b>Commission Number:</b>	21569.44, 21569.49, 21569.50	SMS Project No.: 25-001-16
<b>Date:</b>	October 27, 2025	
<b>Pages:</b>	2 + 5 attachments	

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### GENERAL NOTE

This Addendum (2 pages & 5 attachments) shall form a part of, and be included in the contract documents for the above titled project, and no consideration will be entertained for extras to the contract due to failure of the contractor to become thoroughly familiar with this Addendum.



Jerald D. Peters Architect AAA AIBC MAA OAA SAA FRAIC LEED® AP  
Principal

Includes:

- A. Drawing Revision
- B. Project Manual Revision

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**A. Drawing Revision**

- 1.1 Replace Drawing A4-113 Demolition Ground Floor Plan Block 3 with attached revised Drawing A4-113 Demolition Ground Floor Plan Block 3 – Addendum 01
- 1.2 Replace Drawing A4-131 Demolition Second Floor Plan Block 1 with attached revised Drawing A4-131 Demolition Second Floor Plan Block 1 – Addendum 01
- 1.3 Replace Drawing A4-221 Construction First Floor Plan Block 1 with attached revised Drawing A4-221 Construction First Floor Plan Block 1 – Addendum 01

**B. Project Manual Revision**

- 1.1 Replace Section 04 20 00 Unit Masonry with attached Section 04 20 00 Unit Masonry – Addendum 01. Changes include updated product information reflected under section 2.2
- 1.2 Replace Section 10 90 00 Miscellaneous Specialties with attached Section 10 90 00 Miscellaneous Specialties - Addendum 01. Changes include updated product information reflected under section 2.1

END OF ADDENDUM

REFERENCE LINE  
SEE 1/A4-111

REFERENCE LINE  
SEE 1/A4-212

Consultant

**ft3**  
Architecture  
Landscape  
Interior Design

ISSUE / REVISION	DESCRIPTION	BY	DDMMYY
1	ISSUED WITH ADDENDUM 01	EG	23/10/25
0	ISSUED FOR CONSTRUCTION	EG	09/10/25

Certificate Of Authorization      Engineer's Seal

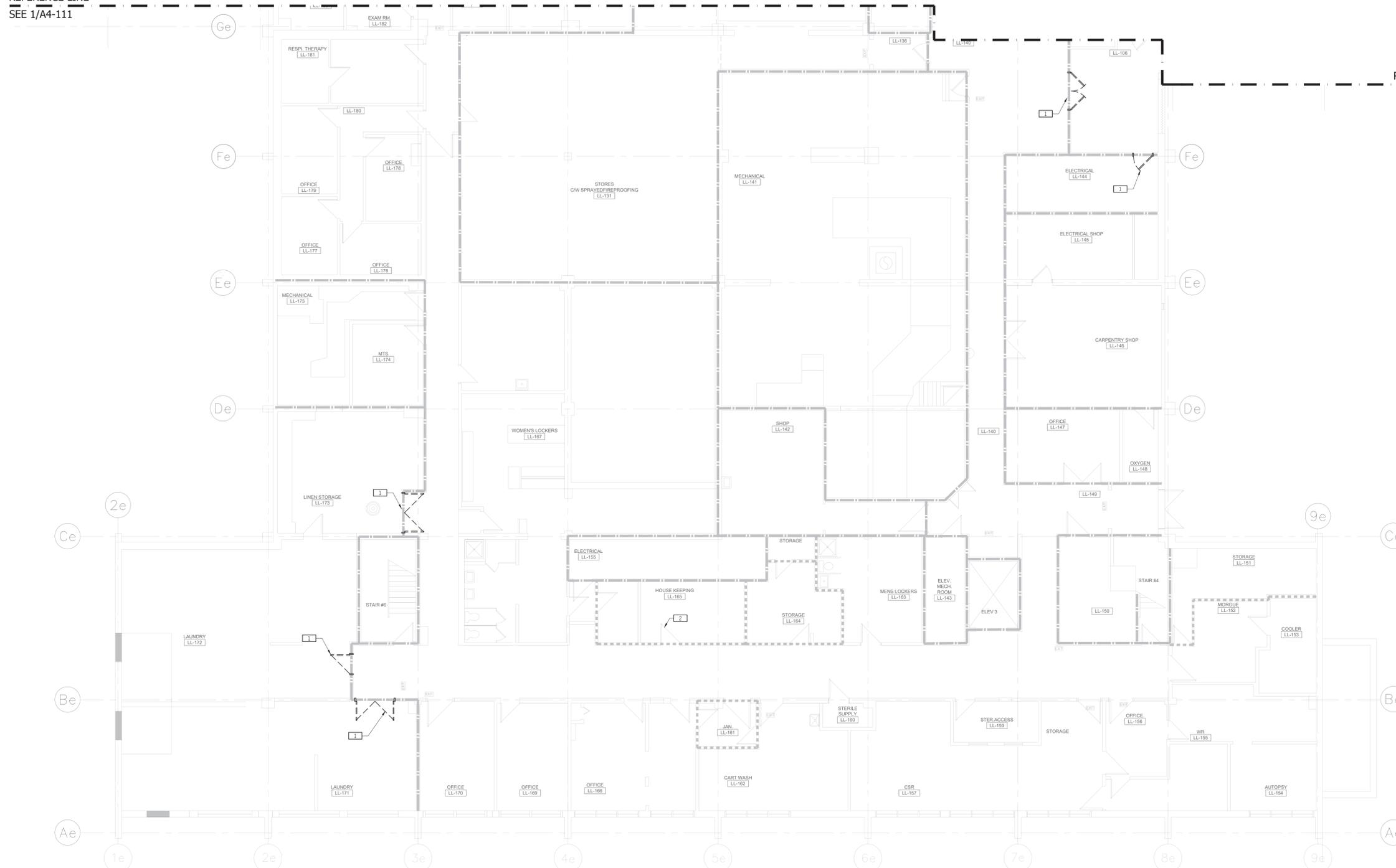
Project Title  
**PROVINCIAL FIRE AND LIFE SAFETY PROJECT - LYNN LAKE, GILLAM, AND THOMPSON SITES**

**THOMPSON GENERAL HOSPITAL**  
THOMPSON      MANITOBA

Drawing Title  
**DEMOLITION GROUND FLOOR PLAN BLOCK 3**

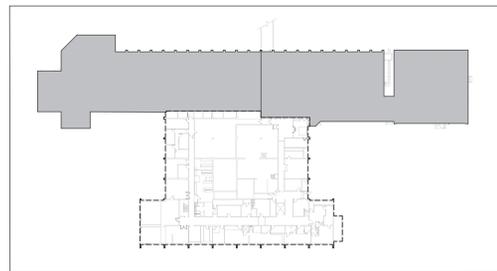
Drawn By	Checked By	Approved By
BR	JW	JP
Scale	Date	Project No.
AS NOTED	OCT. 2025	25-001-18

Revision Number	Drawing Number
1	A4-113

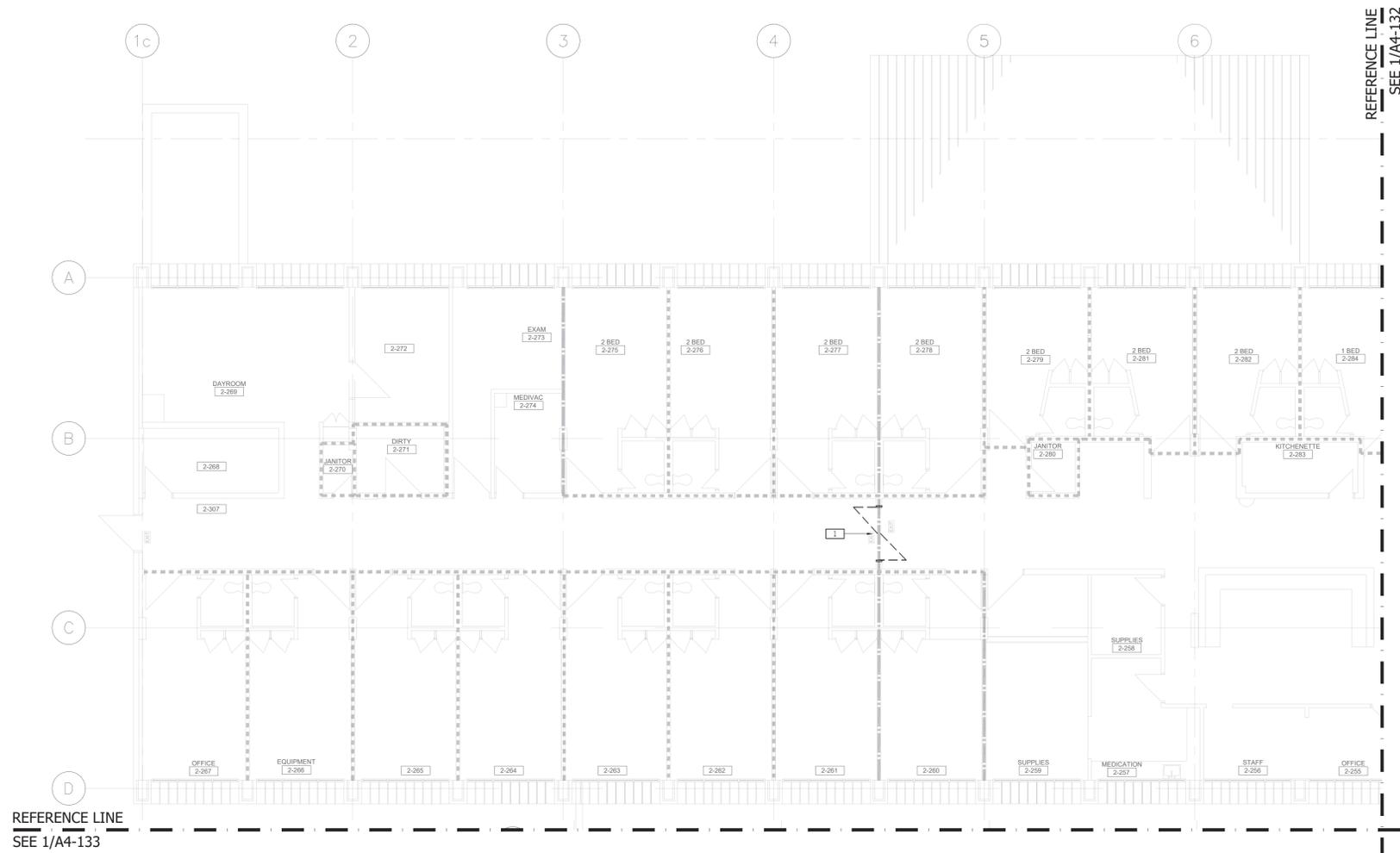


**1** GROUND FLOOR PLAN - BLOCK 3  
A4-113 1:100M

- DEMOLITION KEYNOTES:**
- 1 DEMOLISH EXISTING DOOR SLAB(S) AND DOOR FRAME AND PREPARE FOR NEW DOOR AND FRAME INSTALLATION. REFER TO DOOR SCHEDULE.
  - 2 REMOVE VENT GRILLE FROM EXISTING SERVICE ROOM DOORS. PREPARE OPENING TO BE INFILLED. REFER TO CONSTRUCTION PLAN

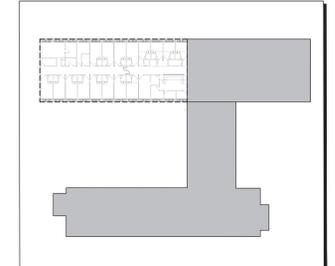


**BUILDING KEY PLAN**  
1:1000M  
north



**1** SECOND FLOOR PLAN - BLOCK 1  
A4-131 1:100M

**DEMOLITION KEYNOTES:**  
 [Symbol] DEMOLISH EXISTING DOOR SLAB(S) AND DOOR FRAME AND PREPARE FOR NEW DOOR AND FRAME INSTALLATION. REFER TO DOOR SCHEDULE.



**BUILDING KEY PLAN**  
1:1000M  
north

ISSUE / REVISION	DESCRIPTION	BY	DDMMYY
1	ISSUED WITH ADDENDUM 01	EG	23/10/25
0	ISSUED FOR CONSTRUCTION	EG	09/10/25

Certificate Of Authorization \_\_\_\_\_ Engineer's Seal \_\_\_\_\_

Project Title  
**PROVINCIAL FIRE AND LIFE SAFETY PROJECT - LYNN LAKE, GILLAM, AND THOMPSON SITES**

**THOMPSON GENERAL HOSPITAL**  
 THOMPSON MANITOBA

Drawing Title  
**DEMOLITION SECOND FLOOR PLAN BLOCK 1**

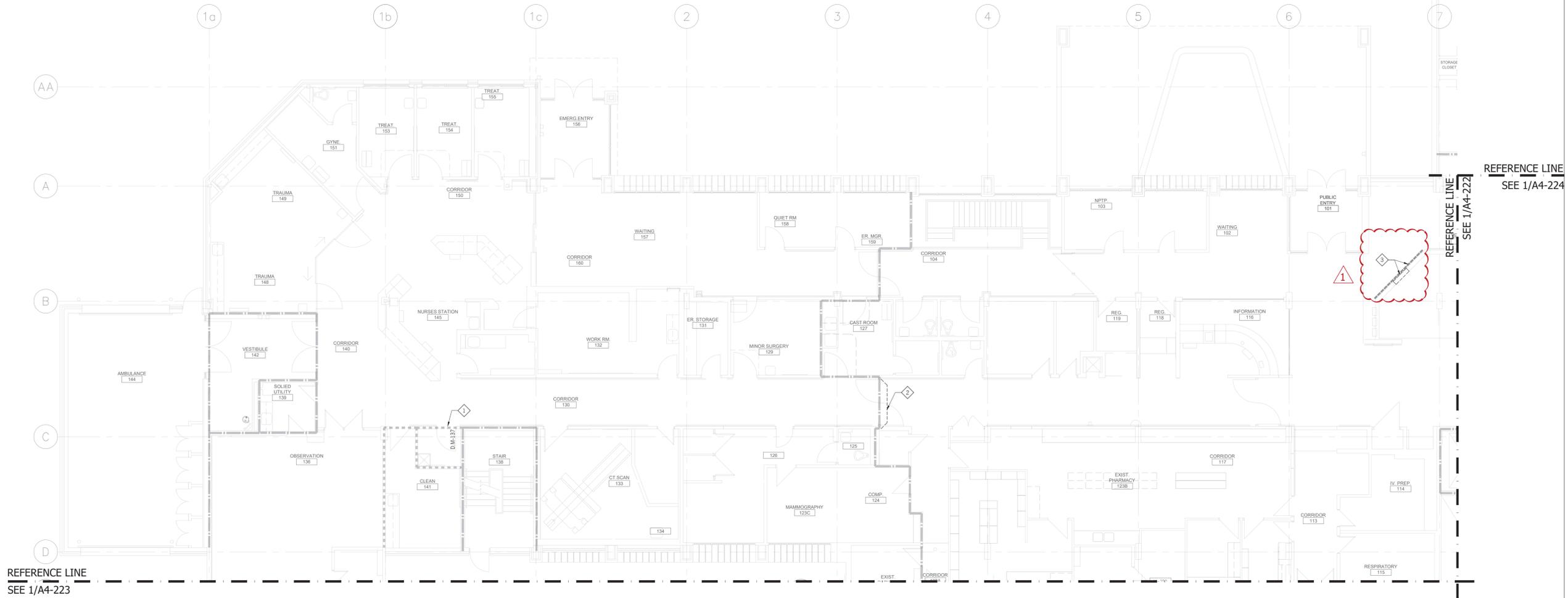
Drawn By	Checked By	Approved By
BR	JW	JP
Scale	Date	Project No.
AS NOTED	OCT. 2025	25-001-18

Revision Number	Drawing Number
<b>1</b>	<b>A4-131</b>

FILE NAME AND PATH: I:\2025\1869 Shared Health\Projects\Life Safety\Architect\Design\3\_Schematic\_Design\21008\_01\_Thompson\_GH\_1\_Northman\_SplitLabor\_PCH.dwg  
 LAYOUT: A4-131 LAST SAVED BY: amason DATE PLOTTED: April 19, 2024 8:16:14 AM

Consultant

**ft3**  
 Architecture  
 Landscape  
 Interior Design



REFERENCE LINE  
SEE 1/A4-223

REFERENCE LINE  
SEE 1/A4-224

REFERENCE LINE  
SEE 1/A4-222

**1** FIRST FLOOR PLAN - BLOCK 1  
 A4-221 1:100M

ISSUE / REVISION	DESCRIPTION	BY	DDMMYY
1	ISSUED WITH ADDENDUM 01	EG	23/10/25
0	ISSUED FOR CONSTRUCTION	EG	09/10/25

Certificate Of Authorization      Engineer's Seal

Project Title  
**PROVINCIAL FIRE AND LIFE SAFETY PROJECT - LYNN LAKE, GILLAM, AND THOMPSON SITES**

**THOMPSON GENERAL HOSPITAL**  
 THOMPSON      MANITOBA

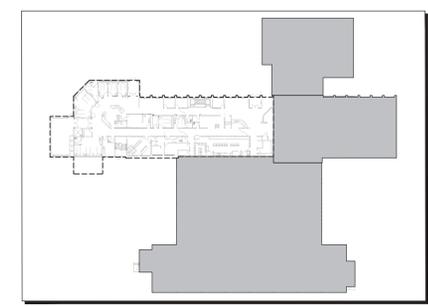
Drawing Title  
**CONSTRUCTION FIRST FLOOR PLAN BLOCK 1**

Drawn By BR	Checked By JW	Approved By JP
Scale AS NOTED	Date OCT. 2025	Project No. 25-001-18

Revision Number <b>1</b>	Drawing Number <b>A4-221</b>
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**CONSTRUCTION KEYNOTES:**

- ◆ NEW U/LC LISTED DOOR CLOSER FOR EXISTING UTILITY/SERVICE ROOM DOORS THROUGHOUT THE BUILDING (ALLOW FOR TOTAL = 19)
- ◆ FIRE STOP 13mm - 102mm BX, CABLE, CONDUIT, AND/OR PIPE PENETRATIONS THROUGH GYPSUM WALLBOARD 1HR SEPARATION. (TOTAL = 31)
- ◆ PROVIDE MODIFICATION TO EXISTING WALL TO SUIT NEW RECESSED PANEL. COORDINATE WITH ELECTRICAL. REMOVE EXISTING HANDRAIL. PATCH AND MAKE GOOD AFFECTED WALL. PAINT TO MATCH EXISTING.



**BUILDING KEY PLAN**  
 1:1000M  
 north

FILE NAME AND PATH: I:\2025\1609 Shared Health - Fire & Life Safety\1609\01 Design\3 Schematic Design\21009\_01 Thompson GH & Northern Spinal Inj Lab\01.dwg  
 LAYOUT: A4-221      LAST SAVED BY: amason      DATE PLOTTED: April 19, 2024 8:16:14 AM

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1      Concrete masonry units
- .2      Face brick
- .3      Mortar
- .4      Reinforcement, anchorage, and accessories

**1.2                RELATED SECTIONS**

- .1      Section 06 10 00 – Rough Carpentry
- .2      Section 07 84 00 – Firestopping
- .3      Section 07 92 00 – Joint Sealants
- .4      Section 09 21 16 – Gypsum Board Assemblies

**1.3                REFERENCES**

- .1      ASTM C216 – Standard Specification for Facing Brick
- .2      CSA A82 - Fired Masonry Brick Made from Clay or Shale
- .3      CSA A371 - Masonry Construction for Buildings
- .4      CSA A179 - Mortar and Grout for Unit Masonry
- .5      CSA S304.1 - Design of Masonry Structures

**1.4                SUBMITTALS**

- .1      Mortar:
  - .1      Brick Mortar Samples: Submit two (2) samples illustrating mortar colour and colour range.
  - .2      To CSA A179: Provide mix design and mortar cube test results on approved coloured mortar.
- .2      Constructed Samples: Provide samples of brick and mortar combination for approval by the Consultant. Samples shall be 600 mm x 600 mm mounted on 19 mm plywood.

**1.5                QUALITY ASSURANCE**

- .1      Perform Work in accordance with CSA A371 and CSA S304.1.
- .2      Installer: Company specializing in performing the work of this section with minimum five (5) years documented experience and approved by unit masonry fabricator.

## **1.6 REGULATORY REQUIREMENTS**

- .1 Conform to applicable code for fire rated masonry construction.

## **1.7 ENVIRONMENTAL REQUIREMENTS**

- .1 Cold Weather Requirements: Conform to CSA A371 for cold weather construction requirements.
- .2 Maintain materials and surrounding air temperature to maximum 32 degrees C prior to, during, and 48 hours after completion of masonry work.

## **1.8 MIX TESTS**

- .1 Inspection and testing will be carried out by agencies designated by the Consultant and paid for as indicated in Section 012100.

## **Part 2 Products**

### **2.1 CONCRETE BLOCK MASONRY UNITS**

- .1 Standard concrete block units: to CAN/CSA-A165 Series (CAN/CSA-A165.1)
  - .1 Size: Modular – Mason to confirm whether existing block is imperial or metric prior to ordering block.
  - .2 Special shapes: provide square units for exposed corners. Provide purpose-made shapes for lintels, beams and bond beams. Provide additional special shapes as indicated.
  - .3 Profile/Texture for Architectural Concrete Unit Masonry: standard, smooth.
- .2 Provide special units for 90 degree corners, bond beams, lintels, and bullnosed corners.

### **2.2 BRICK UNITS**

- .1 Face Brick: CAN/CSA A82, ASTM C216; Type S, Grade EG; distributed by IXL; modular size (size) of 90 x 57 x 190mm (Modular);
  - .1 Hebron Brick Company:
    - .1 Colour: Walnut Creek Ironspot
    - .2 Finish: Smooth
- .2 Or approved equal

### **2.3 MORTAR**

- .1 Portland Cement: CAN3-A5/A8/A362-M88, ASTM C150 Normal Type 10. Masonry Cement not permitted.
- .2 Hydrated Lime: ASTM C207, Type S.
- .3 Water: Clean and potable.

.4 Mortar for Exterior or Load Bearing Walls and Partitions: CSA A179M, Type S using the Proportion specification. Refer to Drawings.

.5 Mortar colour:

.1 Concrete masonry units: grey

.2 Brick: as selected by Consultant

## **2.4 MORTAR MIXING**

.1 Thoroughly mix mortar ingredients in accordance with CSA A179 in quantities needed for immediate use.

.2 Add mortar colour and admixtures in accordance with manufacturer's instructions. Provide uniformity of mix and colouration.

.3 Do not use anti-freeze compounds to lower the freezing point of mortar.

.4 If water is lost by evaporation, re-temper only within two hours of mixing.

.5 Use mortar within two hours after mixing at temperatures of 32 degrees C, or two-and-one-half hours at temperatures under 5 degrees C.

## **2.5 REINFORCEMENT AND ANCHORAGE**

.1 Steel angles and loose lintels: refer to Structural Drawings and Section 055000.

.2 Single Wythe Joint Reinforcement: Ladder type; galvanized steel construction; 4.75 mm side rods; BL30 manufactured by Blok-Lok..

.3 Brick veneer ties (wood frame/sheathing back up): FERRO Slotted Rap-Tie, complete with wire V-tie.

.4 Reinforcing Steel: Specified in Section 032000.

## **2.6 ACCESSORIES**

.1 Control Joint Filler: Close cell polyethylene, oversized 50 percent. self-expanding, maximum lengths; Ethafoam foam rod, manufactured by Dow Chemicals.

.2 Sealant: refer to Section 079200; Type D.

.3 Weeps: Formed opening in mortar.

## **Part 3 Execution**

### **3.1 EXAMINATION**

.1 Verify that field conditions are acceptable and ready to receive work.

.2 Verify items provided by other sections of work are properly sized and located.

- .3 Verify that built-in items are in proper location and ready for roughing into masonry work.

### 3.2 PREPARATION

- .1 Direct and coordinate placement of metal anchors supplied to other sections.
- .2 Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

### 3.3 COURSING

- .1 Establish lines, levels, and coursing indicated. Protect from displacement.
- .2 Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thicknesses.
- .3 Concrete Masonry Units:
  - .1 Bond: Running bond unless otherwise indicated on drawings.
  - .2 Coursing: Two unit and two mortar joint to equal 200 mm.
  - .3 Mortar Joints: Concave.
- .4 Brick Units:
  - .1 Bond: Running, as indicated on Drawings.
  - .2 Coursing: Three units and three mortar joints equal 400 mm.
  - .3 Mortar Joints: Concave.

### 3.4 PLACING AND BONDING

- .1 Lay hollow masonry units with face shell bedding on head and bed joints.
- .2 Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
- .3 Remove excess mortar as work progresses.
- .4 Interlock intersections and external corners. Interlock masonry units with pilasters as indicated on Drawings.
- .5 Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- .6 Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- .7 Isolate masonry partitions from vertical structural framing members with a control joint, or as indicated on Drawings.
- .8 Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler, or as indicated on Drawings.

### **3.5 WEEPS**

- .1 Install weeps in brick 800 mm on centre, horizontally above through-wall flashing above shelf angles and lintels and at bottom of walls.
- .2 Provide air vents in veneer, at same spacing as weeps, at top of walls and below shelf angles and window/opening sills.

### **3.6 CAVITY WALL**

- .1 Do not permit mortar to drop or accumulate into cavity air space or to plug weeps.
- .2 Build inner wythe ahead of outer wythe to receive cavity insulation air/vapour barrier adhesive.

### **3.7 REINFORCEMENT AND ANCHORAGE**

- .1 Spacing for tie anchors: as listed below, unless otherwise noted on Structural Drawings.
  - .1 Horizontal: 810 mm (32 inches), max.
  - .2 Vertical: 610 mm (24 inches), max.
- .2 Refer to Structural for vertical core reinforcing.
- .3 Unless otherwise noted provide the following joint reinforcing:
  - .1 Install horizontal joint reinforcement 400 mm on centre.
  - .2 Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 400 mm each side of opening
  - .3 Place joint reinforcement continuous in first and second joint below top of wall
  - .4 Lap joint reinforcement ends minimum 150 mm.

### **3.8 MASONRY FLASHINGS**

- .1 Extend flashings horizontally at foundation walls, above ledge or shelf angles and lintels, under parapet caps, at bottom of walls.
- .2 Turn flashing up minimum 200 mm and bed into mortar joint of masonry.
- .3 Lap end joints minimum 150 mm and seal watertight.
- .4 Turn flashing, fold, and seal at corners, bends, and interruptions.
- .5 Install metal flashing over membrane flashing and form drip edge.

### **3.9 LINTELS**

- .1 Install loose steel lintels over openings as indicated on Drawings. Minimum 200mm bearing at each end.
- .2 Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled. Refer to Structural Drawings.

- .3 Do not splice reinforcing bars.
- .4 Support and secure reinforcing bars from displacement. Maintain position within 13 mm of dimensioned position.
- .5 Place and consolidate grout fill without displacing reinforcing.

### **3.10 CONTROL JOINTS**

- .1 Do not continue horizontal joint reinforcement through control joints.
- .2 Size control joint in accordance with Section 079200 for sealant performance.

### **3.11 BUILT-IN WORK**

- .1 As work progresses, install built-in metal, fabricated metal frames, wood nailing strips, anchor bolts, plates, and other items to be built-in the work and furnished by other sections.
- .2 Install built-in items plumb and level.
- .3 Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
- .4 Do not build in organic materials subject to deterioration.

### **3.12 TOLERANCES**

- .1 Maximum Variation from Alignment of Pilasters: 6 mm.
- .2 Maximum Variation from Unit to Adjacent Unit: 1.6 mm.
- .3 Maximum Variation from Plane of Wall: 6 mm/3 m and 13 mm/6 m or more.
- .4 Maximum Variation from Plumb: 6 mm per story non-cumulative; 13 mm in two stories or more.
- .5 Maximum Variation from Level Coursing: 3 mm/m and 6 mm/3 m; 13 mm/9.1 m.
- .6 Maximum Variation of Joint Thickness: 3 mm/m.
- .7 Maximum Variation from Cross Sectional Thickness of Walls: 6 mm.

### **3.13 CUTTING AND FITTING**

- .1 Cut and fit for other sections as required. Cooperate with other sections of work to provide correct size, shape, and location.
- .2 Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

**3.14 CLEANING**

- .1 Remove excess mortar and mortar smears. Replace defective mortar. Match adjacent work.
- .2 Clean soiled surfaces with cleaning solution.
- .3 Use non-metallic tools in cleaning operations.

**3.15 PROTECTION OF FINISHED WORK**

- .1 Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities.

**END OF SECTION**

---

**Part 1            General**

**1.1            SECTION INCLUDES**

- .1            Rolling Steel Counter Fire Door

**1.2            SUBMITTALS**

- .1            Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.
- .2            Samples: Provide finish samples from manufacturer's full range, as indicated, for selection by Consultant.

**1.3            COORDINATION**

- .1            Coordinate the work with other work required to be installed within or next to the work of this section.

**Part 2           Products**

**2.1            ROLLING STEEL COUNTER FIRE DOOR**

- .1 Brand: Cornell Cookson – Model ERC10; 3/4hr UL & cUL Label
- Interior Face of wall mount
  - 2" 22Ga Galv steel slats
  - Fire/Smoke Rated automatic counter fire door/shutter
  - Smoke Sealed
  - AlarmGard Advanced Tube Motor Operation
  - Motor operation with push button activation, located within room next to shutter
  - Thumb turn locking bottom bar with interlock switch on room side
  - Fire Link release device, interconnected with atrium exhaust system/fire alarm
  - Refer to drawings for size, to be confirmed on site
- .2 Or approved equal

**Part 3           Execution**

**3.1            INSTALLATION**

- .1            Install items listed as per manufacturer's written instructions.

**END OF SECTION**

**Part 1 General**

**1.1 GENERAL**

- .1 All drawings and all sections of the specification shall apply and form an integral part of this section.

**1.2 Definitions:**

- .1 For purposes of this section:
  - .1 "CONCEALED" - insulated mechanical services and equipment in suspended ceilings and non-accessible chases and furred-in spaces.
  - .2 "EXPOSED" - means "not concealed" as previously defined.

**1.3 WORK INCLUDED**

- .1 Labour, materials, plant, tools, equipment, and services necessary for and reasonably incidental to completion of following services:
  - .1 Piping insulation.
  - .2 Flexible removable and reusable blanket insulation.
  - .3 Jackets and accessories.

**1.4 RELATED WORK SPECIFIED ELSEWHERE**

- .1 Section 07 84 00 – Firestopping
- .2 Section 09 90 00 – Painting
- .3 Section 23 21 13 – Hydronic Piping

**1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- .2 Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

**1.6 SUBMITTALS**

- .1 Refer to Section 01 33 00 – Submittal Procedures

**Part 2 Products**

**2.1 ACCEPTABLE MANUFACTURERS**

- .1 Piping Insulation
  - .1 Manville

- .2 Fibreglas
- .3 Knauf
- .4 Owens Corning
- .5 Pabco
- .2 Fire Retardant Canvas
  - .1 Fattal
  - .2 Radley
- .3 Lagging Adhesive/Coating
  - .1 Bakor
  - .2 Childers
  - .3 Fosters

## **2.2 FIRE AND SMOKE RATING**

- .1 In accordance with CAN/ULC-S102.
  - .1 Maximum flame spread rating: 25.
  - .2 Maximum smoke developed rating: 50.

## **2.3 PIPING INSULATION**

- .1 Thermal conductivity ("k" factor) not to exceed specified values at 24 degrees C mean temperature when tested in accordance with ASTM C335.
- .2 Code A-1:
  - .1 Rigid moulded fibre glass without factory applied vapour retarder jacket.
  - .2 Insulation: to CAN/ULC-S702.
  - .3 Maximum "k" factor: to CAN/ULC-S702.
- .3 Code A-2:
  - .1 Rigid moulded mineral wool with or without factory applied jacket.
  - .2 Insulation: to ASTM C5347.
  - .3 Jacket: to CAN/ULC S102.
  - .4 Maximum "k" factor: to ASTM C518
- .4 Code A-3:
  - .1 Rigid moulded fibre glass with factory applied all service vapour retarder jacket.
  - .2 Insulation: to CAN/ULC-S702.
  - .3 Jacket: to CGSB 51-GP-52M.
  - .4 Maximum "k" factor: to CAN/ULC-S702.
- .5 Code A-4: Flexible closed-cell tubular elastomer.
  - .1 Insulation: to ASTM C534.
  - .2 Maximum "k" factor: to ASTM C534
  - .3 Certified by manufacturer: free of potential stress corrosion cracking corrodants.

## **2.4 PIPE FITTINGS**

- .1 Use pre-formed insulation for pipe fittings and/or full thickness of the same material as the insulation on the piping.
- .2 Sectional pieces of standard insulation may be used on the larger size fittings.
- .3 Do not use fibreglass duct wrap at fittings.

## **2.5 PIPE FINISHES AND PROTECTIVE COVERINGS**

- .1 Polyvinyl Chloride (PVC):
  - .1 One-piece cut and curled type to CAN/CGSB-51.53 with pre-formed shapes for fittings as required.
  - .2 Colour: white
  - .3 Minimum service temperatures: -20 degrees C.
  - .4 Maximum service temperature: 65 degrees C.
  - .5 Moisture vapour transmission: 0.02 perm.
  - .6 Thickness: 20 mil.
  - .7 Fastenings:
    - .1 Use solvent weld adhesive compatible with insulation to seal laps and joints.
- .2 Aluminum Jacket:
  - .1 Cover insulation with aluminum jacket.
  - .2 Thickness: 0.41 mm
  - .3 Finish: Stucco embossed.
  - .4 Polyfilm moisture barrier
  - .5 Overlap: 50 mm (2") minimum
  - .6 Banding: Stainless steel
  - .7 Fittings: die shaped, of same material as straight pipe, with factory attached protective liner on interior surface.

## **2.6 PIPING INSULATION PROTECTION SHIELDS**

- .1 Insulation protection shields shall be installed at all pipe hangers and supports. Shields shall span an arc of 180°.
- .2 Refer to Section 23 05 29 – Hangers and Supports for HVAC Piping

## **2.7 PIPING INSULATION THICKNESSES**

- .1 Includes valves, valve bonnets, strainers, flanges and fittings unless otherwise specified.
- .2 Thickness of insulation as listed in following table.

Type of System	Design Operating Temp. Range	Thermal Conductivity of Insulation			TIAC Code	Nominal Pipe Diameter				
		Cond. Range W/m·°C)	Mean Rating Temp. (°C)	Unit Thermal Resistance (RSI/25mm)		Runouts <sup>1</sup>	≤ 25	32 to 50	64 to 100	≥ 125
						≤ 50	Minimum thickness of pipe insulation			
Heating Systems (Hot Water, Glycol, Steam)	177°C	0.046 - 0.049	121°C		A-2	38	64	64	75	90
	122-177°C	0.042 - 0.045	93°C		A-2	38	50	64	64	90
	94-121°C	0.039 - 0.043	65°C		A-2	25	38	38	50	50
	61-93°C	0.036 - 0.042	52°C		A-2	25	25	25	38	38
	41-60°C	0.035 - 0.040	38°C		A-2	25	25	25	25	38

.3 Notes

- .1 Runouts are pipes that do not exceed 3 meters in length and connect to terminal fixtures
- .2 All piping outside the building envelope shall be insulated to the same levels as pipes with fluid design temperatures above 177°C except condenser water.
- .3 Allow minimum of 3.0 meters back from roof penetration

**2.8 COMPATIBILITY OF COMPONENTS**

- .1 All adhesives, sealers, vapour coating, mastics, laggings and bedding compounds, shall be compatible with materials to which they are applied.
- .2 They shall not soften, corrode, or otherwise attack such material in either wet or dry state and shall only be those recommended by manufacturer of insulation as suitable for application proposed.
- .3 Apply at ambient conditions acceptable to the manufacturer.

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**Part 3 Execution**

**3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

**3.2 PRE-INSTALLATION REQUIREMENT**

- .1 Piping:
  - .1 Do not apply insulation prior to pressure testing of pipe work
  - .2 Pressure testing of piping systems and adjacent equipment to be complete, witnessed and certified.
  - .3 Ensure surfaces are clean, dry, free of grease, scale and foreign material.

**3.3 INSTALLATION**

- .1 Install in accordance with TIAC National Standards.
- .2 Work shall be performed by licensed journeymen.
- .3 Apply materials, accessories, and finishes in accordance with manufacturer's instructions and this specification.
- .4 Insulation shall be clean and dry when installed and during application of any finish. Protect insulation against elements during all stages of application.
- .5 Use two layers with staggered joints when required nominal wall thickness exceeds 75 mm.
- .6 Apply insulation and coverings to equipment and piping which will operate with hot or warm liquid vapour, while surface is hot. Provide any required temporary heat to accomplish this.
- .7 Cold surfaces to be dry and ferrous surfaces to be coated with rust penetrating protective paint before applying insulation and vapour barriers.
- .8 Supports, Hangers:
  - .1 Apply high compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided. Refer to Section 23 05 29 – Hangers and Supports for HVAC Piping.
  - .2 Apply high compressive strength insulation where insulation may be compressed by weight of ductwork.
- .9 All insulation on piping operating below ambient temperature shall be continuous through wall and ceiling openings and sleeves.
- .10 Insulation on all cold surfaces must be applied with a continuous, unbroken vapor seal, without penetration for hangers or seams, and without interruption at sleeves, pipe and

fittings. Hangers, supports, anchors, etc. that are secured directly to cold surfaces shall be adequately insulated and vapor sealed to prevent condensation.

- .11 Specified adhesives, mastics, and coatings shall be applied at the Manufacturer's recommended minimum coverage per gallon.
- .12 Adequately seal edges of vapor barrier insulation at valve stems, instrument wells, unions, and other locations to prevent moisture from penetrating the insulation.
- .13 On piping, gouge out insulation for proper fit where there is interference between weld bead and insulation. Bevel insulation away from studs and nuts to permit their removal without damage to insulation. Closely and neatly trim around extending parts of pipe saddles, supports, hangers and clamp guides. Seal with insulating cement.
- .14 Install insulation with smooth and even surfaces, with round shapes laid to true circular and concentric shape, shaped to blend with fitting insulation and adjacent covering; with full length section and tight to insulated object.
- .15 Pack solid around all pipes where they pass through sleeves in walls, floor slabs, etc. for full thickness of floor with fibreglas or rockwool. Refer to firestopping clause where piping passes through fire separations. On all services, carry full insulation thickness through walls, floors, etc. Protect insulation of exposed pipes passing through floors with 1.2mm (18 ga.) galv. iron 150mm (6") from finished floor.
- .16 Butt joints
  - .1 Adhere and seal laps of vapour barrier cover or vapour barrier strip of 100mm (4") minimum width furnished with insulation, using vapour seal adhesives.
- .17 Existing pipe covering damaged or cut back during installation work to be made good with same insulation as specified for new work.
- .18 Do not cover manufacturer's nameplates. Cut insulation on 45 degree angle to nameplate edge and seal.
- .19 Covering to be uniform in diameter, smooth in finish. Place longitudinal seams so as to be invisible.
- .20 Fasteners: install at 300 mm on centre in horizontal and vertical directions, minimum 2 rows each side. Cover fasteners with foil-faced self-adhesive tape.

### **3.4 INSULATION CLADDING**

- .1 Install in strict accordance with manufacturer's installation instructions.
- .2 Location: Indoors, concealed (i.e. located above ceilings, crawlspace, shafts, etc.):
  - .1 Steam piping: All service jacket. If all service jacket is not available, use canvas jacket.
  - .2 All other piping: All service jacket
- .3 Location: Indoors, exposed (i.e. public areas, mechanical rooms, loading docks, etc.):
  - .1 Steam piping: Canvas jacket

- .2 All other piping: PVC jacket
- .4 Location: Outdoors:
  - .1 All piping: Aluminum jacket

**END OF SECTION**

**Part 1 General**

**1.1 SUMMARY**

- .1 Section Includes:
  - .1 Procedures and cleaning solutions for cleaning mechanical piping systems.

**1.2 REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)

**Part 2 Products**

**2.1 CLEANING SOLUTIONS**

- .1 Tri-sodium phosphate: 0.40 kg per 100 L water in system.
- .2 Sodium carbonate: 0.40 kg per 100 L water in system.
- .3 Low-foaming detergent: 0.01 kg per 100 L water in system.

**Part 3 Execution**

**3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

**3.2 CLEANING HYDRONIC SYSTEMS**

- .1 Timing: systems operational, hydrostatically tested and with safety devices functional, before cleaning is carried out.
- .2 Cleaning Agency:
  - .1 Retain qualified water treatment specialist to perform system cleaning.
- .3 Install instrumentation such as flow meters, orifice plates, pitot tubes, flow metering valves only after cleaning is certified as complete by water treatment specialist.
- .4 Cleaning procedures:
  - .1 Provide detailed report outlining proposed cleaning procedures at least 4 weeks prior to proposed starting date. Report to include:
    - .1 Cleaning procedures, flow rates, elapsed time.
    - .2 Chemicals and concentrations used.
    - .3 Inhibitors and concentrations.
    - .4 Specific requirements for completion of work.

- .5 Special precautions for protecting piping system materials and components.
- .6 Complete analysis of water used to ensure water will not damage systems or equipment.
- .5 Conditions at time of cleaning of systems:
  - .1 Systems: free from construction debris, dirt and other foreign material.
  - .2 Control valves: operational, fully open to ensure that terminal units can be cleaned properly.
  - .3 Strainers: clean prior to initial fill.
  - .4 Install temporary filters on pumps not equipped with permanent filters.
  - .5 Install pressure gauges on strainers to detect plugging.
- .6 Report on Completion of Cleaning:
  - .1 When cleaning is completed, submit report, complete with certificate of compliance with specifications of cleaning component supplier.
- .7 Hydronic Systems:
  - .1 Fill system with water, ensure air is vented from system.
  - .2 Fill expansion tanks 1/3 to 1/2 full, charge system with compressed air to at least 35 kPa (does not apply to diaphragm type expansion tanks).
  - .3 Use water metre to record volume of water in system to +/- 0.5%.
  - .4 Add chemicals under direct supervision of chemical treatment supplier.
  - .5 Closed loop systems: circulate system cleaner at 60 degrees C for at least 36 h. Drain as quickly as possible. Refill with water and inhibitors. Test concentrations and adjust to recommended levels.
  - .6 Flush velocity in system mains and branches to ensure removal of debris. System pumps may be used for circulating cleaning solution provided that velocities are adequate.
  - .7 Add chemical solution to system.
  - .8 Establish circulation, raise temperature slowly to 82 degrees C minimum. Circulate for 12 h, ensuring flow in all circuits. Remove heat, continue to circulate until temperature is below 38 degrees C. Drain as quickly as possible. Refill with clean water. Circulate for 6 h at design temperature. Drain and repeat procedures specified above. Flush through low point drains in system. Refill with clean water adding to sodium sulphite test for residual sulphite.
- .8 Glycol Systems:
  - .1 In addition to procedures specified above perform specified procedures.
  - .2 Test to prove concentration will prevent freezing to minus 40 degrees C. Test inhibitor strength and include in procedural report. Refer to ASTM E202.

### 3.3 START-UP OF HYDRONIC SYSTEMS

- .1 After cleaning is completed and system is filled:
  - .1 Establish circulation and expansion tank level, set pressure controls.
  - .2 Ensure air is removed.

- .3 Check pumps to be free from air, debris, possibility of cavitation when system is at design temperature.
- .4 Dismantle system pumps used for cleaning, inspect, replace worn parts, install new gaskets and new set of seals.
- .5 Clean out strainers repeatedly until system is clean.
- .6 Commission water treatment systems as specified in Section 23 25 00 - HVAC Water Treatment Systems.
- .7 Check water level in expansion tank with cold water with circulating pumps OFF and again with pumps ON.
- .8 Repeat with water at design temperature.
- .9 Check pressurization to ensure proper operation and to prevent water hammer, flashing, cavitation. Eliminate water hammer and other noises.
- .10 Bring system up to design temperature and pressure slowly over a 48 hour period.
- .11 Perform TAB as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
- .12 Adjust pipe supports, hangers, springs as necessary.
- .13 Monitor pipe movement, performance of expansion joints, loops, guides, anchors.
- .14 If sliding type expansion joints bind or if bellows type expansion joints flex incorrectly, shut down system, re-align, repeat start-up procedures.
- .15 Re-tighten bolts using torque wrench, to compensate for heat-caused relaxation. Repeat several times during commissioning.
- .16 Check operation of drain valves.
- .17 Adjust valve stem packings as systems settle down.
- .18 Fully open balancing valves (except those that are factory-set).
- .19 Check operation of over-temperature protection devices on circulating pumps.
- .20 Adjust alignment of piping at pumps to ensure flexibility, adequacy of pipe movement, absence of noise or vibration transmission.

### **3.4 CLEANING**

- .1 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**

**Part 1 General**

**1.1 GENERAL**

- .1 All drawings and all sections of the specifications shall apply to and form an integral part of this section.

**1.2 WORK INCLUDED**

- .1 Labour, materials, plant, tools, equipment and services necessary for and reasonably incidental to completion of following services:
  - .1 hot water heating piping systems
  - .2 glycol heating piping systems
  - .3 chilled glycol piping systems
  - .4 condenser glycol piping systems

**1.3 RELATED WORK SPECIFIED ELSEWHERE**

- .1 Section 07 84 00 - Firestopping
- .2 Section 23 05 16 – Expansion Fittings and Loops for HVAC Piping
- .3 Section 23 05 53 – Identification for HVAC Piping and Equipment
- .4 Section 23 07 19 – HVAC Piping Insulation
- .5 Section 23 21 14 – Hydronic Specialties

**1.4 REFERENCES**

- .1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME)
  - .1 ANSI/ASME B16.15, Cast Bronze Threaded Fittings, Classes 125 and 250.
  - .2 ANSI/ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
  - .3 ANSI/ASME B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
  - .4 ANSI/ASME B16.24, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150.
- .2 ASTM International Inc.
  - .1 ASTM A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - .2 ASTM B88M, Standard Specification for Seamless Copper Water Tube (Metric).
  - .3 ASTM F1476 – Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications.
- .3 American National Standards Institute/American Water Works Association (ANSI)/(AWWA)

- .1 AWWA C-606 – Grooved and Shouldered Joints
- .4 Canadian Standards Association (CSA International)
  - .1 CSA B242, Groove and Shoulder Type Mechanical Pipe Couplings.

## **1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Accept materials on site in original factory packaging, labelled with manufacturer's identification.
- .2 Protect piping from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

## **1.6 SUBMITTALS**

- .1 Refer to Section 01 33 00 – Submittal Procedures

## **Part 2 Products**

### **2.1 GENERAL**

- .1 All piping shall be in accordance with the “Buy Canada Act” and instructions to bidders section.
  - .1 Ensure piping meets all requirements of the corresponding certification standard and provide the following:
    - .1 Pipe and fitting mill certificates, metallurgy and heat numbers for traceability.
    - .2 Provide third party certification tests where piping is not received from the mill directly.

### **2.2 PIPE**

- .1 Steel pipe for condenser glycol, chilled glycol, hot water heating and glycol heating, as follows:
  - .1 13mm to 250mm (½” to 10”) NPS: Schedule 40 carbon steel to ASTM A53, Grade B, continuous weld or electric resistance weld.
  - .2 300mm to 400mm (12” to 16”) NPS: Schedule 40 standard weight carbon steel to ASTM A53, Grade B, electric resistance weld.
  - .3 450mm (18”) and above: Schedule 40 standard weight carbon steel to ASTM API 5L, Grade X42, submerged arc weld.

### **2.3 FITTINGS**

- .1 Unions, Class 150, to ASME B16.39
  - .1 Brass to iron ground joint type
  - .2 Threads to ASME B1.20.1
- .2 Screwed fittings: 1034 kPa (150 psi), Class 150, to ASME B16.3.
  - .1 Black malleable iron, banded

- .2 Threads to ASME B1.20.1
- .3 Nipples to suit pipe type.
- .3 Weld Fittings:
  - .1 Thred-O-Lets and Weld-O-Lets: carbon steel to ASTM A105 or ASTM A181 Grade 1.
  - .2 Butt weld fittings: carbon steel to ASTM A234, fitting dimensions to ASME B16.9
  - .3 Acceptable Manufacturers: Anvil, Bonney Forge, Crane, Tube Turn, Weldbend
- .4 Pipe flanges and flanged fittings:
  - .1 Slip-on welding flanges: Forged carbon steel to ASTM A105 or ASTM A181.
  - .2 System pressures to 682 kPa (99 psi): Class 150 flanges to suit equipment connections, to ASTM B16.5 or ASTM B16.1
  - .3 System pressures above 682 kPa (99 psi): Class 300 flanges to suit equipment connections, to ASTM B16.5 or ASTM B16.1
  - .4 Flange gaskets:
    - .1 Pre-formed, non-asbestos. No shop or site cut gaskets will be accepted.
    - .2 Ring type for raised face flanges
    - .3 Full faced gaskets on flat face flanges
  - .5 Acceptable Manufacturers: Weldbend, Crane, Gourd, Anvil, International Malleable, Interplex Press-Fit
- .5 Branch Connections
  - .1 Type 'L' hard drawn copper tube - Silver braze joints using silver brazing alloy and flux.
  - .2 Fittings:
    - .1 Bronze pipe flanges and flanged fittings, Class 150.
    - .2 Cast bronze threaded fittings, Class 125.
    - .3 Cast copper solder joint pressure fittings.
    - .4 Copper alloy solder joint pressure fittings.
- .6 Fittings for grooved piping:
  - .1 All grooved piping system components shall be of one manufacturer.
  - .2 Couplings, to CSA B242:
    - .1 Housing: ductile iron to ASTM A536, Grade 65-45-12
    - .2 Coating: Enamel
    - .3 Gasket: EPDM, grade E, to ASTM D 2000.
    - .4 Bolts/Nuts: plated carbon steel to meet ASTM A449 and A183.
    - .5 Where rigid type couplings are required, housings shall be cast with offsetting, angle-pattern bolt pads to provide joint rigidity.
    - .6 Outlet couplings to provide an integral reducing outlet. Couplings to be equipped with electroplated carbon steel gasket neck insert.
    - .7 Reducing couplings to be equipped with special reducing gasket for pressure responsive sealing.

- .8 Use flange adapters of materials conforming to above to connect flanged components and equipment into the grooved piping system.
- .3 Acceptable Manufacturers: Victaulic, Gruvlok

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for hydronic systems installation in accordance with manufacturer's written instructions.
  - .1 Inform Consultant of unacceptable conditions immediately upon discovery.
  - .2 Proceed with installation only after unacceptable conditions have been remedied.

#### **3.2 PIPING INSTALLATION**

- .1 General
  - .1 Install branch riser take-offs to grade up to riser.
  - .2 Run piping parallel to walls and as unobtrusive as possible when viewed from inside or outside building.
  - .3 Where pipe change in direction is shown to take up expansion, spring piping cold.
  - .4 Blow out radiation and coils with compressed air prior to piping connections.
  - .5 Use welded piping in concealed areas and as a result inaccessible, i.e. plastered ceilings, etc. Control valves, etc. to be accessible through access doors.
  - .6 Inside of all pipe, fittings, traps, valves and all other equipment to be smooth, clean and free from blisters, loose mill scale, sand and dirt when erected.
  - .7 Grade up in flow direction or as noted so air may pass through connecting risers, etc. Minimum grading to be 1:480.
  - .8 Install screwed unions or flanges at all equipment connections, elements, traps, valves, etc.
  - .9 Pipe bending is not permitted.
- .2 Pipe and Fittings:
  - .1 Pipe and fittings up to and including 50mm (2") diam. to be threaded. Make screw joints iron to iron, with PTFE tape or lead free joint compound. Dope male threads only.
  - .2 Pipe and fittings 63mm (2-1/2") diam. and above to be jointed by welding. Branch connections to be welded using butt welding fittings. Use slip-on welding flanges, welded to pipe on which they are fitting, at flange neck and back-welded on pipe end, at inside flange face. Valve companion flanges to be flat or raised face, matching valve flange. Use gaskets on flanged joints.
  - .3 Branch connections of sizes 13mm (1/2"), 19mm (3/4") and 25mm (1") for radiation may be formed on mains of 50mm (2") diam. and above using carbon steel Thred-O-Let welding fittings.

- .4 Branch connections of sizes 31mm (1-1/4"), and larger to be formed using Weld-O-Lets. Reductions in mains to be after branches using butt weld reducing fittings. Site or shop fabricated welding fittings not permitted.
- .5 Welding to conform to Provincial Department of Labour Regulations. Welders to be licensed.
- .6 Use long radius elbows. For pipe reductions use eccentric reducing sockets.
- .7 Keep pipe connections clear for tube removal, etc.
- .8 Dielectric Couplings
  - .1 Provide where pipes of dissimilar metals are joined.
  - .2 Provide unions or flanges for pipe 50mm (2") and smaller and flanges on piping 63mm (2-1/2") and larger.
  - .3 Standard of Acceptance: Victaulic Style 47 Dielectric Waterway
- .3 Grooved Piping:
  - .1 For mechanical grooving on site, prepare pipe in accordance with same specifications using specially designed tools.
  - .2 Mechanical grooved pipe couplings, fittings, butterfly valves may be used for piping systems and mechanical equipment connections in lieu of welded, flanged and threaded methods for piping systems 32mm (1¼") and larger. Mechanical grooved couplings, and fittings may be used as unions, seismic joints, flexible connections, expansion compensators, and vibration reducers in systems specified.
  - .3 Prior to coupling assembly, lightly coat lips and outer surface of gasket with a non-toxic lubricant as recommended by manufacturer. Pipes shall be gapped at time of installation to allow for expansion and contraction of system where required.

### **3.3 CLEANING, FLUSHING AND START-UP**

- .1 In accordance with Section 23 25 00 - HVAC Water Treatment

### **3.4 BALANCING**

- .1 In accordance with Section 23 05 93 - Testing, Adjusting and Balancing for HVAC for applicable procedures.

### **3.5 TESTING OF SYSTEMS**

- .1 Tests to be carried out in accordance with following time-pressure requirements and regulations and requirements of authorities have jurisdiction.
  - .1 Hot water heating - test at 862 kPa (125 psig), or to pressure 1-1/2 times operating pressure, which ever is greatest, for 12 hrs.
  - .2 Chilled glycol - test at 862 kPa (125 psig), or to pressure 1-1/2 times operating pressure, which ever is greatest, for 12 hrs.
  - .3 Glycol heating - test at 862 kPa (125 psig), or to pressure 1-1/2 times operating pressure, which ever is greatest, for 12 hrs.
  - .4 Condenser GLycol - test at 862 kPa (125 psig), or to pressure 1-1/2 times operating pressure, which ever is greatest, for 12 hrs.

- .2 Piping, concealed prior to completion of total service, to be tested in sections prior to concealment. Tests to be witnessed by Consultant's representative. Two working days prior notice to be given Consultant of such tests. Pressures to be as registered at system highest point. When sections are being tested additional pressure developed by static head of remainder of system above, to be added to specified test pressure.
- .3 Tests to be with water, unless noted otherwise, prior to insulation being applied.
- .4 System tests to be with equipment connected. Trap diaphragms to be removed and systems flushed prior test.
- .5 Make good leaks, replace defective parts, flush out defective section, re-test and adjust until system functions correctly.
- .6 Prior to Owner's takeover, systems to be balanced and ready for operation, with traps, strainers, drip legs, etc. cleaned.
- .7 For glycol systems, retest after cleaning. Repair leaking joints, fittings or valves.

### **3.6 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by hydronic systems installation.

### **3.7 PRESSURE PIPING QUALITY ASSURANCE MANUAL AND DOCUMENTATION**

- .1 Contractors working on pressure piping systems must be registered with Inspection and Technical Services Manitoba (ITSM) for work on Pressure Piping Systems and upon award of contract present a copy of their Quality Control Manual and Procedures for review by the Plumbing Shop Supervisor.
- .2 The Mechanical Contractor shall provide one copy of the Contractor's Certificate of Authorization issued by ITSM. Include one copy in O&M Manuals.
- .3 Provide a complete copy of the Quality Assurance Manual registered with and approved by ITSM. Include one copy in O&M Manuals.
- .4 Provide all record information that is specified in the Quality Assurance Manual on pressure vessel and pressure piping systems under GSA-B51. Include one copy in O&M Manuals.
- .5 Information shall include, but is not limited to:
  - .1 Pipe and fitting mill certificates, metallurgy and heat numbers for traceability.
  - .2 Valve and pressure vessel ORN numbers.
  - .3 Fitting registrations where required.
  - .4 Welding procedures, records and inspection reports.
  - .5 MLMEB inspection reports.
  - .6 Quality control inspection reports.

- .7 Hydrostatic test reports on each system subject to GSA – B51.
- .8 Material acquisition data sheets.

**END OF SECTION**

**Part 1 General**

**1.1 GENERAL**

- .1 All drawings and all sections of the specifications shall apply to and form an integral part

**1.2 WORK INCLUDED**

- .1 Labour, materials, plant, tools, equipment, and services necessary for and reasonably incidental to completion of following services:
- .1 Triple Duty Valves
  - .2 Suction Guides
  - .3 Automatic Air Vents
  - .4 Manual Air Vents
  - .5 Air Purgers
  - .6 In Line Air Separators
  - .7 Coalescing Type Air Separators
  - .8 Strainers
  - .9 Water Pressure Reducing Valves
  - .10 Bladder Type Expansion Tanks
  - .11 Glycol System

**1.3 RELATED WORK SPECIFIED ELSEWHERE**

- .1 Section 23 21 13 – Hydronic Piping
- .2 Section 23 21 23 – Hydronic Pumps
- .3 Section 23 25 00 – HVAC Water Treatment Pipe Cleaning

**1.4 DELIVERY, STORAGE, AND HANDLING**

- .1 Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- .2 Provide temporary protective coating on cast iron and steel valves.
- .3 Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- .4 Protect piping system components from entry of foreign materials by temporary weatherproof covers.

**Part 2 Products**

**2.1 EXPANSION TANK, BLADDER TYPE**

- .1 Working pressure: 862 kPa (125 psi) at 115 deg C (240 deg F) maximum.

- .2 Tank Construction:
  - .1 Replaceable heavy duty butyl bladder.
  - .2 Constructed and stamped in accordance with ASME Boiler and Pressure Vessel Code Section VIII.
  - .3 Conform to CSA B51 and provincial regulations. Submit certificate of registration as required by provincial authorities.
  - .4 Vessel to be of vertical configuration with aerated skirt, and bottom system connection through skirt.
  - .5 Provide charging valve connection, system connection, and holding rings.
  - .6 Piping from the system to the vessel to include a square-head cock and a boiler drain.
  - .7 The tank should have a built-in pressure gauge and tank integrity indicator.
- .3 Bladder connection to be capable of handling the flow of the corresponding pipe size at 1.83 M/S (6ft/sec) with a maximum pressure drop of 3.45 kPa (0.5 psi).
- .4 In piping adjacent to each tank provide Apollo 510 Series relief valve c/w packed caps. Relief valves to be ASME Section VIII approved and rated for 10% overpressure. Do not install any valves between relief valve connection and tank.
- .5 Refer to drawings for tank locations.
- .6 Refer to expansion tank schedule for sizes, capacities, and pre-charge pressures.
- .7 Standard of Acceptance: Calefactio Expanflex Model AL
- .8 Acceptable Manufacturers: Amtrol; Calefactio; Wessels; Bell & Gossett; Taco; John Wood; Flexcon

## 2.2 GLYCOL FILL PACKAGE

- .1 Prefabricated glycol fill unit consisting of:
  - .1 208 litre (55 gallon) storage/mixing tank with cover
  - .2 Pump suction hose
  - .3 Pressure pump with thermal cut-out: 0.06 l/s at 345 kPa (1.0 gpm at 50 psi)
  - .4 Integral pressure switch, inlet strainer, check valve
  - .5 3-prong plug and cord, 115volt/60 Hz/1 Ph/0.7 amp
  - .6 Pre-charged accumulator tank with EPDM diaphragm
  - .7 Manual diverter valve for purging air and agitating contents of storage tank
  - .8 Adjustable pressure regulating valve with pressure gauge, 35 – 380 kPa (5 – 55 psig)
  - .9 Low level pump cut-out
  - .10 Self priming up to 2.1m (7 ft)
  - .11 Low level alarm panel complete with remote monitoring dry contacts.
- .2 CSA Certified.
- .3 Standard of Acceptance: Axiom SF100

- .4 Acceptable Manufacturers: Axiom; Calefactio;

### 2.3 PROPYLENE GLYCOL SOLUTION

- .1 50% aqueous solution by volume propylene glycol shall be used in the glycol heating and glycol heat recovery systems. Glycol shall be pre-mixed or mixed on site. The following criteria shall be met:
- .1 50% aqueous solution by volume shall be made from propylene glycol (minimum 99.9% pure by weight) and distilled water, deionized water, or soft water containing less than 25 ppm each of chloride and sulfate ions and 50 ppm each of hard water ions (calcium and magnesium as calcium carbonate) with total hardness not to exceed 100 ppm.
  - .2 For site mixing City of Winnipeg water may be used without softening. For all other locations, water analysis shall be submitted to Engineer prior to use.
  - .3 Solution shall have freezing point of -31.15oC (-24.1oF) and viscosity of 31.42 centipoises at 0 deg. C.
  - .4 Provide Consultant with written report indicating methodology and type of treated water used prior to mixing solution.
  - .5 Pure glycol shall have the following physical properties:
    - .1 Molecular wt = 76.10
    - .2 Specific Gravity at +20 deg. C = 1.0381
    - .3 Boiling Point at 760mm Hg = 187.4 deg. C
    - .4 Freezing Point = -60 deg. C
    - .5 Viscosity at +20 deg. C = 60.5 centipoises
    - .6 Specific Heat at 20 deg. C = 0.593 Btu/lb./deg. F
  - .2 Glycol shall contain such inhibitors as deemed necessary by manufacturer to provide maximum corrosion protection to system. Manufacturer shall ensure that the glycol used to manufacture the heat transfer fluid is of high quality grade and is not recycled or reclaimed material. The manufacturer of the fluid must provide written documentation stating the fluid passes ASTM D1384 standards (less than 0.5 mil penetration per year for all system metals).
  - .3 Compatibility of glycol: verify propylene glycol solution (including corrosion inhibitors) is suitable for use with system materials, products, and equipment. Solution shall meet all requirements of, and be compatible with, any component of the hydronic system including, but not limited to: boiler heat exchanger material, couplings, seals, flex connectors, etc. and hydronic system components selected for the project (i.e. pH, freezing point, etc.). Coordinate with final reviewed system component shop drawings.
  - .4 Provide two additional drums of the heat transfer fluid over and above quantity required to fill systems.
  - .5 After the solution has been circulated for 24 hours, a sample shall be tested by the manufacturer and a written report submitted to Consultant.

## **2.4 SAFETY RELIEF VALVES AND DRAINS**

- .1 On heat exchangers and expansion tanks use relief valves c/w packed caps. Valves to be lever-operated, ASME Section VIII approved, rated at 10% overpressure.
- .2 Provide drains from all boiler relief valves.
- .3 Refer to Safety Valve and Relief Valve Schedules.
- .4 Standard of Acceptance: Apollo 510
- .5 Acceptable Manufacturers: Apollo; Spence; Farris

## **2.5 WATER PRESSURE REDUCING VALVES**

- .1 Chilled water and hot water heating systems, 35 kPa to 1032 kPa (5psig to 150 psig): cast iron, steel, or stainless steel. Provide backflow preventer and strainer.
  - .1 Standard of Acceptance: Fisher type 95H.
- .2 Refer to water pressure reducing valve schedule.
- .3 Acceptable Manufacturers: Bell & Gossett; Fisher

## **Part 3**

### **3.1 GENERAL**

- .1 Run drain lines and blow off connections to terminate above nearest drain.
- .2 Maintain adequate clearance to permit service and maintenance.
- .3 Should deviations beyond allowable clearances arise, request and follow Consultant's directive.
- .4 Check shop drawings for conformance of tappings for ancillaries and for equipment operating weights.

### **3.2 APPLICATION**

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and data sheets.

### **3.3 EXPANSION TANKS**

- .1 Adjust expansion tank pressure to suit design criteria.
- .2 Install as per manufacturer's recommendations.

### **3.4 GLYCOL FILL PACKAGE**

- .1 Connect tank to glycol system as indicated on drawings and/or detail sheets.

- .2 Glycol recovery line(s) shall be piped from each glycol system relief valve outlet to the solution container, through its lid in such a way that the lid can be removed for filling and mixing.
- .3 Provide 100mm (4") housekeeping base.
- .4 Adjust pressure control to system fill pressure plus allowance for fill line pressure drop.
- .5 Install unit in strict accordance with manufacturer's published installation manual.

### **3.5 GLYCOL SOLUTION**

- .1 Glycol heating and glycol heat recovery systems to be filled with 50% aqueous glycol solution.
- .2 Glycol supplier to report on procedure required for testing inhibitor concentration of glycol.

### **3.6 SAFETY RELIEF VALVES AND DRAINS**

- .1 On hot water boilers and water heat exchangers pipe relief valve discharge immediately above adjacent funnel floor drain.
- .2 On glycol boilers and heat exchangers pipe relief valve discharge to glycol fill tank.

**END OF SECTION**

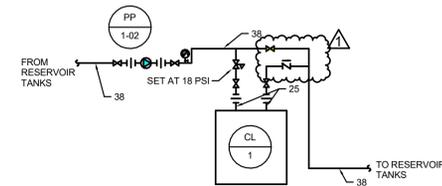
Consultant

**GENERAL NOTES**

- A. CONFIRM ALL INFORMATION AND DIMENSIONS ON SITE PRIOR TO CONSTRUCTION. RESOLVE ALL DISCREPANCIES BEFORE PERFORMING THE INSTALLATION.
- B. WHERE DISCREPANCIES APPEAR BETWEEN THE DRAWINGS AND SITE CONDITIONS, NOTIFY THE CONSULTANT PRIOR TO PERFORMING ANY WORK. WHERE MODIFICATIONS ARE REASONABLY INCIDENTAL PERFORM WORK AT NO ADDITIONAL COST TO THE OWNER.
- C. NOTIFY FACILITY MANAGER OF ANY SERVICE INTERRUPTIONS AND COORDINATE WITH THE FACILITY TO CAUSE THE LEAST IMPACT TO BUILDING OPERATION.
- D. PROVIDE SPRINKLER SYSTEM IN ACCORDANCE WITH MANITOBA BUILDING CODE, MANITOBA FIRE CODE, LOCAL BUILDING BY-LAWS, NFPA 13 AND REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
- E. ALL SPRINKLER SPACING AND DISTANCE AGAINST OBSTRUCTIONS TO CONFORM TO NFPA 13.
- F. REFER TO SPECIFICATION FOR PIPING MATERIALS AND FITTINGS.

**KEY NOTES #**

1. FIRE PUMP TO BE INSTALLED ON HOUSEKEEPING PAD. COORDINATE WITH STRUCTURAL.
2. JOCKEY PUMP TO BE INSTALLED ON HOUSEKEEPING PAD. COORDINATE WITH STRUCTURAL.
3. FIRE PUMP AND JOCKEY PUMP CONTROL PANEL.
4. UNDERGROUND MAIN SERVING NEW FACILITY SPRINKLER SERVICE. REFER TO SITE PLAN AND CIVIL DRAWINGS.
5. DOUBLE CHECK VALVE ASSEMBLY ON DOMESTIC WATER CISTERN FILL MAIN.
6. DOMESTIC COLD WATER SUPPLY FROM MUNICIPAL MAIN. REFER TO SITE PLAN AND CIVIL DRAWINGS.
7. PROVIDE NEW 45,460 L FIRE PUMP RESERVOIR TANK INSTALLED ON HOUSEKEEPING PAD.
8. FIRE PUMP TEST HEADER ON BUILDING EXTERIOR.
9. ELECTRIC UNIT HEATER INSTALLED AT HIGH LEVEL. COORDINATE WITH ELECTRICAL.
10. VENTILATION INTAKE LOUVER AT HIGH LEVEL.
11. FAN EXHAUST HOOD AT HIGH LEVEL.
12. PROVIDE NEW THERMOSTAT FOR COOLING FAN CONTROL. FAN TO OPERATE ON TWO STAGE CONTROL FOR HUMIDITY AND TEMPERATURE CONTROL. REFER TO CONTROLS SPECIFICATION.
13. PROVIDE LOW TEMPERATURE ALARM WITH REMOTE INDICATOR LOCATED AT NURSES DESK AND MAINTENANCE OFFICE.
14. PROVIDE NEW AUTOMATIC CHLORINATION SYSTEM AND CONTROLS.



**4 CHLORINATION SCHEMATIC**

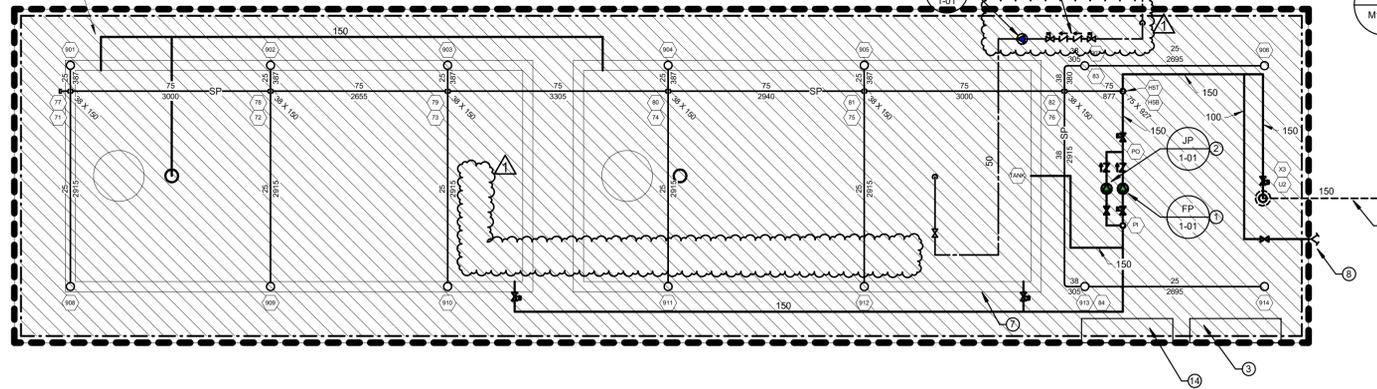
SCALE: NTS

REMOTE AREA NAME	5A - PUMPHOUSE
REMOTE AREA HAZARD	Ordinary Hazard Group 2
DENSITY	8.1 L/min
APPLICABLE AREA	94 m <sup>2</sup>
ACTUAL AREA	97 m <sup>2</sup>
TYPE OF SPRINKLER	QUICK RESPONSE / STANDARD SPRAY
FLOWING SPRINKLERS	14
K-FACTOR	8
TOTAL HOSE STREAMS	0 LPM
TOTAL FLOW REQUIRED	1255 LPM
SYSTEM PRESSURE	238 kPa
SAFETY MARGIN	+349 kPa
ALARM DEVICES	TS-50, FS-50
TYPE OF SYSTEM	WET

ZONE SCHEDULE			
ZONE	SPRINKLERS	AREA (M <sup>2</sup> )	TYPE
ZONE 5 - PUMPHOUSE	14	100	WET

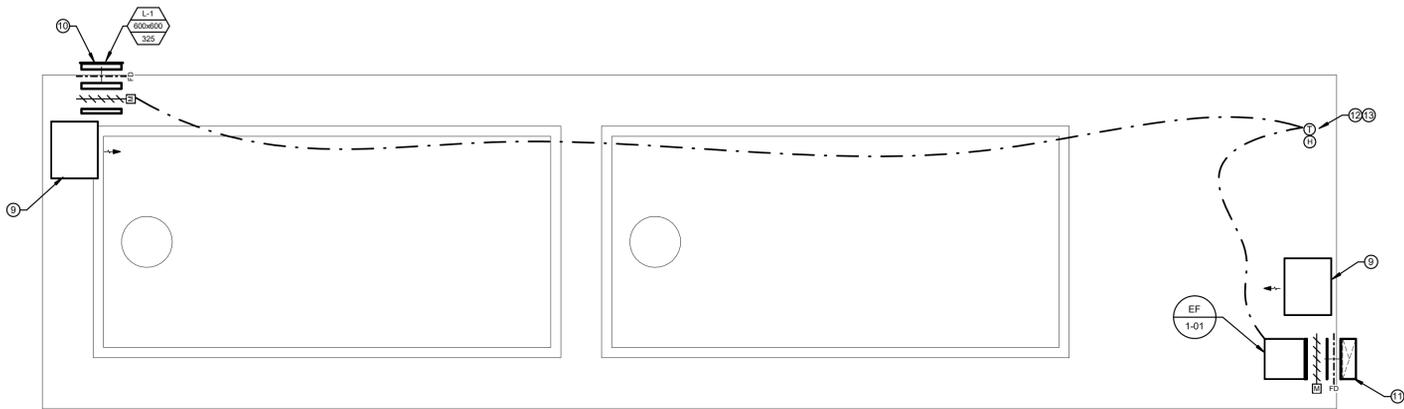
NEW SPRINKLER SUMMARY						
SYMBOL	SPRINKLER TYPE	ZONE 5	MFR.	SIN	K-FACTOR (METRIC)	TEMP RATING
○	UPRIGHT SPRINKLER HEAD	14	TYCO	TY3131	8.0	155 °F

ZONE: ZONE 5 - PUMPHOUSE  
 HAZARD: LIGHT  
 ALARM DEVICE: TS-50, FS-50  
 SYSTEM TYPE: WET



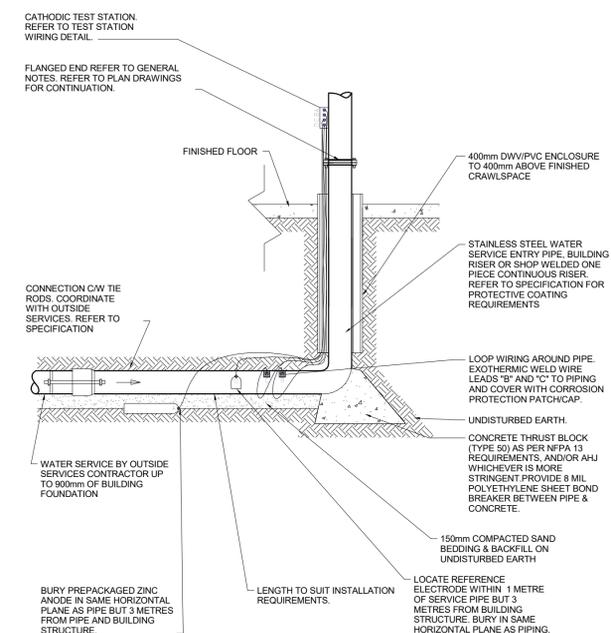
**1 FIRE PUMPHOUSE - MAIN FLOOR - FIRE PROTECTION**

SCALE: 1:50



**2 FIRE PUMPHOUSE - MAIN FLOOR - HVAC**

SCALE: 1:50



**3 WATER SERVICE ENTRY DETAIL**

SCALE: N.T.S.

ISSUE / REVISION	DESCRIPTION	BY	DDMMYY
1	ISSUED FOR ADDENDUM 2	MAB	2025-11-06
0	ISSUED FOR CONSTRUCTION	MAB	2025-10-09

**ENGINEERS GEOSCIENTISTS MANITOBA**  
 Certificate of Authorization  
**SMS Engineering Ltd.**  
 No. 166

ORIGINAL CONTRACT DRAWING  
 SIGNED AND SEALED BY  
 J.R. BULL, P. ENG  
 OCTOBER 8, 2025

Project Title  
**PROVINCIAL FIRE AND LIFE SAFETY PROJECT - LYNN LAKE, GILLAM, AND THOMPSON SITES**

**LYNN LAKE HOSPITAL**  
 64 CAMP STREET, LYNN LAKE, MB R0B 0W0

Drawing Title  
**FIRE PUMPHOUSE PLAN & DETAILS - FIRE PROTECTION - NEW CONSTRUCTION**

Drawn By	Checked By	Approved By
RP	MAB	JRB
Scale	Start Date	Project No.
AS SHOWN	MAY 2025	23-001-22

Revision Number: **0**  
 Drawing Number: **M1-222**

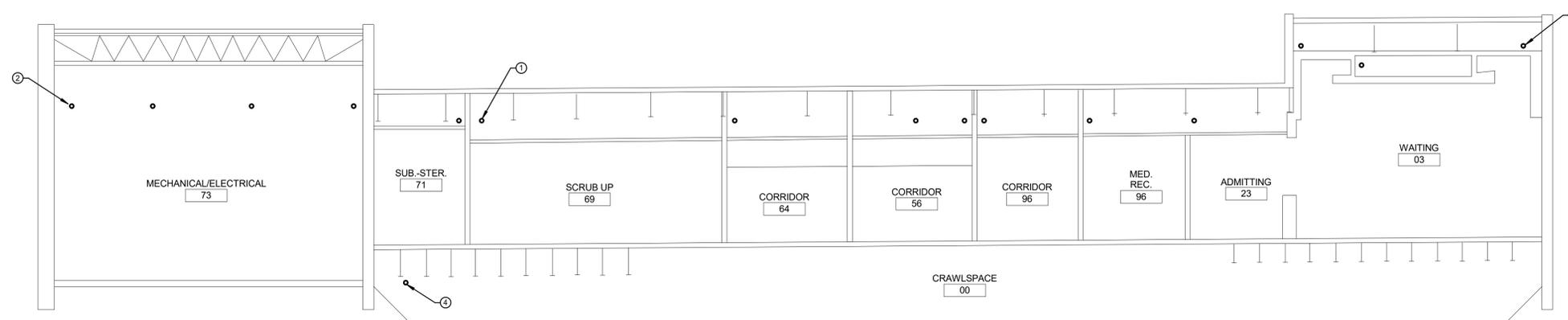
Consultant

**GENERAL NOTES**

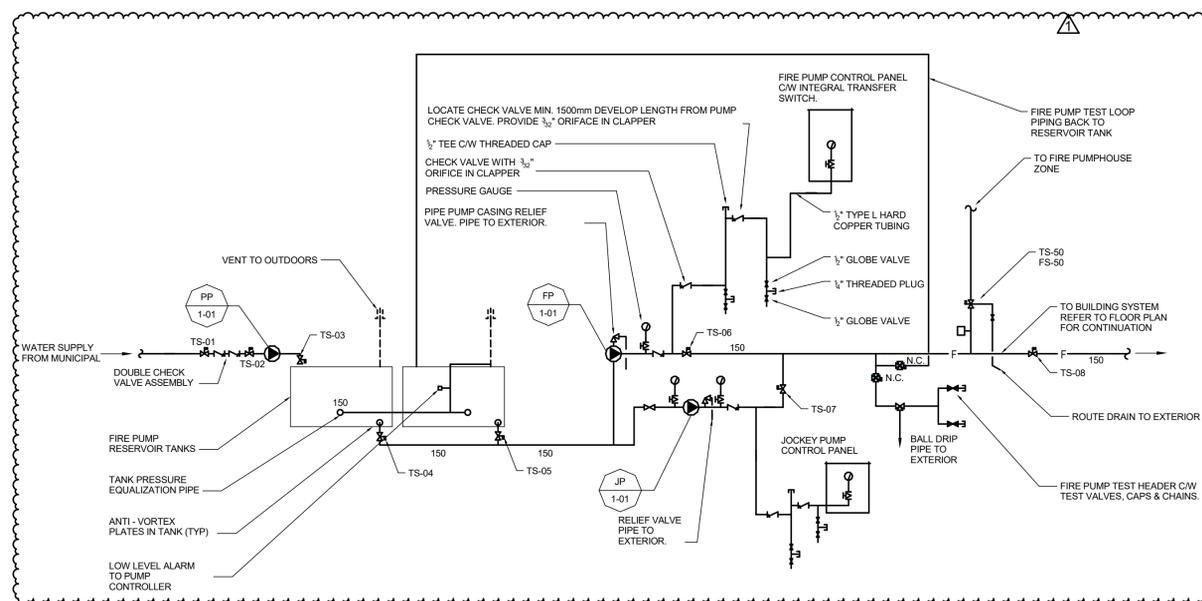
- A. CONFIRM ALL INFORMATION AND DIMENSIONS ON SITE PRIOR TO CONSTRUCTION. RESOLVE ALL DISCREPANCIES BEFORE PERFORMING THE INSTALLATION.
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- E. ALL SPRINKLER SPACING AND DISTANCE AGAINST OBSTRUCTIONS TO CONFORM TO NFPA 13.
- F. REFER TO SPECIFICATION FOR PIPING MATERIALS AND FITTINGS.

**KEY NOTES**

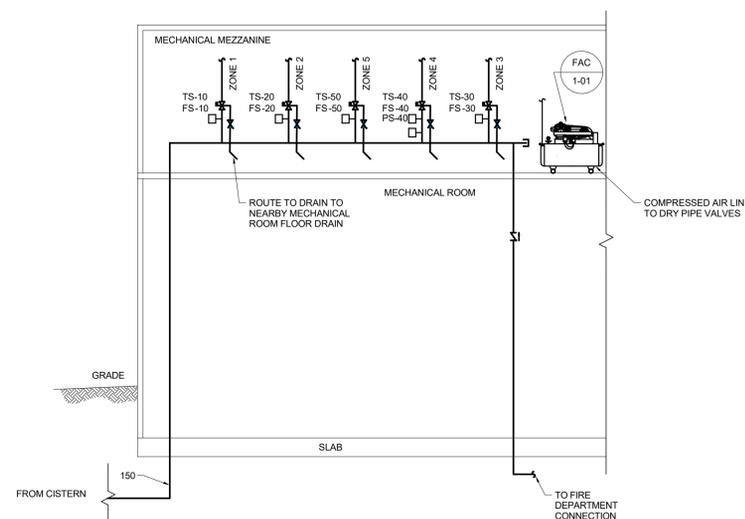
- 1. SPRINKLER PIPING LOCATED WITHIN CEILING SPACE ABOVE ACT OR GWB CEILING. TYPICAL.
- 2. SPRINKLER PIPING ROUTED AT HIGH LEVEL WITHIN MECHANICAL/ELECTRICAL ROOM.
- 3. SPRINKLER PIPING ROUTED ABOVE ARCHITECTURAL FEATURE CEILING IN WAITING ROOM.
- 4. SPRINKLER PIPING ROUTED THROUGH CRAWLSPACE.



**1 BUILDING SECTION**  
 M1-223 SCALE: 1:25



**3 FIRE PUMP SYSTEM SCHEMATIC**  
 M1-223 SCALE: 1:100



**2 FIRE PROTECTION SCHEMATIC**  
 M1-223 SCALE: 1:100

ISSUE / REVISION	DESCRIPTION	BY	DDMMYY
1	ISSUED FOR ADDENDUM 2	MAB	2025-11-06
0	ISSUED FOR CONSTRUCTION	MAB	2025-10-09

**ENGINEERS GEOSCIENTISTS MANITOBA**  
 Certificate of Authorization  
 SMS Engineering Ltd.  
 No. 166

ORIGINAL CONTRACT DRAWING  
 SIGNED AND SEALED BY  
 J.R. BULL, P. ENG  
 OCTOBER 8, 2025

Project Title  
**PROVINCIAL FIRE AND LIFE SAFETY PROJECT - LYNN LAKE, GILLAM, AND THOMPSON SITES**

**LYNN LAKE HOSPITAL**

64 CAMP STREET, LYNN LAKE, MB R0B 0W0

Drawing Title  
**SECTION & SCHEMATICS - FIRE PROTECTION - NEW CONSTRUCTION**

Drawn By RP	Checked By MAB	Approved By JRB
Scale AS SHOWN	Start Date MAY 2025	Project No. 23-001-22

Revision Number

Drawing Number

**0 M1-223**



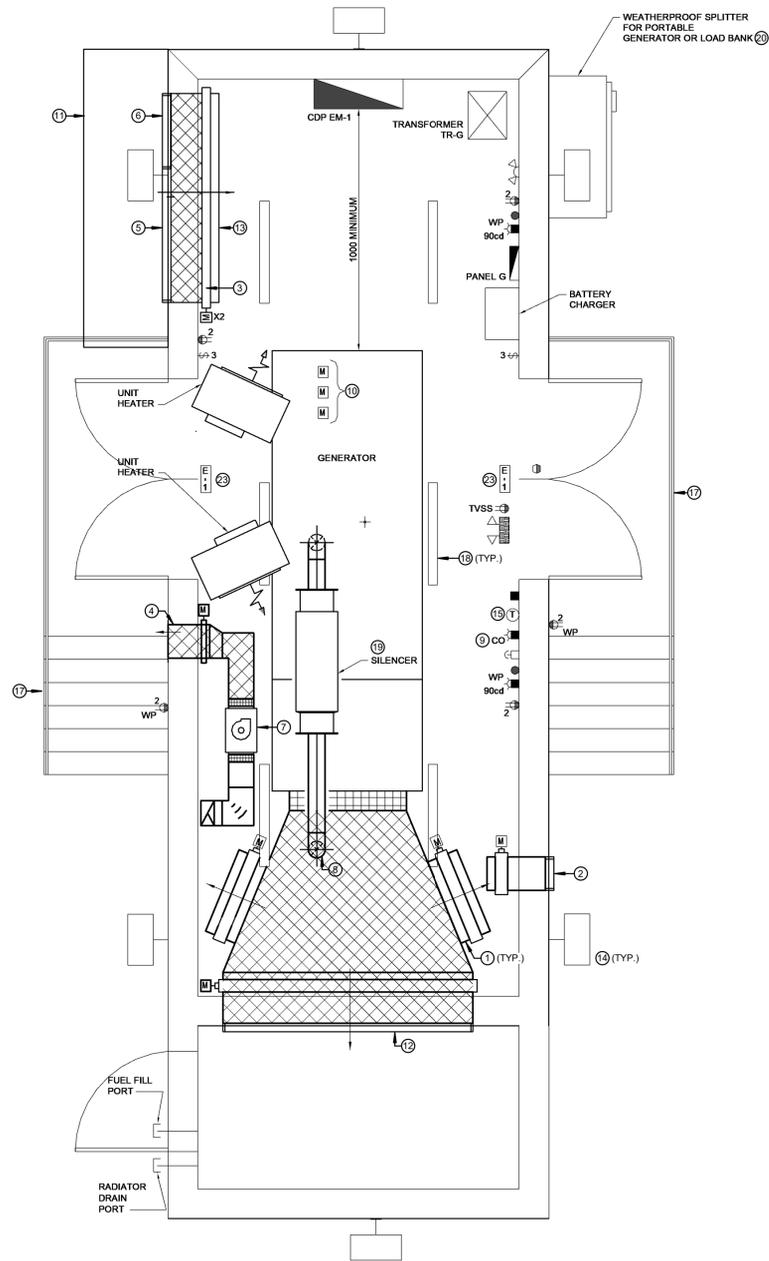




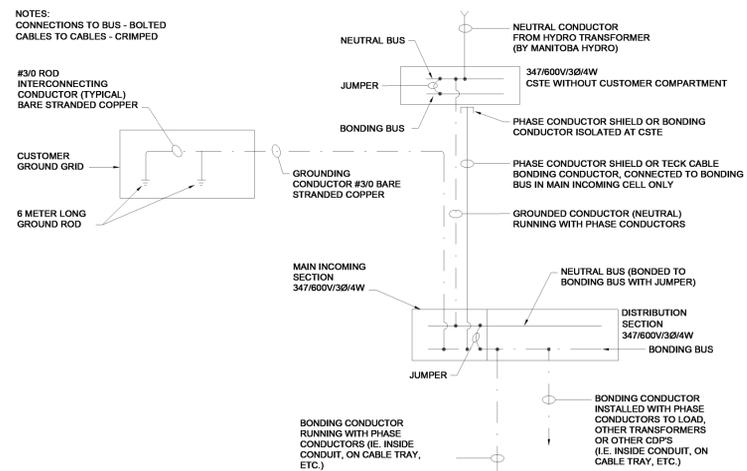


**DRAWING LIST**

- E2-000 DRAWING LIST, SYMBOL LEGEND, GENERAL NOTES AND ELECTRICAL DETAILS
- E2-001 SITE PLAN - ELECTRICAL
- E2-111 BASEMENT/CRAWLSPACE PLAN - ELECTRICAL - DEMOLITION
- E2-121 MAIN FLOOR PLAN - ELECTRICAL - DEMOLITION
- E2-211 BASEMENT/CRAWLSPACE PLAN - ELECTRICAL - NEW CONSTRUCTION
- E2-221 MAIN FLOOR PLAN - ELECTRICAL - NEW CONSTRUCTION
- E2-301 PARTIAL SINGLE LINE DIAGRAM - DEMOLITION AND NEW CONSTRUCTION, FIRE ALARM RISER DIAGRAM AND MOTOR SCHEDULE



**1 GENERATOR WALK-IN ENCLOSURE**  
E2-000 SCALE: NTS



**2 GROUNDING DETAIL**  
E2-000 SCALE: NTS

ELECTRICAL SYMBOL LEGEND	
FCAP	FIRE ALARM CONTROL PANEL
ANN	ANNUNCIATOR
■	PULL STATION
⊙	SMOKE DETECTOR
+	HEAT DETECTOR
●	BELL
⌋	DUCT SMOKE DETECTOR
⌋	STROBE
⌋	COMBINATION HORN STROBE
⌋	MAGNETIC DOOR HOLDER
M	MONITOR MODULE
⌋	PROGRAMMABLE RELAY
⌋	SPRINKLER FLOW SWITCH
⌋	SPRINKLER TAMPER SWITCH
⌋	SPRINKLER PRESSURE SWITCH
ML	MAGNETIC LOCK
⊙	SECURITY REQUEST TO EXIT
⌋	DOOR ALARM CONTACT
⌋	EMERGENCY POWER OFF BUTTON
⌋	DOUBLE REMOTE HEAD
⌋	BATTERY BANK COMPLETE WITH DOUBLE HEADS
E	EXIT LIGHT
⌋	SWITCH
⌋	DUPLEX RECEPTACLE 20A 1" SLOT 5-20R
⊙	JUNCTION BOX
⌋	CEILING MOUNTED ELECTRIC UNIT HEATER
⌋	THERMOSTAT
⌋	SURFACE MOUNTED PANEL
X	GROUND ROD
X-X	GROUND GRID
WP	WEATHER PROOF

\* PLEASE NOTE \*

ALL EQUIPMENT SHOWN "FADED BACK" IS EXISTING TO REMAIN UNLESS OTHERWISE NOTED.

ALL EQUIPMENT SHOWN "DASHED" IS EXISTING TO BE DEMOLISHED.

ALL EQUIPMENT SHOWN "SOLID" ARE NEW TO BE PROVIDED UNLESS OTHERWISE NOTED.

**GENERAL NOTES**

- (APPLIES TO ALL DRAWINGS)
- A. WHERE RELOCATION OF EQUIPMENT OR WIRING IS REQUIRED, EXTEND WIRING AND CONDUIT AS NECESSARY.
  - B. PATCH, REPAIR AND PAINT EXISTING SURFACES WHERE EXISTING ELECTRICAL DEVICES HAVE BEEN REMOVED. INSTALLATION OF BLANK COVERPLATES OVER ABANDONED OUTLETS IS NOT ACCEPTABLE.
  - C. CO-ORDINATE WITH OWNER PRIOR TO SHUT-DOWN OF EQUIPMENT.
  - D. CONFIRM EXACT LOCATIONS OF EQUIPMENT AND WIRING PRIOR TO ROUGH-IN.
  - E. CONFIRM ALL EQUIPMENT CONNECTIONS AND ELECTRICAL REQUIREMENTS WITH EQUIPMENT MANUFACTURER. MAKE ADJUSTMENTS AND INSTALL PER MANUFACTURER'S REQUIREMENTS AT NO ADDITIONAL COST.
  - F. PROVIDE ELECTRONIC SCANNING OR OTHER APPROVED MEANS TO LOCATE AND IDENTIFY ALL CONCEALED SERVICES PRIOR TO MAKING OPENINGS OR CUTTING THROUGH SURFACES AND BEFORE DIGGING AND TRENCHING.
  - G. DO NOT CUT REINFORCING STEEL.
  - H. USE "SOFT-DIG" TECHNIQUES WHEN WORKING AROUND EXISTING UNDERGROUND SERVICES TO MITIGATE THE POSSIBILITY OF DAMAGE.
  - I. BACKFILL EXCAVATED AREAS. COMPACT, REGRADE AND RESTORE EXTERIOR SURFACES TO ORIGINAL STATE.
  - J. PVC CONDUITS SHALL BE SCHEDULE 40.
  - K. PROVIDE LIQUID TIGHT CONNECTORS ON OUTDOOR CONDUITS.
  - L. SEAL PENETRATIONS THROUGH FIRE RATED WALLS, FLOORS AND CEILINGS WITH FIRE STOP MATERIAL AS REQUIRED TO MAINTAIN FIRE RATING.
  - M. UPDATE PANEL DIRECTORIES.
  - N. VERIFY FIRE ALARM SYSTEM AFTER COMPLETION OF INSTALLATION.
  - O. FIRE ALARM AUDIBLE LEVELS SHALL BE VERIFIED TO MEET REQUIREMENTS OF CANULC 5524 AFTER INSTALLATION.
  - P. DOWNTIME OF THE FIRE ALARM SYSTEM TO BE KEPT TO AN ABSOLUTE MINIMUM. FIRE WATCH SERVICE TO BE PROVIDED AND PAID FOR THE PERIOD DURING WHICH THE FIRE ALARM SYSTEM IS PARTIALLY OR FULLY DISABLED. EMPLOY FIRE WATCH SERVICE AND TO PAY ALL FIRE WATCH FEES. COORDINATE FIRE WATCH WITH THE FIRE DEPARTMENT AND THE BUILDING MANAGER. THE FIRE ALARM SYSTEM SHALL REMAIN FULLY OPERATIONAL AT THE END OF EACH WORKDAY.

**KEY NOTES**

1. RETURN AIR MOTORIZED DAMPER C/W WIRE MESH BIRD SCREEN ON OUTLET.
2. RELIEF AIR DUCT C/W LOUVRE AND MOTORIZED DAMPER.
3. INTAKE AIR MOTORIZED DAMPER CONNECTED TO COMMON AIR INTAKE LOUVRE.
4. ROOM EXHAUST DISCHARGE LOUVRE AND MOTORIZED DAMPER.
5. COMMON OUTSIDE AIR INTAKE LOUVRE.
6. COMBUSTION AIR MOTORIZED DAMPER CONNECTED TO COMMON AIR INTAKE LOUVRE.
7. ROOM EXHAUST FAN C/W HIGHLOW EXHAUST GRILLES.
8. GENERATOR ENGINE EXHAUST OUT ROOF.
9. STROBE C/W BLUE LENS AND LAMACOID LABEL INDICATING "CO STROBE INDICATOR".
10. PROGRAMMABLE MONITOR MODULES FOR:  
-GENERATOR RUNNING  
-GENERATOR LOW FUEL  
-GENERATOR TROUBLE
11. SNOW HOOD.
12. GENERATOR EXHAUST LOUVRE AND MOTORIZED DAMPER.
13. FILTERS.
14. EXTERIOR LIGHTING.
15. SPACE TEMPERATURE SENSOR AND CONTROLS.
16. EQUIPMENT PLACEMENT IS ARBITRARY. FINAL LOCATIONS TO BE SELECTED BY ENCLOSURE MANUFACTURER.
17. STEEL PLATFORM WITH STAIR AND RAILING.
18. INTERIOR LIGHTING.
19. LOCATED INSIDE WALK-IN ENCLOSURE.
20. REFER TO SINGLE LINE DIAGRAM FOR SPLITTER AND FEEDER REQUIREMENTS.
21. PHASE BUS IN EQUIPMENT AND PHASE CONDUCTORS NOT SHOWN.
22. BONDING CONDUCTORS IN FREE AIR INSIDE BUILDING SHALL BE FT-4 RATED.
23. EXIT SIGN SHALL BE GREEN PICTOGRAM TYPE.



Consultant

ISSUE / REVISION	DESCRIPTION	BY	DDMMYY
0	ISSUED FOR ADDENDUM #2	EM	2025-11-06



ORIGINAL CONTRACT DRAWING SIGNED AND SEALED BY G.J. WHIFFEN, P. ENG OCTOBER 09, 2025

Project Title  
**PROVINCIAL FIRE AND LIFE SAFETY PROJECT - LYNN LAKE, GILLAM, AND THOMPSON SITES**

**GILLAM MANITOBA**

Drawing Title  
**DRAWING LIST, SYMBOL LEGEND, GENERAL NOTES AND ELECTRICAL DETAILS**

Drawn By	Checked By	Approved By
KAM/EM	EM	GW
Scale	Start Date	Project No.
AS SHOWN	OCTOBER 2025	25-001-17

Revision Number Drawing Number  
**0 E2-000**

**DRAWING LIST**

E3-000	DRAWING LIST, SYMBOL LEGEND AND GENERAL NOTES
E3-111	CRAWLSPACE PLAN - ELECTRICAL - DEMOLITION
E3-121	MAIN FLOOR PLAN - ELECTRICAL - DEMOLITION
E3-211	CRAWLSPACE PLAN - ELECTRICAL - NEW CONSTRUCTION
E3-221	MAIN FLOOR PLAN - ELECTRICAL - NEW CONSTRUCTION

**ELECTRICAL SYMBOL LEGEND**

	FIRE ALARM CONTROL PANEL
	ANNUNCIATOR
	PULL STATION
	SMOKE DETECTOR
	HEAT DETECTOR
	BELL
	DUCT SMOKE DETECTOR
	MAGNETIC DOOR HOLDER
	MONITOR MODULE
	SPRINKLER FLOW SWITCH
	SPRINKLER TAMPER SWITCH
	SPRINKLER PRESSURE SWITCH
	MAGNETIC LOCK
	KEY PAD
	EXIT LIGHT
	SURFACE MOUNTED PANEL
	WEATHER PROOF

\* PLEASE NOTE \*

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**GENERAL NOTES**

(APPLIES TO ALL DRAWINGS)

- A. WHERE RELOCATION OF EQUIPMENT OR WIRING IS REQUIRED, EXTEND WIRING AND CONDUIT AS NECESSARY.
- B. PATCH, REPAIR AND PAINT EXISTING SURFACES WHERE EXISTING ELECTRICAL DEVICES HAVE BEEN REMOVED. INSTALLATION OF BLANK COVERPLATES OVER ABANDONED OUTLETS IS NOT ACCEPTABLE.
- C. CO-ORDINATE WITH OWNER PRIOR TO SHUT-DOWN OF EQUIPMENT.
- D. CONFIRM EXACT LOCATIONS OF EQUIPMENT AND WIRING PRIOR TO ROUGH-IN.
- E. CONFIRM ALL EQUIPMENT CONNECTIONS AND ELECTRICAL REQUIREMENTS WITH EQUIPMENT MANUFACTURER. MAKE ADJUSTMENTS AND INSTALL PER MANUFACTURER'S REQUIREMENTS AT NO ADDITIONAL COST.
- F. PROVIDE ELECTRONIC SCANNING OR OTHER APPROVED MEANS TO LOCATE AND IDENTIFY ALL CONCEALED SERVICES PRIOR TO MAKING OPENINGS OR CUTTING THROUGH SURFACES AND BEFORE DIGGING AND TRENCHING.
- G. DO NOT CUT REINFORCING STEEL.
- H. SEAL PENETRATIONS THROUGH FIRE RATED WALLS, FLOORS AND CEILINGS WITH FIRE STOP MATERIAL AS REQUIRED TO MAINTAIN FIRE RATING.
- I. UPDATE PANEL DIRECTORIES.
- J. VERIFY FIRE ALARM SYSTEM AFTER COMPLETION OF INSTALLATION.
- K. FIRE ALARM AUDIBLE LEVELS SHALL BE VERIFIED TO MEET REQUIREMENTS OF CANULC S524 AFTER INSTALLATION.
- L. DOWNTIME OF THE FIRE ALARM SYSTEM TO BE KEPT TO AN ABSOLUTE MINIMUM. FIRE WATCH SERVICE TO BE PROVIDED AND PAID FOR THE PERIOD DURING WHICH THE FIRE ALARM SYSTEM IS PARTIALLY OR FULLY DISABLED. EMPLOY FIRE WATCH SERVICE AND TO PAY ALL FIRE WATCH FEES. COORDINATE FIRE WATCH WITH THE FIRE DEPARTMENT AND THE BUILDING MANAGER. THE FIRE ALARM SYSTEM SHALL REMAIN FULLY OPERATIONAL AT THE END OF EACH WORKDAY.



Consultant

ISSUE / REVISION	DESCRIPTION	BY	DDMMYY
0	ISSUED FOR ADDENDUM #2	EM	2025-11-06



ORIGINAL CONTRACT DRAWING SIGNED AND SEALED BY G.J. WHIFFEN, P. ENG OCTOBER 09, 2025

Project Title  
**PROVINCIAL FIRE AND LIFE SAFETY PROJECT - LYNN LAKE, GILLAM, AND THOMPSON SITES**

**NORTHERN SPIRIT MANOR**  
 THOMPSON MANITOBA

Drawing Title  
**DRAWING LIST, SYMBOL LEGEND AND GENERAL NOTES**

Drawn By KAM/EM	Checked By EM	Approved By GW
Scale AS SHOWN	Start Date OCTOBER 2025	Project No. 25-001-17

Revision Number	Drawing Number
<b>0</b>	<b>E3-000</b>

DRAWING LIST

E4-000	DRAWING LIST, SYMBOL LEGEND AND GENERAL NOTES
E4-101	CRAWLSPACE PLAN - BLOCK 1 - FIRE ALARM - DEMOLITION
E4-102	CRAWLSPACE PLAN - BLOCK 2 - FIRE ALARM - DEMOLITION
E4-111	GROUND FLOOR PLAN - BLOCK 1 - FIRE ALARM - DEMOLITION
E4-112	GROUND FLOOR PLAN - BLOCK 2 - FIRE ALARM - DEMOLITION
E4-113	GROUND FLOOR PLAN - BLOCK 3 - FIRE ALARM - DEMOLITION
E4-121	FIRST FLOOR PLAN - BLOCK 1 - FIRE ALARM - DEMOLITION
E4-122	FIRST FLOOR PLAN - BLOCK 2 - FIRE ALARM - DEMOLITION
E4-123	FIRST FLOOR PLAN - BLOCK 3 - FIRE ALARM - DEMOLITION
E4-124	FIRST FLOOR PLAN - BLOCK 4 - FIRE ALARM - DEMOLITION
E4-131	SECOND FLOOR PLAN - BLOCK 1 - FIRE ALARM - DEMOLITION
E4-132	SECOND FLOOR PLAN - BLOCK 2 - FIRE ALARM - DEMOLITION
E4-133	SECOND FLOOR PLAN - BLOCK 3 - FIRE ALARM - DEMOLITION
E4-201	CRAWLSPACE PLAN - BLOCK 1 - FIRE ALARM - NEW CONSTRUCTION
E4-202	CRAWLSPACE PLAN - BLOCK 2 - FIRE ALARM - NEW CONSTRUCTION
E4-211	GROUND FLOOR PLAN - BLOCK 1 - FIRE ALARM - NEW CONSTRUCTION
E4-212	GROUND FLOOR PLAN - BLOCK 2 - FIRE ALARM - NEW CONSTRUCTION
E4-213	GROUND FLOOR PLAN - BLOCK 3 - FIRE ALARM - NEW CONSTRUCTION
E4-221	FIRST FLOOR PLAN - BLOCK 1 - FIRE ALARM - NEW CONSTRUCTION
E4-222	FIRST FLOOR PLAN - BLOCK 2 - FIRE ALARM - NEW CONSTRUCTION

DRAWING LIST

E4-223	FIRST FLOOR PLAN - BLOCK 3 - FIRE ALARM - NEW CONSTRUCTION
E4-224	FIRST FLOOR PLAN - BLOCK 4 - FIRE ALARM - NEW CONSTRUCTION
E4-231	SECOND FLOOR PLAN - BLOCK 1 - FIRE ALARM - NEW CONSTRUCTION
E4-232	SECOND FLOOR PLAN - BLOCK 2 - FIRE ALARM - NEW CONSTRUCTION
E4-233	SECOND FLOOR PLAN - BLOCK 3 - FIRE ALARM - NEW CONSTRUCTION
E4-301	FIRE ALARM RISER DIAGRAM

ELECTRICAL SYMBOL LEGEND	
	FIRE ALARM CONTROL PANEL
	ANNUNCIATOR
	PULL STATION
	SMOKE DETECTOR
	HEAT DETECTOR
	BELL
	DUCT SMOKE DETECTOR
	DUCT DAMPER
	STROBE
	COMBINATION HORN STROBE
	MAGNETIC DOOR HOLDER
	MONITOR MODULE
	PRE SIGNAL ACKNOWLEDGE SWITCH
	PROGRAMMABLE RELAY
	SPRINKLER FLOW SWITCH
	SPRINKLER TAMPER SWITCH
	SPRINKLER PRESSURE SWITCH
	SPRINKLER SOLENOID VALVE
	MAGNETIC LOCK
	PUSH BUTTON
	KEY PAD
	CARD READER
	JUNCTION BOX
WP	WEATHER PROOF

\* PLEASE NOTE \*

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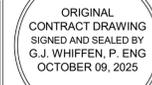
GENERAL NOTES

- (APPLIES TO ALL DRAWINGS)
- WHERE RELOCATION OF EQUIPMENT OR WIRING IS REQUIRED, EXTEND WIRING AND CONDUIT AS NECESSARY.
  - PATCH, REPAIR AND PAINT EXISTING SURFACES WHERE EXISTING ELECTRICAL DEVICES HAVE BEEN REMOVED. INSTALLATION OF BLANK COVERPLATES OVER ABANDONED OUTLETS IS NOT ACCEPTABLE.
  - CO-ORDINATE WITH OWNER PRIOR TO SHUT-DOWN OF EQUIPMENT.
  - CONFIRM EXACT LOCATIONS OF EQUIPMENT AND WIRING PRIOR TO ROUGH-IN.
  - CONFIRM ALL EQUIPMENT CONNECTIONS AND ELECTRICAL REQUIREMENTS WITH EQUIPMENT MANUFACTURER. MAKE ADJUSTMENTS AND INSTALL PER MANUFACTURER'S REQUIREMENTS AT NO ADDITIONAL COST.
  - PROVIDE ELECTRONIC SCANNING OR OTHER APPROVED MEANS TO LOCATE AND IDENTIFY ALL CONCEALED SERVICES PRIOR TO MAKING OPENINGS OR CUTTING THROUGH SURFACES AND BEFORE DIGGING AND TRENCHING.
  - DO NOT CUT REINFORCING STEEL.
  - SEAL PENETRATIONS THROUGH FIRE RATED WALLS, FLOORS AND CEILINGS WITH FIRE STOP MATERIAL AS REQUIRED TO MAINTAIN FIRE RATING.
  - UPDATE PANEL DIRECTORIES.
  - VERIFY FIRE ALARM SYSTEM AFTER COMPLETION OF INSTALLATION.
  - FIRE ALARM AUDIBLE LEVELS SHALL BE VERIFIED TO MEET REQUIREMENTS OF CANULC S524 AFTER INSTALLATION.
  - DOWNTIME OF THE FIRE ALARM SYSTEM TO BE KEPT TO AN ABSOLUTE MINIMUM. FIRE WATCH SERVICE TO BE PROVIDED AND PAID FOR THE PERIOD DURING WHICH THE FIRE ALARM SYSTEM IS PARTIALLY OR FULLY DISABLED. EMPLOY FIRE WATCH SERVICE AND TO PAY ALL FIRE WATCH FEES. COORDINATE FIRE WATCH WITH THE FIRE DEPARTMENT AND THE BUILDING MANAGER. THE FIRE ALARM SYSTEM SHALL REMAIN FULLY OPERATIONAL AT THE END OF EACH WORKDAY.



Consultant

ISSUE / REVISION	DESCRIPTION	BY	DDMMYY
0	ISSUED FOR ADDENDUM #2	EM	2025-11-06



Project Title  
**PROVINCIAL FIRE AND LIFE SAFETY PROJECT - LYNN LAKE, GILLAM, AND THOMPSON SITES**

**THOMPSON GENERAL HOSPITAL**  
 THOMPSON MANITOBA

Drawing Title  
**DRAWING LIST, SYMBOL LEGEND AND GENERAL NOTES**

Drawn By KAM/EM	Checked By EM	Approved By GW
Scale AS SHOWN	Start Date OCTOBER 2025	Project No. 25-001-17

Revision Number	Drawing Number
<b>0</b>	<b>E4-000</b>

FILE PATH: C:\Users\skamrind\Documents\200116\_ELEC\_R0205\_01\_1.mxd



Consultant

**KEY NOTES** Ⓢ

1. PROVIDE NEW SMOKE DETECTOR. WIRE AND CONNECT TO NEW CLASS A INITIATING LOOP. REFER TO FIRE ALARM RISER DIAGRAM.
2. PROVIDE NEW COMBINATION HORN/STROBE. WIRE AND CONNECT TO NEW CLASS B NOTIFICATION CIRCUIT. REFER TO FIRE ALARM RISER DIAGRAM.
3. PROVIDE NEW STROBE. WIRE AND CONNECT TO NEW CLASS B NOTIFICATION CIRCUIT. REFER TO FIRE ALARM RISER DIAGRAM.
4. PROVIDE NEW FIRE ALARM PULL STATION. WIRE AND CONNECT TO NEW CLASS A INITIATING LOOP. REFER TO FIRE ALARM RISER DIAGRAM. REFER TO SPECIFICATION FOR MOUNTING HEIGHT.
5. PROVIDE NEW MONITOR MODULES TO REPLACE ALL DEMOLISHED EXISTING, INCLUDING BUT NOT LIMITED TO: SPRINKLER MONITORING MODULES FOR FLOW, TAMPER AND PRESSURE SWITCHES. ALL NEW MONITOR MODULES ARE NOT NECESSARILY SHOWN ON DRAWINGS. REFER TO SPECIFICATION FOR EXISTING FIRE ALARM VI REPORT FOR SUPPLEMENTARY INFORMATION.
6. PROVIDE NEW FIRE ALARM RELAYS TO REPLACE ALL DEMOLISHED EXISTING, INCLUDING BUT NOT LIMITED TO: HVAC SHUT DOWN RELAYS, FIRE/SMOKE DAMPER RELAYS, MAGNETIC LOCK RELAYS, MAGNETIC DOOR HOLD-OPEN RELAYS, ETC. ALL NEW FIRE ALARM RELAYS ARE NOT NECESSARILY SHOWN ON DRAWINGS. REFER TO SPECIFICATION FOR EXISTING FIRE ALARM VI REPORT FOR SUPPLEMENTARY INFORMATION.



**1 FIRST FLOOR PLAN - BLOCK 4 - FIRE ALARM - NEW CONSTRUCTION** Ⓢ  
 E4-224 SCALE: 1:100

ISSUE / REVISION	DESCRIPTION	BY	DATE
1	ISSUED FOR ADDENDUM #2	EM	2025-11-06
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**ENGINEERS  
 GEOSCIENTISTS  
 MANITOBA**  
 Certificate of Authorization  
 SMS Engineering Ltd.  
 No. 166

ORIGINAL  
 CONTRACT DRAWING  
 SIGNED AND SEALED BY  
 G.J. WHIFFEN, P. ENG  
 OCTOBER 09, 2025

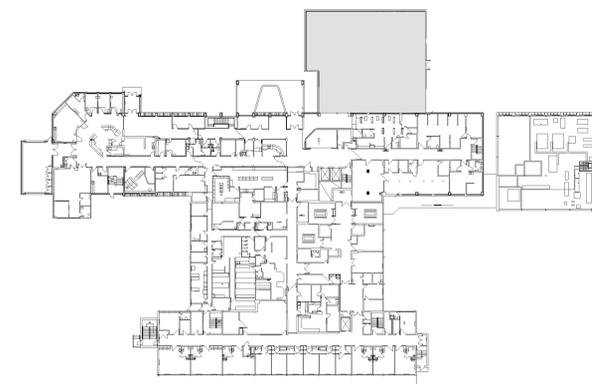
Project Title  
**PROVINCIAL FIRE AND LIFE  
 SAFETY PROJECT - LYNN  
 LAKE, GILLAM, AND  
 THOMPSON SITES**

**THOMPSON GENERAL  
 HOSPITAL**  
 THOMPSON MANITOBA

Drawing Title  
**FIRST FLOOR PLAN -  
 BLOCK 4 - FIRE ALARM -  
 NEW CONSTRUCTION**

Drawn By	Checked By	Approved By
KAM/EM	EM	GW
Scale AS SHOWN	Start Date OCTOBER 2025	Project No. 25-001-17

Revision Number	Drawing Number
<b>1</b>	<b>E4-224</b>



**FIRST FLOOR BLOCK 4 KEYPLAN**  
 SCALE: NTS

