United Church in Meadowood Greening Project Summary

February 16, 2024

Prepared by Caryn Douglas, Minister, UCIM on behalf of UCIM Greening Steering Committee

Project description

With a vision to lead the transformation to a carbon free future, The United Church in Meadowood (UCiM) is replacing our aging natural gas heating system with a Geothermal/Ground Source Heat pump system. This fossil free technology will provide reliable heating and cooling all year-round while reducing our green house gas emissions for heating and cooling to zero.

Project timeline

Initiation April 2023, Construction goal summer 2024, wrap up by January, 2025.

Partnerships and Grants

Community groups using the building have been kept informed about the project and are enthusiastically endorsing it. As we have been spreading the word in the larger community, we are getting indications that people are keen on lending support, for example, offering to participate in fundraising events.

Faithful Footprints, a partnership of Faith and the Common Good and the United Church of Canada, devoted to assisting in the reduction of our carbon footprint is on board. They are committed to a $30,000 grant. A $10,000 grant has been approved/received by the Cropo Foundation and Efficiency Manitoba, a Manitoba Crown Corporation, has verbally committed to a grant of $30,000.

Meetings with representatives of all three levels of government have resulted in endorsement and commitments to champion this project wherever possible. With the change in the provincial government in the fall of 2023, further provincial funding for the project is uncertain at this point as the new government has not finalized their greenhouse gas reduction programs.

The United Church in Meadowood is a healthy congregation with financial viability. This project is going to reduce our annual operating costs, especially when factoring in Carbon Tax impacts as this tax will rise over time.

The Greening Committee is seeking grants from a number of parties and any further grant funds will be used to reduce the UCC loan commitment.

Leadership Development

The congregation engaged in a thorough education and discernment process leading to the decisions to become green leaders and undertake this project. A Steering Committee, reporting to the UCiM Board is overseeing Task Groups assigned specific work (Communication, Finance, Construction, Fundraising, Engagement). Twenty-two people from the congregation are actively engaged in the leadership of the project, and many more are working on specific tasks such as grant writing, fund raisers and the production of communication tools.

UCiM is rich with the expertise needed for this project. Active in the Greening Steering Committee and its Task Groups are congregational members with professional training and experience in architecture, building sciences, energy conservation, accounting, construction, graphic arts and video production, procurement, project management, administration, fundraising, and community education.

Why this project is needed at this time

The severity of the changing climate is impacting all of us and the need to make positive change is urgent. This conversion will enable the congregation to dramatically reduce our carbon emissions, which is essential to reaching Net Zero by 2050, the internationally agreed upon goal to address disastrous climate change. Equally important, this publicly visible project will serve as a motivator to others in the community to take emissions reducing actions in their homes and workplaces. We believe the need for leading by example is essential to help overcome climate anxiety and replace it with tangible hopegiving action.

"Living with respect in Creation" is a line from The United Church of Canada creed. This is a goal for the congregation. Earth is a gift from God, our Creator. Our task is to care for it and to equitably share its abundance in a sustainable way.

On the reconciliation journey with Indigenous people we are learning how significant respect for the earth is to accomplishing reconciliation. Over the last few years, we are being led to new understanding and action in light of this learning.

The decision to pursue geothermal, which was enthusiastically embraced even though the *upfront* cost is greater than other options, is a sign of a deepening commitment.

We are blessed with the right resources to make this project work: a healthy congregation filled with many skilled professionals who are keen to provide leadership and a building that serves as a vital community hub, along with the right set of circumstances.

The economics of this project work because our heating system needs to be changed, our lot size is large enough and we have a relatively new, well insulated building that does not require renovation to convert from natural gas.

Manitoba has a large amount of green hydro electricity, but it is limited. As we move to electric vehicles (new gas engine car sales end in Canada in 11 years) and attempt to lessen our fossil fuel consumption for heating, we must take every opportunity available to draw energy from sustainable sources other than hydro electricity. Hydro electricity should be used where other options are not practical. It would be a sin not to utilize this geothermal opportunity to lower emissions and increase the supply of energy in our community.

Outcomes for this project and measures of success of each.

Outcome 1
Geothermal system is installed and performing as expected, operational costs for heating and cooling reduced; measured by observation and evaluation of system and utility costs
Outcome 2
UCiM's building continues as a vital community asset, hosting activities and groups that strengthen healthy community; measure user group frequency and changes and informal survey of user group comfort.
Outcome 3
Congregation and Community well informed about Geothermal option and motivated to take similar action to reduce GHG emissions in their homes and workplaces and other community places; measure by observation of interest, confidence in telling the story and engagement of those who have become informed and encouragement of reporting on other actions taken.

The community this project will serve

This greening project has three goals: to address the climate crisis by reducing harmful emissions; to ensure that the building continues to serve the community with accessible and affordable space and, to serve as a visible model to demonstrate possibilities and inspire action from others.

The church is a known and trusted pillar of the community, and the members of the congregation are well connected in the broader community. Collectively and individually, as we tell our story of positive response to the climate dilemma that seems overwhelming, we are confident we can contribute to shifting culture away from despair toward positive action.

The United Church in Meadowood is a vibrant, multi-aged congregation serving the community of South St. Vital in Winnipeg. We currently have 235 sustaining families and serve more than 350 families with pastoral care and support. We are a progressive, diverse and welcoming congregation where *all* people find a sincere welcome. There are no ideological or theological barriers limiting participation in our services and programs. We offer programs for all ages, including recreation, special events, concerts, crafting, meals, day camp and others. Our outreach projects support poverty relief locally and in the inner city and we have taken leadership in education and advocacy for social inclusion and social justice for the vulnerable.

UCiM is a centre hub for community. The congregation partners with many organizations to make community services accessible. The building is used extensively throughout the week by groups including: Youville Centre (Baby and Me), Meadowood Senior's Club (with programs almost every day), Embers (formerly Brownies), *Collège Jeanne-Sauvé* Choral program (Louis Riel School Division), Alzheimer's Society, St. Vital Art Group, and a variety of community choirs and music programs. Because of our size, flexible space, and openness, we have welcomed people of various faiths, often from immigrant communities, when they need a space to hold large gatherings, including funerals and other ceremonies. We have a large and lovingly maintained green space and garden which is frequented by our neighbours, including people from our direct neighbour, Dakota House, a large, assisted living facility. Our parking lot is used for overflow parking by the neighbouring *Collège Jeanne-Sauve*, Community Centre and Dakota House. Users, for the most part pay no or nominal fees as the congregation is committed to being a place to foster strong and healthy community.

The 14,000 square foot (1,300 square metre) building was designed with accessibility in mind with no stairs, an entrance at grade and a spacious parking lot. It was also designed with flexibility in mind. The part of the building which is used as a sanctuary on Sunday mornings is entirely flexible (chairs) and continuous with the fellowship hall, so we are able to host community events of up to 400 people. We have a well designed kitchen which is used extensively.

Project implementation

Research and assessment of options to replace our aging heating system began in 2021. A Congregational decision to install a geothermal system was made in April 2023. Once financing is in place, the construction is anticipated to take 3 to 4 weeks during the Summer of 2024. The education to the wider community about options to address climate change will continue throughout the construction period and beyond. Attached to this application is a more detailed Project Schedule.

The Choice for Geothermal

UCiM's building is heated by a system of 3 natural gas furnaces, augmented by localized electric baseboard heating. A roof top air conditioning unit cools the office area only. At 35 years old, these mechanical systems are at the end of their predicted life expectancy.

As temperatures rise, and are predicted to rise even more, the congregation realizes that without air conditioning in the large multi-purpose space its use for community activities will be limited. For example, Canadian Blood Services no longer holds donor clinics in the building because it is not air conditioned.

While the upfront costs of geothermal are greater than other options, the long-term operational costs are lower. In 2024 there will be a 25% reduction in operating cost over natural gas, even with additional air conditioning, by 2030 that reduction increases to over 40%, based on increasing carbon charges. This reduction in operating cost will assist the congregation in continuing to host community groups for no or very low rental fees. The congregation is also factoring into the bottom line the benefits of eliminating reliance on fossil fuels as a step to mitigate against the costly impact of changing climate. Our current natural gas furnaces produce 18 tonnes of GHG (Green House Gas) emissions annually.

Conversion to a geothermal system will reduce UCiM's emissions for heating and cooling to zero.

Geothermal heating and cooling systems are in use all over the world for residential, commercial and industrial applications. While geothermal applications have been successfully operating in Canada for nearly 50 years, this green technology is still not well known, although awareness is rapidly growing as people are perceiving the need to meet carbon emissions reductions. Once geothermal applications become more common, the initial costs will drop, just like solar which was once prohibitively expensive in some jurisdictions is now cheaper than electricity produced by other means. Until geothermal costs are lowered, investment by civil society and government is essential to support early adopters, who can publicize and evangelize for the technology.

How Geothermal works

There are two steps to the Geothermal Heat Pump project: the laying of an underground closed fluid loop that will collect and disperse heat according to the season, and the installation of a mechanical condenser system, consisting of 3 heat pumps, to extract the heat and circulate warm or cool air throughout the building.

In the winter, geothermal systems collect heat from the ground using a loop filled with a fluid, buried well below the frost line. The fluid absorbs heat from the ground which is at a stable temperature of about 6 degrees. Inside the building, the fluid is compressed into a gas in a heat pump where the heat is concentrated, extracted, and sent into the building. Then the liquid, now cooled, is sent back into the ground to repeat the cycle. In the summer, the system is run

in reverse, so the fluid absorbs warmth from the building and that heat is dumped into the ground.

Heat pumps are comparable in size to furnaces. The heat pump requires electricity to run the compressor, but it is a very small amount in comparison with heating and cooling a building with electricity only. The bulk of the energy needed for the heating and cooling comes free from the ground. In Manitoba, we are fortunate that electricity is generated from hydro dams and is fossil fuel free.

The Construction Process

UCiM engaged Geoptimize, an internationally recognized leader in the design of Geothermal systems, to conduct an initial feasibility study, measuring the energy needs of the building, assessing the geological and lot size suitability and providing a preliminary design of the mechanical system needed. They concluded the 2 acre (8400 square metre) site is suitable and that the current forced air ducting adequate for geothermal. Using this data, an estimate was provided on final engineering design and loop and mechanical installation and commissioning.

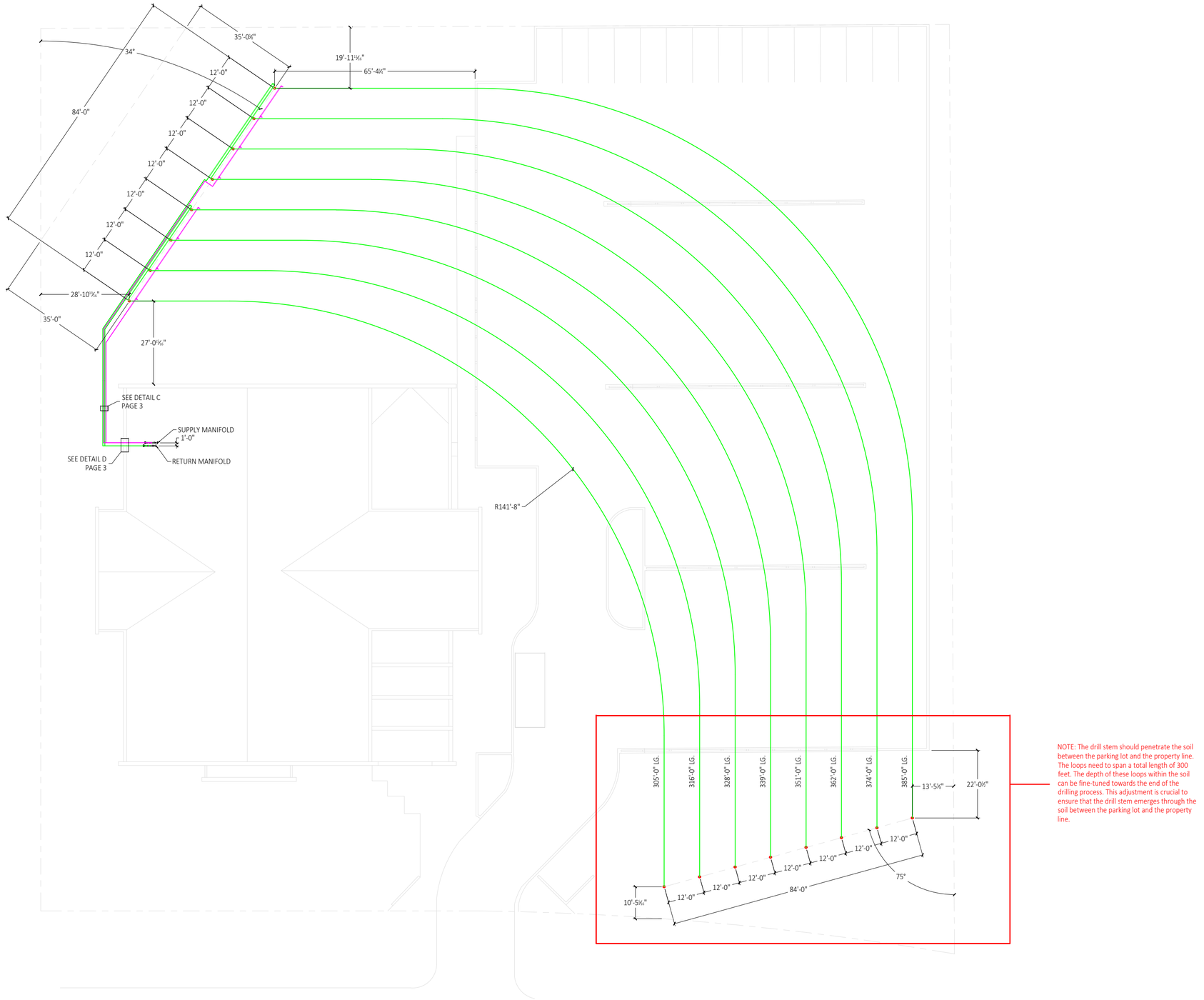
The plan involves laying a closed loop, 10 metres (33 feet) underground. The loop will be installed under the parking lot and back yard using horizontal drilling. The loop will enter the building in the mechanical room in the basement, just as the current natural gas pipe does. The pipe will be filled with a benign anti-freeze solution. After installation the trench will be back-filled, the sod replaced and no sign of the loop will be visible. It would even be possible to construct a building overtop of the loop in the future. The loop has a life expectancy of upwards of 75 years.

In the mechanical room, the existing furnaces will be dismantled and removed and replaced with 3 heat pumps. The heat pumps have a 25 year life expectancy. (Three pumps are necessary to match the way that the building is designed, including the size of the stairwell. The existing office air conditioning unit on the roof will be decommissioned. Adjustment will be made as needed to the ducting to hook up to the heat pumps and some electrical work will be required. A new computer control system will be installed along with new thermostats. The system will be tested and balanced during the commissioning process.

Attached Files Application

Project drawings and details:
2206 09 Geopitimze quote feasibility description
22 01 10 SCMI heat pump quote REVO
GEO 23.003-Site Plan

GEO 23.003-Details_drawing
Greening Project Budget summary



NOTE: The drill stem should penetrate the soil between the parking lot and the property line. The loops need to span a total length of 300 feet. The depth of these loops within the soil can be fine-tuned towards the end of the drilling process. This adjustment is crucial to ensure that the drill stem emerges through the soil between the parking lot and the property line.

DAKOTA STREET

Ground Floor Plan
Scale : NTS

GEOptimize

167 Lombard Ave,
500
Winnipeg, MB
R3B 0V3

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0	11/17/23	25% COORD.
1	12/11/23	25% COORD.
2	12/18/23	25% COORD.
3	01/03/24	25% COORD.

DATE	17 November 2023
SCALE	AS NOTED
DRAWN BY	DS
REVIEW BY	SH
REVISED	–
FILE	GEO 23.003

SHEET INDEX

SHEET 1—Cover
SHEET 2—Site Plan
SHEET 3—Details

PROJECT TITLE

GHX

ADDRESS

1111 DAKOTA ST.
WINNIPEG, MB

SITE PLAN

Full Workers' Compensation Coverage
$5,000,000 Liability Insurance Coverage

PROPOSAL

Name: Dakota United Church
Address:
City: Winnipeg, MB

SCMI SOUTHERN COMFORT MECHANICAL INC
(204) 388 6658
www.scmigroup.ca

Date: January 10, 2023
Revision Number: REV0
Expiration Date: 90 Days
CLASS D BUDGET

GENERAL DESCRIPTION:	The quote below outlines the scope of work proposed for the Dakota United Church. We have allowed for the installation of the HVAC system, and are able to adhere to the required tradesperson ratios in MB.

HVAC SYSTEM

- Remove old furnace, 5 ton condenser, and MUA;
- Supply and install (x2) 10 ton water to air heat pump, including ductwork;
- Supply and install (x1) 5 ton water to air heat pump, including ductwork;
- Includes geothermal piping;
- Includes pumps and methanol;
- Includes filling and flushing of geothermal system;
- Supply and install 1800-2000 CFM HRV, including ductwork;
- Supply and install 300 CFM HRV, including ductwork;
- Includes testing and balancing;
- Includes M1 permit.

- Includes engineered drawings.

TOTAL (including PST): $234,049.16

ADDITIONAL OPTIONS (prices include PST)

- Provisional electrical budget. Add to base price to include:	$30,000.00
- Budget to supply and install 30 ton ground loop:	$85,000.00

NOT INCLUDED

- *Geothermal ground loop not included in base price;*
- *Concrete cutting/coring by others, unless stated otherwise above;*
- *Mechanical openings to be accomodated by framing crew and concrete crew to increase site efficiency;*
- *Conduit, backfill, concrete patching by others;*
- *SCMI is bondable and can provide a quote for bonding on request.*
- *GST*

Additional work not outlined above to be quoted separately, or charged at $85.00 per hour, plus materials and taxes.

I agree to have the above work done for the Proposal Price and understand the terms of the agreement.	Client Signature	Date

		PST		Total
$218,737.53	+	$15,311.63	=	$234,049.16

**Does not include additional options*

GST # 874365711

UNFORESEEN CONDITIONS - LIMITATIONS

This contract is based on drawings provided to Southern Comfort Mechanical Inc, or to measurements taken from an existing structure. If the drawings change, or the structure changes, please notify Southern Comfort Mechanical Inc. If a heat loss calculation was calculated, it is completed to the specifications of the drawings provided, or the information given at the time of measuring the structure. If construction methods or materials differ from those specified, Southern Comfort Mechanical Inc does not assume responsiblity for a higher than expected heat loss. Please review the heat loss provided to you carefully, and notify us if there are any discrepencies. (An example would be a garage which has been designed to be kept at 7C, but which you intend to heat to 21C). Surcharges will apply if phased occupancy is required, causing additional labour/overtime. Early planning and communication can mitigate or eliminate these surcharges. SCMI rate for additional hours is $85.00/hr.

PRICE VOLATILITY AND INCREASED COSTS DUE TO COVID-19

The parties acknowledge that some of the materials and products to be used and installed in the construction of this project may become unavailable, delayed in shipment, and/or subject to price increases due to circumstances beyond the control of the mechanical contrator, including the COVID-19 pandemic. If a specified product is unavailable or shipment is delayed, subcontractor shall provide written notice and shall be afforded additional time and substitute products may be considered. If there is an increase in price of materials, equipment, or products between the date of this subcontract and the time when the project is ready for the installation of the affected material, as determined by the US Bureau of Labour Statistics Producer Price Index as at today's date, the amount of this subcontract shall be increased to reflect the additional cost to obtain the materials, provided that the mechanical contractor gives the owner/general contractor written notice and documentation of increased costs.

FORCE MAJEURE

Notwithstanding any provision herein to the contrary, the Seller shall not be deemed to have defaulted under or breached these Terms and Conditions for failure or delay in fulfilling or performing any term or provision of these Terms and Conditions when such failure or delay is caused by any of the following: fire; flood; accident; explosion; equipment or machinery breakdown not related to the Seller's negligence; sabotage; strike or any labour disturbance (regardless of the reasonableness of the demands of labour); civil commotions; riots; invasions; wars (present or future); epidemics or pandemics (present or future); acts, restraints, requisitions, regulations or directions of any Governmental authority, including without limitation, any bulletin, notice or public health communication related to any disease, virus or other biological or physical agent which may be detrimental to human health in any way; voluntary or mandatory compliance by the Seller with any request of any Governmental authority; shortage of labour, fuel, power or raw materials; inability to obtain supplies; failures of normal sources of supplies; inability to obtain or delays of transportation facilities; any act of God; any act or omission of the Purchaser/Buyer (insofar as the Seller or the transactions or arrangements contemplated by these Terms and Conditions are concerned); or any other cause or circumstance beyond the Seller's reasonable control, whether similar or dissimilar to any of the foregoing. Any such causes of delay even though existing on the date of order or on the date of starting of installation shall extend the time of the Seller's performance by the length of delays occasioned thereby, including delays reasonably incidental to the resumption of normal procedures.

WARRANTIES

Carrier Units - 5 Year Parts and Labour, 20 Year Heat Exchanger. 5 Year Warranty can be upgraded to 10 Year if registered online within 90 days.
1 Year Labour and Material warranty on all new installations.
All other warranties to be detailed upon request.

PAYMENT TERMS

Invoices Due on Receipt unless otherwise specified.
2% Interest on overdue accounts (24% per annum).

HVAC DETAILS

Roof cubs, pitch pockets, and access holes to be provided by others.
Electrical (line voltage and low voltage) by others.
Force flow heaters by others; Baseboard heaters by others; Stairwells assumed to be heated with baseboards.
Heating and hoarding by others; Construction heat by others; Soffit heat by others.
3rd party power vac not included.
Heat loss calculation assumes that window coverings are in place on a design day.
VRF systems are designed to maintain an indoor cooling temperature of 78.2F (25.6C) in the suite on a design day. Lower temperatures are available upon request but will require a small mechanical redesign and potential reselection of equipment.
Where fan coils and HRVs are installed above drop ceilings or access doors a minimum 4" clearance between underside of unit and ceiling must be maintained.

PLUMBING DETAILS

In order to ensure the integrity of all expansion fittings and glued fittings, construction heat is required when exterior ambient temperatures drop below 5C. SCMI may abondon the site until heat is provided, or additional labour charges will apply if the site is not heated.

If customer supplies fixtures; (1) No warranty on product, only on workmanship. (2) If parts are missing, time and material charges may apply.

Tubs should be in place if customer supplied. Walls should be insulated prior to plumbing rough-in.

Waste/Overflow to be provided by owner if tubs are supplied by customer.

Firestopping for plumbing lines excluded unless otherwise specified.

Product must be on site at time of final fixture installation. Properly detailed plans must be provided prior to job start.

Selection of fixtures must be discussed within a reasonable time with plumbing foreman prior to start of job. This allows for the proper rough-in to be completed.

If fixtures are quoted, this does not include showers and tubs, sauna or softener. Showers and tubs (if quoted) are fibreglass, unless stated otherwise.

Appliance plumbing hook-up by others if appliances are not on site at the time of installation. (ie, water function on fridge).

Washers and dryers to be supplied and installed by others.

No charge for anode rod removal on hot water tanks at the time of install only. Removing the anode rod voids the warranty on the unit. (Customer to request)

SCMI is responsible for the building drain (up to building sewer). Others are responsible for building sewer.

Kitchen drawings and millwork drawings to be available prior to job start, to allow reasonable time to plan and order material.

Stairs to second level to be in place prior to commencing work if reasonably possible.

Wall locations to be marked by others. SCMI is not responsible for incorrect line locations on jobs where interior wall locations are not accurately marked.

Ground work rough in cannot be completed with water in the basement.

Sump pit and all other services relating to plumbing must be complete prior to job start.

Sump/grit interceptor pit and trough drain (if applicable) formed/supplied/installed by others. SCMI will connect drain.

No allowances for steel covers for sump, grit, and elevator pits.

Pressure tank and septic tank by others, unless otherwise stated.

SCMI does not accept responsiblity for damage cause to the building if the water is turned on for the first time by others.

Plumbing pricing does not include electrical work, vapour barrier sealing, insulation, back trenching, installation of shower doors.

Pricing does not include water service line, sewer/storm service, or gas service installation (from the exterior into the structure).

Shower curtain rod (if required) supplied and installed by others. Tubs/Shower framed and secured by others.

Recirculation Pump not included unless specified.

Mechanical allowances for irrigation systems not included.

Concrete hole coring by others, unless stated otherwise. Conduit, backfill, concrete patching by others.

Plumbing excludes barrier free showers, heat trace lines (if required), lift station, partition stops, fridge waterline, gas line to suites.

Lockable hose bibs not included. We can provide upon request.

SCMI not responsible for installation of area well.

Mechanical water meters for each suite not included. We can provide separate pricing if requested prior to commencing construction.

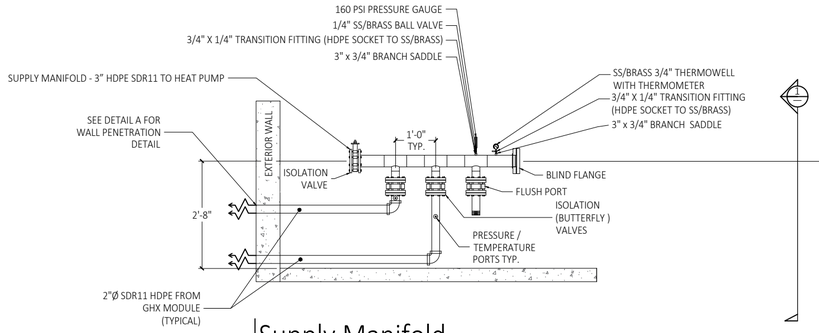
Fire extinguishers, fire suppression, water treatment, monitoring valve, exterior/parkade land drainage by others.

Backing for towel bars, showers, bathroom accessories by others.

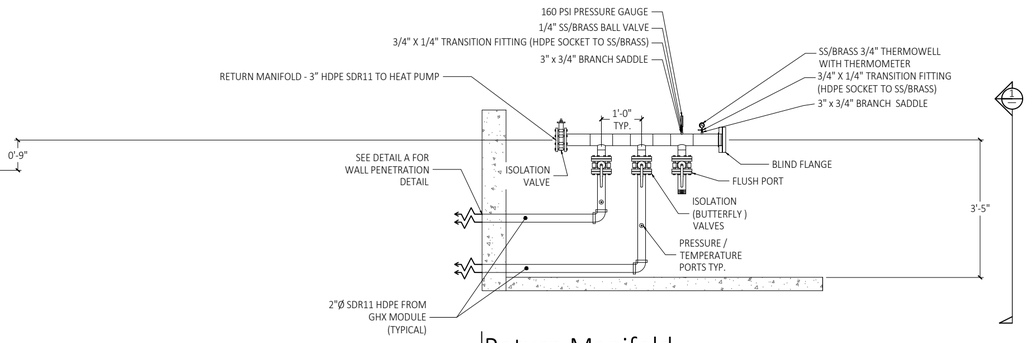
Plumbing waterlines upgraded to Uponor and AquaRise to eliminate the need for insulation.

SCMI not responsible to provide the stainless steel tee for the incoming water service.

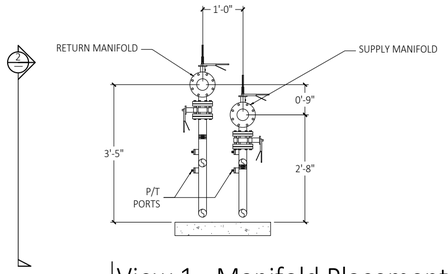
SCMI not responsible to provide stack jacks if required.



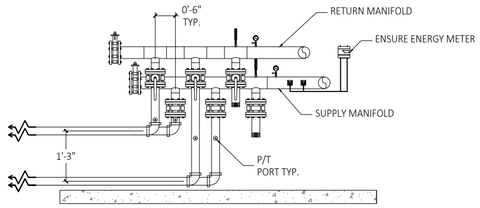
Supply Manifold
Scale: 3/8" = 1'-0"



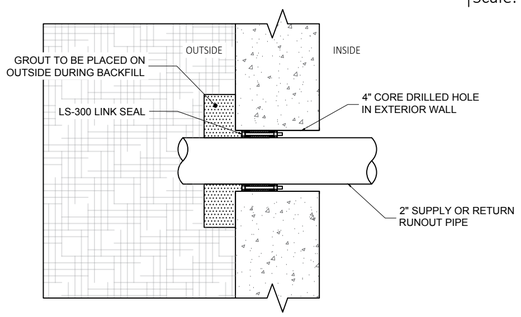
Return Manifold
Scale: 3/8" = 1'-0"



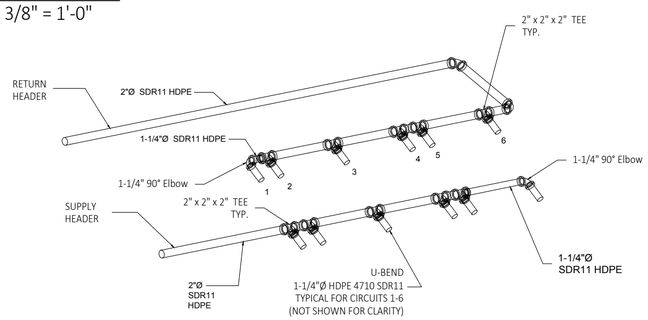
View 1 - Manifold Placement
Scale: 3/8" = 1'-0"



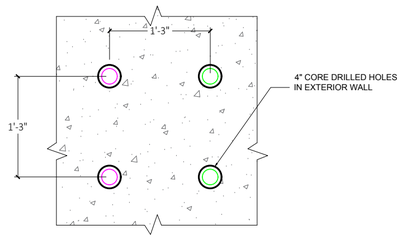
View 2 - Manifold Placement
Scale: 3/8" = 1'-0"



Detail A - Wall Penetration
Scale: NTS

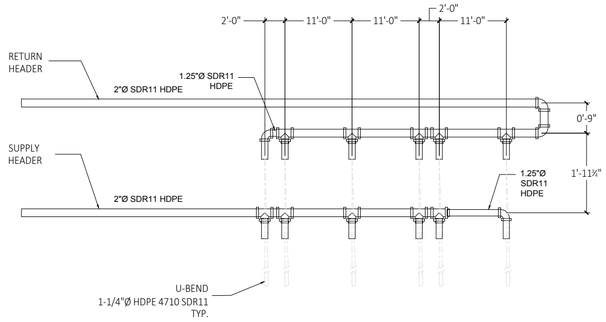


Detail B - Header Detail (6 - Circuits)
Scale: NTS

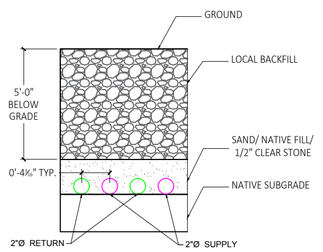


NOTE: TWO HORIZONTAL BOREHOLE CIRCUITS CONNECTED IN SERIES TO CREATE 1 CIRCUIT OF 1,200FT LENGTH

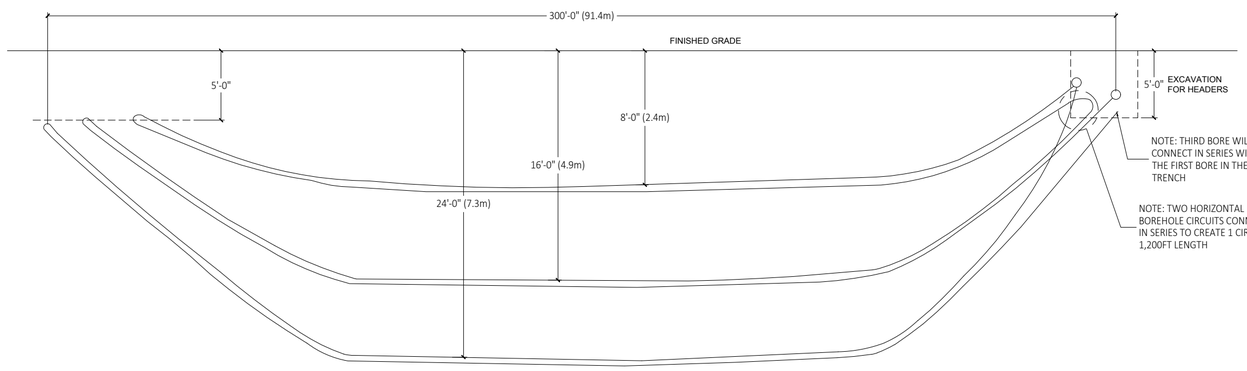
Detail D - Wall Penetration Plan
Scale: 3/4" = 1'-0"



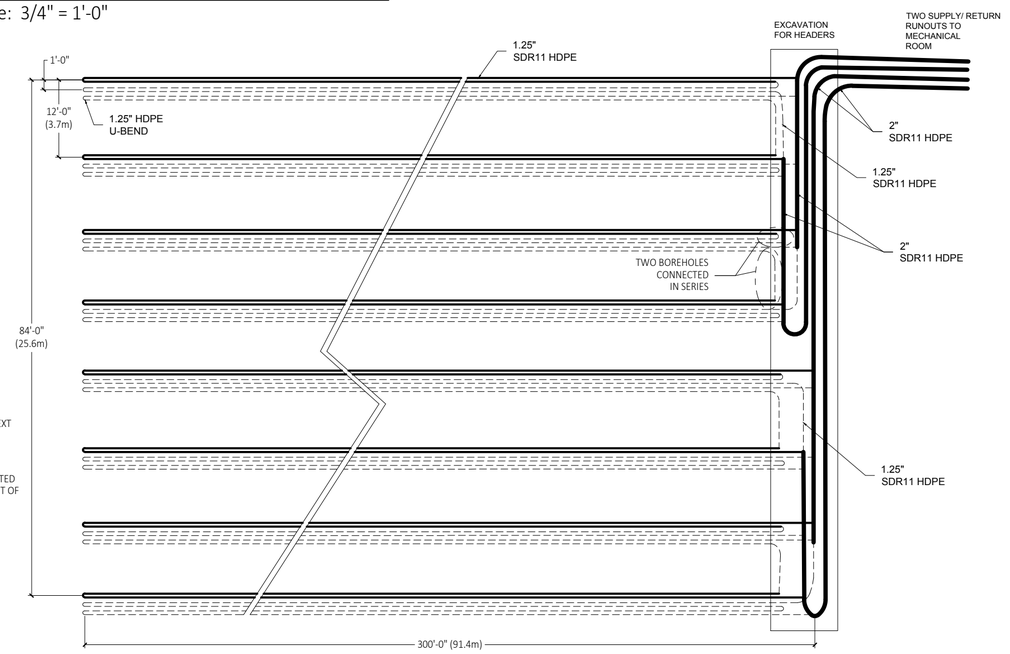
Detail E - Header Plan View
Scale: NTS



Detail C - Trench Detail
Scale: 3/4" = 1'-0"



Detail F - Cross-section of horizontal directionally drilled GHX
Scale: NTS



Detail G - Plan view of horizontal directionally drilled GHX
Scale: NTS

GEOptimize
167 Lombard Ave,
500
Winnipeg, MB
R3B 0V3

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DRAWN BY	DS
REVIEW BY	SH
REVISED	–
FILE	GEO 23.003

SHEET INDEX
SHEET 1–Cover
SHEET 2–Site Plan
SHEET 3–Details

PROJECT TITLE
GHX

ADDRESS
1111 DAKOTA ST.
WINNIPEG, MB

DETAILS

Sheet 3 of 3