LONSDALE energy

Developer Guidelines and Requirements

Version 1.2

This document outlines the guidelines and requirements to be followed at the time it was prepared. Lonsdale Energy will endeavour to make updates to reflect amendments made to the City of North Vancouver's bylaws as well as the developing state of practice and technology.

Please visit www.lonsdaleenergy.ca to view the latest version of the guide.

If you have any questions related to the contents within this guide, please email info@lonsdaleenergy.ca.

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1 | INTRODUCTION

Purpose

The Developer Guidelines and Requirements guide was created to better support developers and ensure new developments are optimized to connect to the community energy system. It is also intended to serve as a resource for the developer's contractors and design consultants.

The guide provides a general overview of the City of North Vancouver's community energy system, operated and maintained by Lonsdale Energy. It also outlines the responsibilities of developers and of Lonsdale Energy and summarizes the City of North Vancouver's development process as it relates to Lonsdale Energy.

Most importantly, the guide also lists critical factors to consider during building installation.

About Lonsdale Energy

Incorporated in 2003, Lonsdale Energy is a utility company owned by the City of North Vancouver. Lonsdale Energy is responsible for operating and maintaining the community energy system (also known as district energy).

Lonsdale Energy also reviews and inspects development projects on behalf of the City during development, permitting, construction, and operation.

With energy plants located throughout the City, Lonsdale Energy supplies heating to over 100 buildings in Lower Lonsdale, Central Lonsdale, Marine Harbourside and Moodyville. At the end of 2023, over 15,600 residents received heating services from Lonsdale Energy.

Regulatory Framework

The City of North Vancouver's Hydronic Energy Service Bylaw, 2004, No. 7575 (Bylaw No. 7575) establishes the regulatory framework of the community energy system. Developments with a combined floor area of greater than 1,000 m^2 are required to connect to the community energy system.

Bylaw No. 7575 also establishes general terms and conditions for the services provided by Lonsdale Energy.

Climate Action

Community energy systems are an efficient way to distribute heating or cooling energy to many buildings. Instead of every building having its own system, heating is centrally produced then distributed through an underground network of pipes to all connected buildings.

The community energy system is an important part of the City's plan to reduce greenhouse gas emissions from buildings and help reach its target of net-zero emissions by 2050. Buildings are the second largest source of emissions in the City.

One big benefit of a community energy system is the flexibility to seamlessly switch fuel sources.

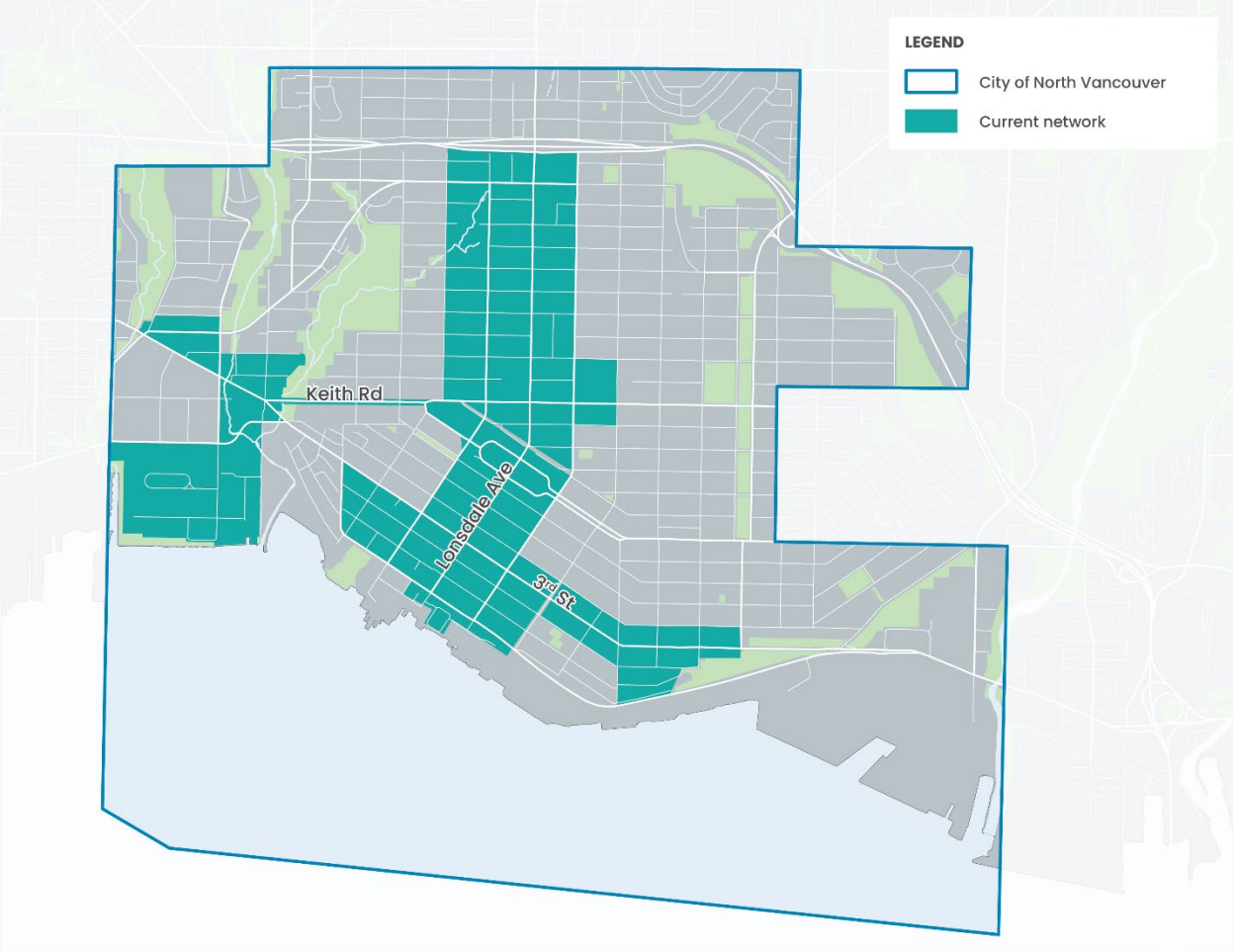
Community energy systems can switch to renewable energy sources at a lower cost than if an individual building had to do it alone. For North Vancouver, this means that the emissions of over 100 buildings will be drastically reduced, simply by being a part of the community energy system.

Today, about 15% of the energy provided is from renewable sources. By 2027, Lonsdale Energy aims to have at least 40% to come from low-carbon technologies. In line with the City's climate targets, Lonsdale Energy aims to achieve net-zero emissions by 2050.

Service Area Map

Our service area focuses on supporting the residents and businesses within the City of North Vancouver. The community energy system began in Lower Lonsdale during its redevelopment in the early 2000s. Since then, it has expanded to serve the neighborhoods of Central Lonsdale, Moodyville, and Marine Harbourside.

The community energy system will continue to grow where density is added. By 2030, it's expected that one in three residents will be a Lonsdale Energy customer.



Service Area Map, 2023

2 | COMMUNITY ENERGY EXPLAINED

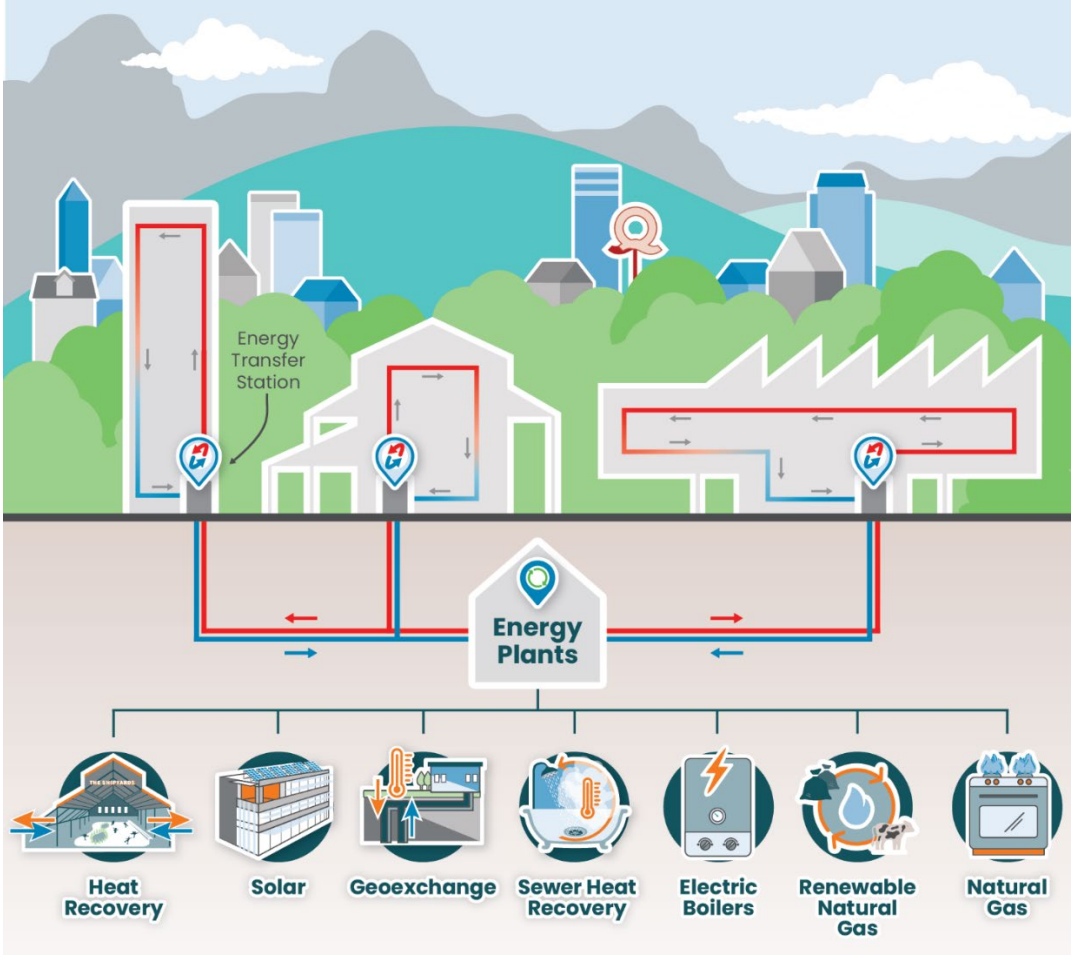


Illustration of the community energy system

How it works

Heating is generated at the energy plants and is then distributed to multiple buildings throughout the City. Here's how the system works:

Step 1: Energy is generated
The process begins at the energy plant, where thermal energy (primarily for heating) is produced. Lonsdale Energy uses a variety of sources to generate heat.

Step 2: Energy is distributed
The heat is carried by water from the plant to the connected buildings through a network of insulated underground pipes.

Step 3: Energy is transferred
Each building connected to the community energy system has a heat exchanger – a system that allows heat to be transferred to the building's distribution system. In addition to space heating, heat can be used for domestic water heating (e.g., taking a shower or washing dishes).

Step 4: System water is returned, reheated, then recirculated
After the energy is used in the buildings, the lower temperature water is returned to the energy plant through a separate set of pipes. This water is reheated and then recirculated back into the system.

Throughout the process, Lonsdale Energy monitors the system to ensure energy is used efficiently, addressing potential system issues and making adjustments to meet the energy demands across the system.

Energy Plants

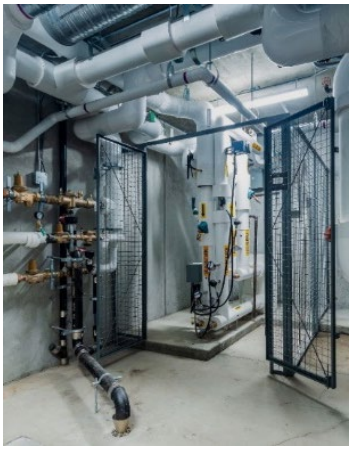
Lonsdale Energy makes use of a distributed set of energy plants as opposed to a single larger, centralized energy plant. This allows Lonsdale Energy to grow the system as demand increases. The method also allows us to spread the capital costs over time. Energy plants are operated and maintained by Lonsdale Energy.

Distribution Piping System

Energy plants transfer heat to customer buildings through a 15 km long piping network, known as the distribution piping system. This system includes insulated pipes, communication infrastructure, and other auxiliary equipment.

Very hot water is sent to customer buildings through the pipes for various heating needs. Once the heat energy from the hot water is used by the customer, any remaining heat energy is returned to the energy plants to be reheated then recirculated, creating a continuous loop of thermal energy transfer.

Energy Transfer Stations



In each customer building, there is at least one energy transfer station. The energy transfer station serves to separate the building's heating system from the community energy system. The two systems are hydraulically separate, meaning that water from one system does not mix with water from the other. Only thermal energy is transferred between the community energy system and the building's heating system.

Typically, an energy transfer station includes a heat exchanger, an energy meter, insulated pipes, control equipment, and other ancillary equipment. The energy transfer stations are operated and maintained by Lonsdale Energy.

Key Benefits of Community Energy

There are many benefits of community energy systems:

- **Energy efficiency:** Community energy systems provide economies of scale and significant efficiencies compared to individual systems, reducing overall energy consumption.

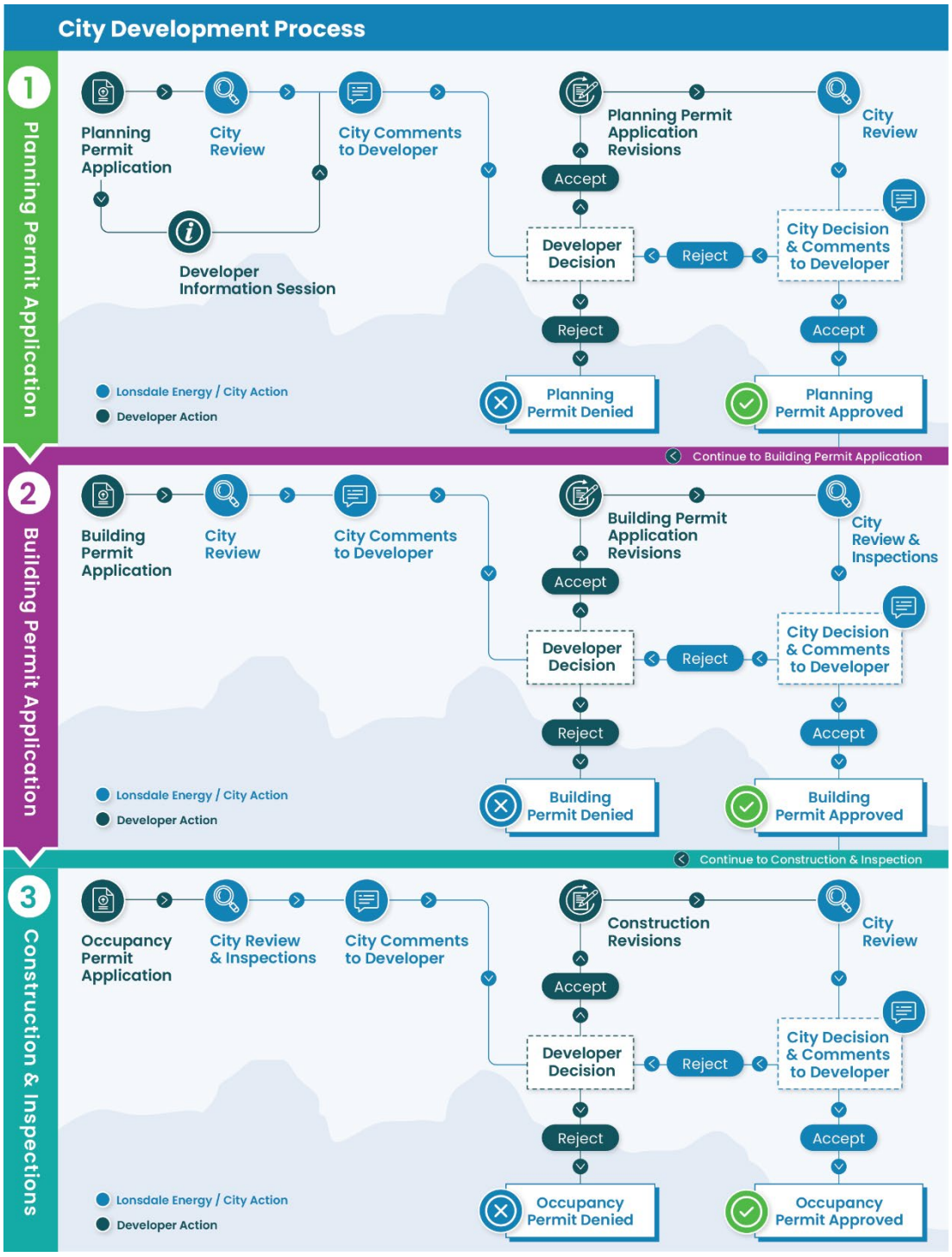
- **Enhanced reliability through redundancy:** With eight energy plants located throughout the city, customers experience virtually uninterrupted service.

- **Easy switch to low-carbon energy:** Its flexible infrastructure can incorporate a number of renewable and low-carbon energy sources; switching fuel sources would be a costly and very difficult endeavour for existing (fixed) individual heating system.

- **Space savings:** Developers can benefit from space savings, as it reduces the capital costs associated with designing and constructing a heat generation system for a building. Energy transfer stations are much more compact compared to traditional heating systems, resulting in space savings within buildings.

3 | THE CITY'S DEVELOPMENT PROCESS

If your development is connecting to the community energy system, follow the City of North Vancouver's development process. The following chart highlights key stages when Lonsdale Energy is involved in the process:



- **Planning Permit Application**
    - Submit a planning permit application to the City of North Vancouver.
        - The planning permit application is reviewed by various departments in the City, including Lonsdale Energy. Your application is also reviewed by other City Committees as needed (i.e., Advisory Design Panel).
    - Attend a Developer Information Session.
    - Update the application to address comments provided by the City and resubmit.
        - The planning permit application is considered by City Council or by the Director of Planning and Development and is either rejected or accepted.
        - If accepted, you may apply for a building permit.

- **Building Permit Application**
    - Submit a building permit application to the City.
        - The building permit application is reviewed by various departments in the City, including Lonsdale Energy.
    - Update the application to address comments provided by the City, then resubmit.
    - Once all comments are sufficiently addressed, the building permit is issued.
    - City inspections, including inspections conducted by Lonsdale Energy, are required during construction.

- **Occupancy Permit Application**
    - Submit an occupancy permit application to the City.
        - The occupancy permit application is reviewed by various departments in the City, including Lonsdale Energy.
    - Update the application to address City comments, then resubmit.
    - After all comments are sufficiently addressed, the occupancy permit is issued.

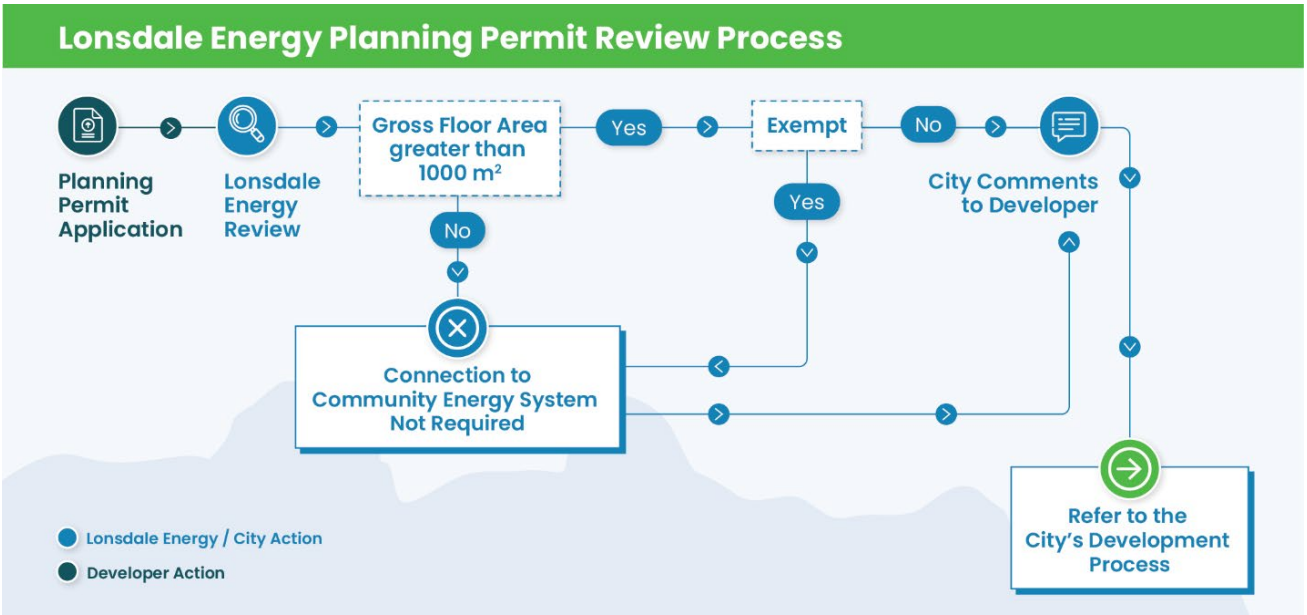
Note: this process may vary if Land Use Approval is outright or discretionary.

Refer to their website, www.cnv.org/Business-Development/Building, for forms and more details on the development process.

Reviewing Planning Permit Applications

As part of the City's planning permit application review process, Lonsdale Energy performs a review of the application to determine if connection to the community energy system is required.

If connection is required, Lonsdale Energy will provide comments and considerations to the developer through the City.



Refer to **Appendix D** and **Appendix E** for a list of Lonsdale Energy's standard comments. In addition to the standard comments, Lonsdale Energy's review of the planning permit application typically includes the following high-level comments and considerations. Please keep these in mind when preparing an application.

1. Connection to the community energy system – required for developments with a gross floor area of greater than 1,000 m^2.
2. Lonsdale Energy distribution piping system service connection – Lonsdale Energy will indicate its preferred service connection location.
3. Lonsdale Energy mechanical space – Lonsdale Energy will indicate its preferred mechanical space location and provide preliminary sizing requirements.
4. Mechanical heating system technical performance and compatibility – the Community Energy Agreement defines the overall technical performance requirements.

Exemptions

Connection to the community energy system is typically not required if the development's gross floor area is 1,000 m^2 or less.

Bylaw No. 7575 allows for an exemption to connect to the community energy system if the City's Chief Financial Officer determines that the cost of providing the service to the property and buildings would be excessive to the City. This may be the case if the development is small or located far from Lonsdale Energy's existing distribution piping system.

Bylaw No. 6700, Division II, Part 4, 419(4) and 420 give requirements to allow buildings to connect to Lonsdale Energy but exempt space heating "to the extent expressly contemplated in respect to each specific zone in this bylaw". This currently applies to the Moodyville Area (CD-669) only. The requirements are summarized below. Refer to Bylaw No. 6700 for more information.

- Compliance with the Passive House energy standard.
- Peak Thermal Load (PTL) for space heating shall be no greater than 10 W/m^2 (designed and installed).

Reviewing Building Permit Applications

Lonsdale Energy's review of the building permit application continues from the planning application review. More detailed comments are provided based on the building permit submission. The focus is similar to the planning application review, and remains high-level, but reflects the level of detail provided in the building permit submission documents. Refer to **Appendix F** and **Appendix G** for building permit submissions requirements.

Prior to Lonsdale Energy's sign-off on the building permit, the following are required:

- ✓ All comments made by Lonsdale Energy are sufficiently addressed.
- ✓ All Lonsdale Energy building permit application fees are paid.
- ✓ The Community Energy Agreement is executed and registered on title.
- ✓ The Hydronic Energy Service Agreement is executed.
- ✓ The security deposit is provided.

The applicant is responsible for the design of the building mechanical system. Lonsdale Energy will review the design. An accepted design does not release you from meeting the required technical and operating performance requirements.

Reviewing Occupancy Permit Applications

You are required to arrange inspections with Lonsdale Energy during construction.

The following items are required prior to Lonsdale Energy signoff on the occupancy permit:

- ✓ The service connection fee is paid.
- ✓ All items from Lonsdale Energy's inspection reports are sufficiently addressed.
- ✓ An authenticated letter is provided from a mechanical engineer certifying that the building has been constructed in accordance with the requirements described in the Community Energy Agreement.
    - The letter should state that all heating-related equipment including domestic water heating systems have been satisfactorily installed, balanced, and commissioned, particularly with respect to return water temperature requirements. The heating system is to operate with a maximum 43°C return water temperature at the energy transfer station delivery point year-round under all non-zero heating load conditions.
- ✓ Lonsdale Energy is provided with keys and fob for access to the mechanical room and other spaces with Lonsdale Energy's equipment and services.

4 | THE DEVELOPER'S RESPONSIBILITIES

Throughout the development, construction, and operational phases of a project, the developer has various responsibilities when connecting to the community energy system. Please refer to **Appendix A** and **Appendix B** for additional details and useful information to share with your consultants and contractors.

Building Design and Construction

Requirements and items for consideration are:

- All building services heating applications will be connected to and employ an in-building hydronic heating system served by the community energy system.
- Consider using hydronic instantaneous domestic water heating stations (also known as "heating interface units" or "heat transfer panels").
- Lonsdale Energy provides a delivery point supply temperature of 65°C.
- Return water temperature at the delivery point shall be no greater than 43°C year-round during all non-zero load conditions.
- Inspections are required during building construction.

- We recommend arranging a meeting with your design consultants (architectural, civil, structural, landscaping, mechanical, electrical, etc.) either before or early in the building permit application to ensure all requirements are addressed and to allow for any questions to be answered.
- We also recommend a similar meeting with your construction team either before or early in construction for the same reasons.

With respect to Lonsdale Energy fees and charges, there are two primary means of reduction through building design and construction.

1. The first method is to reduce the nominated energy capacity, which is the sum of each load required for all heating end-uses (e.g., space heating, ventilation heating, domestic water heating, etc.). This number represents power and is noted in kilowatts.
2. The second method is to reduce energy usage. This number is the operational energy used by the building and is noted in kilowatt-hours.

We strongly recommend minimizing the development's energy capacity and energy usage. This can be accomplished by strategies such as passive design measures, architectural optimization, enhanced building envelope performance, and on-site thermal energy storage.

Energy Transfer Station Requirements

A dedicated mechanical space is required for the energy transfer station. Requirements include the following items:

- Energy transfer station location
- Minimum space allocation and security
- Maintenance and access
- Housekeeping pad
- Electrical service
- Space temperature

Performance and Security Deposit

There are two main performance requirements for buildings connected to the community energy system:

1. Domestic hot water will be heated to a minimum of 60°C under all load conditions. This may not be required if central domestic hot water storage is not used.
2. Maximum return water temperature of 43°C year-round under all non-zero load conditions at the delivery point of the energy transfer station.

The City authorizes Lonsdale Energy to require customers to provide a security deposit, in the form of a letter of credit or cash deposit.

- We will retain the security deposit for a minimum holding period of 18 continuous months after the issuance of the final Certificate of Occupancy.
- If the customer building has not been constructed, is not being operated or cannot be operated in accordance with Lonsdale Energy requirements, then Lonsdale Energy may retain a portion or all of the security deposit.
- If the customer building has been constructed and is being operated in accordance with our requirements, then the security deposit will be returned after the minimum holding period has expired.

The design of the in-building system remains the responsibility of the developer, and review and acceptance by Lonsdale Energy does not release the customer from their obligation to meet the required technical and operating performance requirements. Any concerns regarding the in-building system not satisfactorily addressed during the building permit application may result in an increased security deposit.

Operation and Maintenance

The customer is responsible for maintaining good water quality in the building hydronic systems.

Poor water quality can cause fouling, decreased thermal efficiency and heat transfer, and increased pumping costs. Appropriate and ongoing maintenance and water quality management can help ensure a hydronic system's longevity, reliability, and performance.

The customer will be held responsible for any damage to our equipment due to poor water quality in the building hydronic systems.

Energy Plant Space Requirements

Where required and agreed to with the City, a developer must provide space suitable to operate an energy plant, including any applicable utility connections.

If your development requires an energy plant, please refer to **Appendix C**.

5 | LONSDALE ENERGY'S RESPONSIBILITIES

Energy Plants

It is Lonsdale Energy's responsibility to design and construct the energy plants at our cost. Each energy plant will consist of thermal energy generation equipment, pumps, heat exchangers, expansion tanks, chemical treatment tanks, pipes, and associated ancillary equipment. Construction for an energy plant takes approximately six months to complete.

Distribution Piping System

It is Lonsdale Energy's responsibility to design and construct the distribution piping system that connects a building to the community energy system.

Service connection construction can vary greatly depending on the location and configuration of the development. Most service connections include the following steps:

1. Excavation of sections of the existing distribution piping system
2. Installation of new connection infrastructure including communication conduits to the existing distribution piping system.
3. Excavation of the trench to the new customer building.
4. Installation of new distribution piping system branch and controls cabling conduits to the customer building through developer-provided penetrations.
5. Professional backfilling and pavement restoration.

Energy Transfer Stations

It is Lonsdale Energy's responsibility to design and construct the energy transfer station at our cost. The energy transfer station consists of heat exchangers, control valves, piping, valves, sensors, controls, and energy meters. We select the energy transfer station components based on the buildings nominated energy capacity, and supply and return temperature (65°C/43°C) at the delivery point.

For a standard energy transfer station, construction takes approximately four weeks to complete and follows the installation of the distribution piping system. The typical process for energy transfer station construction is as follows.

1. Heat exchanger installed on developer-provided housekeeping pad.
2. Piping, supports, valves, devices, sensors, and gauges installed.
3. Control panel and field wiring installed.
4. Control panel connected to the developer-provided permanent power.
5. Energy transfer station tested and commissioned.
6. Piping and heat exchanger insulated.
7. Developer-provided fence and lockable gate installed (if in a shared mechanical room).
8. Heating service commenced.

6 | RATES AND FEES

Bylaw No. 7575 describes and explains the standard fees, rates and charges for service. Refer to the bylaw for the current rates. The most common fees and rates are described below.

One-Time Fees

Application Fee

The application fee is a one-time fee charged when Lonsdale Energy is involved in the process of building permit issuance or inspection. This fee is charged at a rate of 0.15% of the construction value as defined by the City of North Vancouver.

Service Connection Fee

The service connection fee is one-time fee calculated by multiplying the service connection rate ($/kilowatt) by the energy capacity nominated by the developer's professional engineer qualified for such purposes and described in kilowatts.

The current rate for customer connections with a service agreement date December 1, 2023, or later, is $94.18 per kilowatt (if an agreement was executed prior to this date, the rate in Bylaw No. 7575 at that time will apply). Effective December 1, 2023, there is a minimum connection fee of $75,000.

Generally, more energy efficient buildings have lower service connection fees. Thermal energy storage and appropriate building controls can also help lower service connection fees.

Costs Recovered from the Developer

Some of the most common costs that are recovered from the developer are described below. An agreement will be drafted by Lonsdale Energy and signed by both parties describing the scope of the services. We will recover design, material, labour and administrative costs from the developer. Refer to Bylaw No. 7575 for more information on these and other recoverable costs.

- **Energy transfer station and service connection location:** Lonsdale Energy designates the location and space requirements of the energy transfer station and the service connection on the customer's premises.

  The developer may request a different routing or location. We will charge the customer for all additional costs to install the energy transfer station and service connection according to the customer's request if it is feasible to do so.

- **Additional energy transfer stations and service connections:** The developer may request additional energy transfer stations and service connections. Lonsdale Energy will charge the customer for all costs incurred to install the energy transfer station and

service connection according to the customer's request if it is feasible to do so.

Recurring Charges

Meter Charge

The meter charge is a monthly administrative fee. This charge does not vary from month to month unless the rate is changed with the consent of our regulator, the City of North Vancouver.

Capacity Charge

The capacity charge is a fixed monthly charge per kilowatt multiplied by the energy capacity nominated by the developer’s professional engineer qualified for such purposes and described in kilowatts.

As the energy capacity nominated to a building is constant, this charge does not vary from month to month unless the rate is changed with the consent of our regulator.

Generally, more energy efficient buildings have lower capacity charge fees. Thermal energy storage and appropriate building controls can also help lower capacity charge fees.

Commodity Charge

The commodity charge is a charge per kilowatt hour of thermal energy consumed by a customer.

Appendices

APPENDIX A: Detailed List of Developer's Responsibilities

Architectural and Engineering Design

We strongly recommend minimizing the development's energy capacity and energy usage to reduce associated fees and charges. This can be accomplished by strategies such as passive design measures, architectural optimization, enhanced building envelope performance, and on-site thermal energy storage.

All building services heating applications shall be connected to and employ an in-building hydronic heating system served by the community energy system, including but not limited to space heating, ventilation heating, and domestic water heating. Other heating energy sources including electricity and natural gas are not permitted and shall not be used for building services applications. This also applies to any commercial spaces on the property.

It is strongly suggested to locate any centralized in-building mechanical heating equipment (particularly domestic hot water production equipment) directly adjacent to the energy transfer station space to avoid potential temperature performance issues.

For domestic water heating, consider using hydronic instantaneous domestic water heating stations (also known as "heating interface units" or "heat transfer panels"). The benefits include:

1. Minimizing domestic hot water distribution piping and eliminating associated centralized equipment.
2. Eliminating domestic hot water recirculation piping and associated centralized equipment.
3. Drastically simplifying and reducing costs associated with high-rise domestic water pressure zones.
4. Eliminating costs associated with domestic hot water recirculation balancing and commissioning.
5. Significantly reducing energy usage for domestic water heating.
    a. Eliminating domestic hot water central storage heat losses.
    b. Eliminating domestic hot water recirculation heat losses.
    c. Eliminating domestic hot water recirculation pumping energy.
    d. Reducing the domestic hot water supply temperature below 60°C by eliminating the need to heat centrally stored domestic hot water to control legionella growth.
6. Helping to ensure low heating return water temperature to comply with our temperature performance requirements.

Lonsdale Energy provides a delivery point supply temperature of 65°C, subject to customer building hydronic flow dynamics. The delivery point is defined as the points immediately downstream of the supply isolation valve and immediately upstream of the return isolation valve on the building side of the energy transfer station. Modern buildings should not require greater than 65°C supply temperature setpoint any time during the year.

During steady heat load conditions, the actual supply temperature at the delivery point may vary by up to ±2°C. During dynamic heat load conditions, the actual ramp-up time required to achieve supply temperature setpoint at the delivery point depends on the rate of change of heat demand from the customer in-building system. Actual supply temperature at the delivery point cannot change instantaneously to satisfy instantaneous changes in heat demand from the customer in-building system. It may take several minutes to ramp up to achieve setpoint.

Return water temperature at the delivery point shall be no greater than 43°C year-round during all non-zero load conditions. Suggestions for meeting this performance requirement include the following:

1. Low supply water temperature space heating systems.
2. Low supply water temperature ventilation heating systems.
3. Heat interface units for instantaneous domestic water heating.
4. Scavenging system for centralized domestic water heating systems.
5. Stratifying domestic hot water tanks for centralized domestic water heating systems.
6. Careful consideration of part-load space heating conditions.
7. Careful consideration of part-load ventilation heating conditions.
8. Careful consideration of part-load domestic water heating conditions.
9. Systems and equipment should be checked for both design conditions and “worst case” part-load conditions as they relate to our temperature requirements.
10. Pressure-dependent balancing valves (manual balancing valves, circuit balancing valves, CBVs) should be avoided. Alternatives include modulating control valves, on/off control valves paired with flow-limiting valves (autoflow valves), and thermostatic balancing valves.

A detailed control methodology narrative must be submitted describing how the system will be controlled during both full-load and part-load conditions.

Lonsdale Energy Inspections

Lonsdale Energy inspections (pre-board/frame and final) are required during building construction. We will inspect construction against City-approved plans and drawings for the building permit.

Changes made affecting any heating, cooling and domestic hot water systems must be communicated to Lonsdale Energy for review and acceptance. Any changes made after the building permit is issued are subject to review, inspection, and approval. We suggest taking

photos/videos/construction notes of installation throughout the construction period showing installations of heating and cooling systems, and domestic hot water systems.

Our final inspection is required prior to the City Building Inspector's final inspection. Lonsdale Energy inspections are a prerequisite to sign-off on the Certificate of Occupancy.

Performance and Security Deposit

There are two main performance requirements for buildings connected to the community energy system:

1. Domestic hot water will be heated to a minimum of 60°C under all load conditions, unless determined and noted otherwise by the customer's mechanical engineer and discussed with Lonsdale Energy. This may not be required if central domestic hot water storage is not used.
2. Maximum return water temperature of 43°C year-round under all non-zero load conditions at the delivery point of the energy transfer station.

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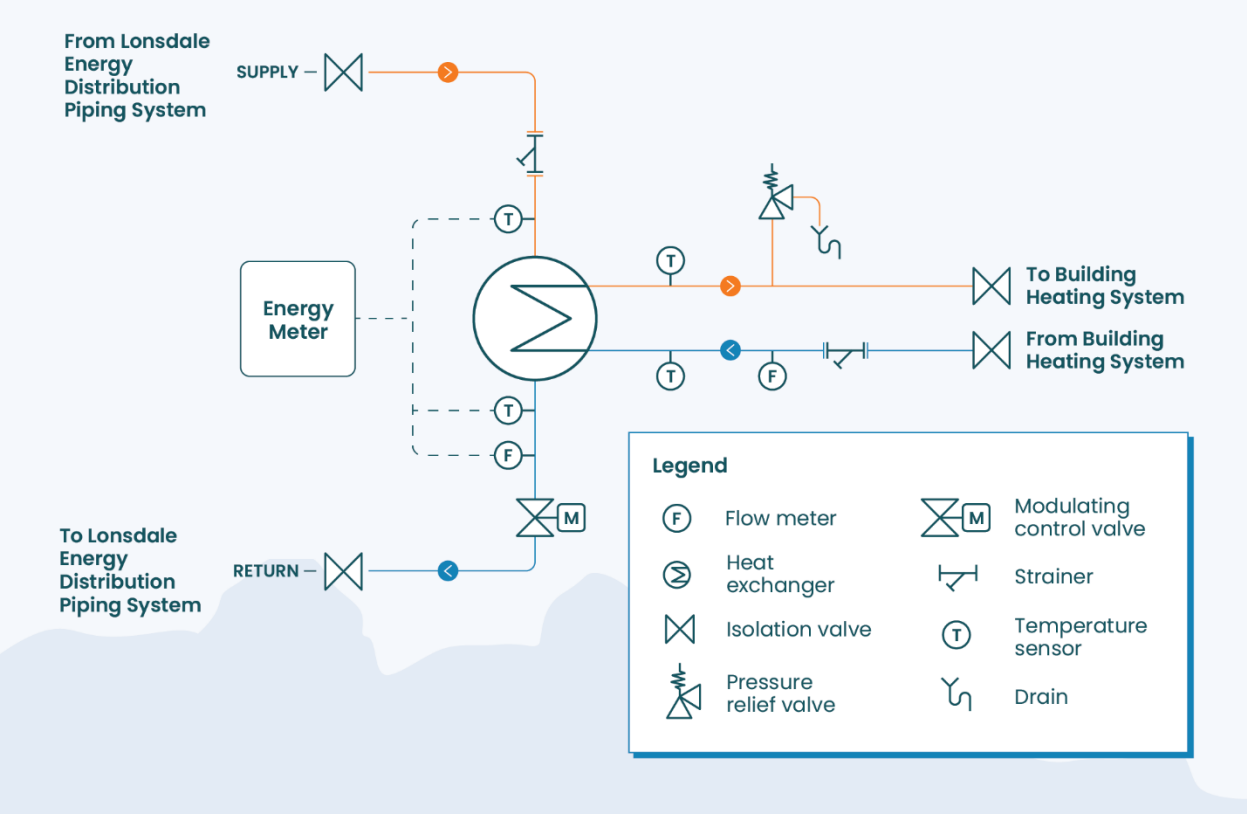
The customer will be held responsible for any damage to our equipment due to poor water quality in the building hydronic systems.

Energy Transfer Station Requirements

A dedicated mechanical space is required for the energy transfer station.



- This space should be located directly where the our service connection enters the building, on the highest below-grade level.
- An estimated minimum space of 3 m. x 2.5 m. x 2.75 m. high is required (to be confirmed by Lonsdale Energy following confirmation of the energy capacity of the premises by the customer's mechanical engineer).
- A dedicated energy transfer station room with a lockable door that swings outward is recommended. The space may also be located within a building mechanical room with lockable fenced space and a gate that swings outward, provided by the developer.
- A clear path for maintenance and access is required.
- Building equipment and services should not be located within or routed through our space. Any items required by code are to be fully coordinated with us prior to building permit issuance.
- A concrete housekeeping pad for Lonsdale Energy's heat exchanger is required. The exact size and location are to be coordinated during construction.

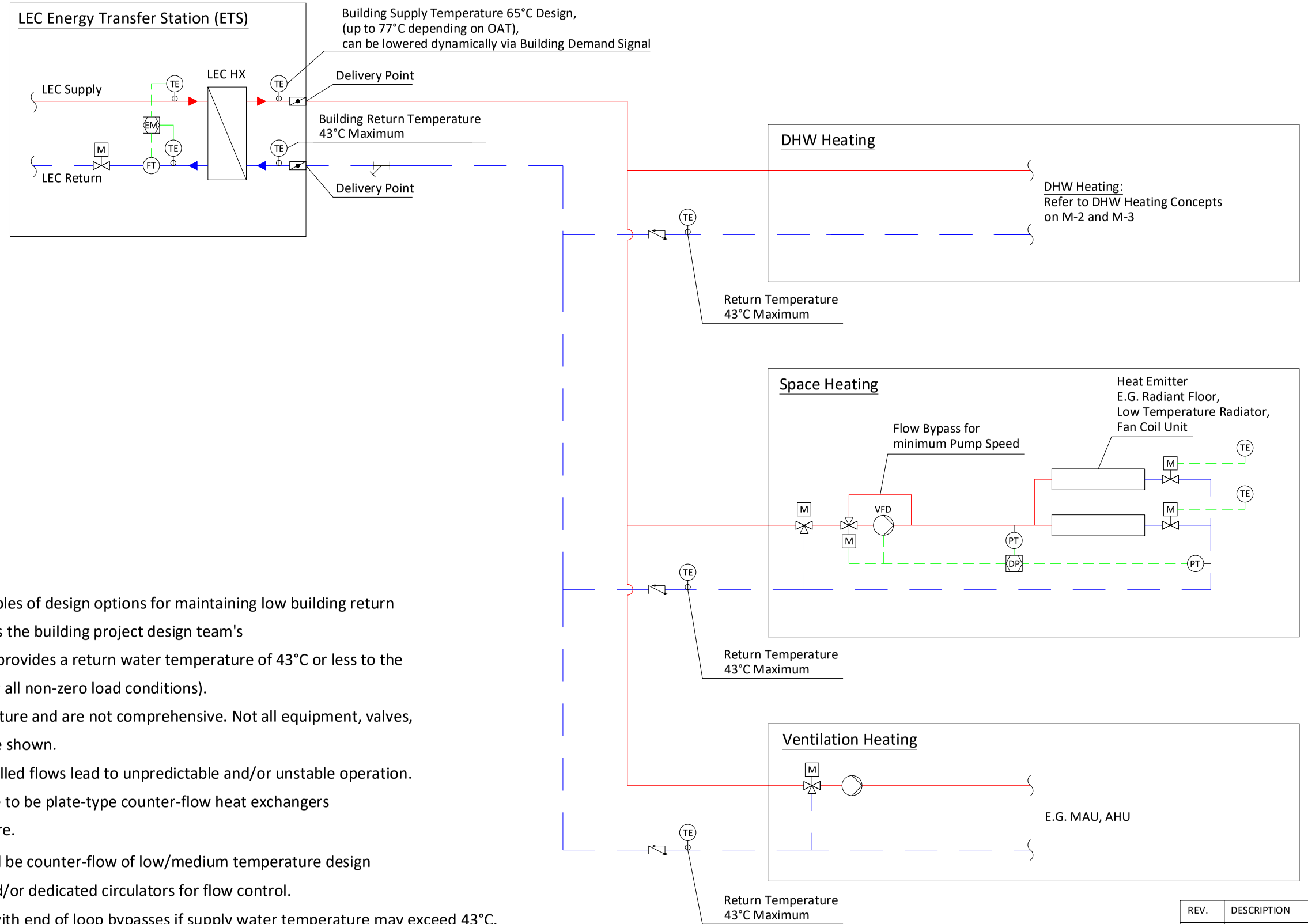
- One 120V/15A circuit with dedicated neutral to our energy transfer station control panel.
    - The power is to be brought into the bottom right of the panel. The exact location is to be coordinated during construction. Lonsdale Energy's electrician will land in the panel.
    - The dedicated circuit in the circuit breaker will be labelled with "Lonsdale Energy".
- Electrical receptacles in the space are to be ground fault circuit interrupters.
- The room must allow for 2 kW heat gain from our equipment. The room temperature must not exceed 35°C.

APPENDIX B: Building Heating Design Examples

M1 General Design Heating Concept

Legend

- Plate Heat Exchanger
- Centrifugal Pump
- Electric Actuator
- 2-way Valve
- 3-way Valve
- Butterfly Valve
- Check Valve
- Y-Strainer
- Temperature Element with well
- Flow Element with Transmitter
- Pressure Transmitter
- Programmable Controller
- Energy Meter
- Pipe Heating
- Pipe DW
- Field Signal Wire



General Design Notes

1. These schematics and notes are examples of design options for maintaining low building return water temperature to the LEC ETS. It is the building project design team's responsibility to design a system that provides a return water temperature of 43°C or less to the LEC ETS at all times of the year (during all non-zero load conditions).
2. These schematics are conceptual in nature and are not comprehensive. Not all equipment, valves, controls, etc. that may be required are shown.
3. All flows must be controlled. Uncontrolled flows lead to unpredictable and/or unstable operation.
4. All water to water heat exchangers are to be plate-type counter-flow heat exchangers to ensure low return water temperature.
5. All heat emitters/terminal units should be counter-flow of low/medium temperature design and must have control/zone valves and/or dedicated circulators for flow control.
6. Supply/return loops cannot be fitted with end of loop bypasses if supply water temperature may exceed 43°C.

Control Notes

1. Provide modulating heating supply temperature set point demand signal (4-20 mA) to LEC ETS control panel. The signal shall vary between no demand and maximum demand as required to satisfy the set point of the active heating loop requiring highest supply temperature (e.g. radiant floor heat set point when DHW is satisfied).
2. PID controllers must be appropriately tuned and deadbands implicated to avoid rapid cycling and unstable operation.

REV.	DESCRIPTION	DATE	BY
1	Issued	2019-12-18	JA
2	Updated	2022-04-12	JA

LONSDALE energy

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Heating Customer Connections

General Design Heating Concept

Drawn: Jacob Allen	DATE 2019-12-18	DWG NO M-1	
Reviewed: Ivan Tang	SCALE n/a	SHEET 1 of 1	REV 2

Legend

- Plate Heat Exchanger
- Centrifugal Pump
- Electric Actuator
- 2-way Valve
- 3-way Valve
- Butterfly Valve
- Check Valve
- Y-Strainer
- Temperature Element with well
- Flow Switch
- Pressure Transmitter
- Programmable Controller
- Pipe
- Field Signal Wire

General Design Notes

1. Heat Interface Units are intended to be installed in each unit to serve that unit. This system employs decentralized instantaneous heating of DHW and does not require any DHW or DHWR distribution. Hydronic buffer tanks should be implemented to reduce peak heating capacity. This type of system is well-suited for hydronic submetering.
2. Refer to notes on M-1.

Example Sequence of Control

Buffer tanks

- P-1 to start when T_H drops below set point
- P-1 to stop when T_L reaches set point

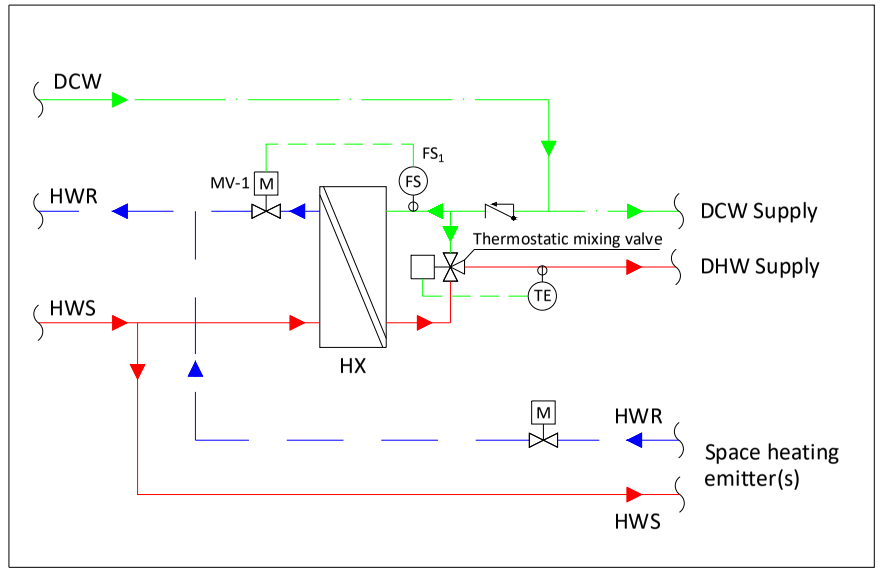
Heating Distribution

When dP drops below set point

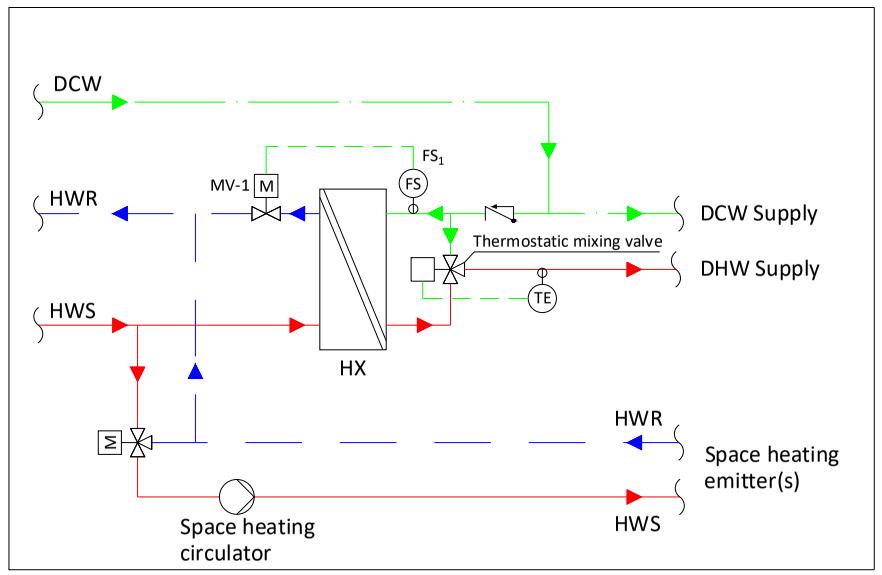
- P-2 starts at minimum speed with MV-1 at minimum setting

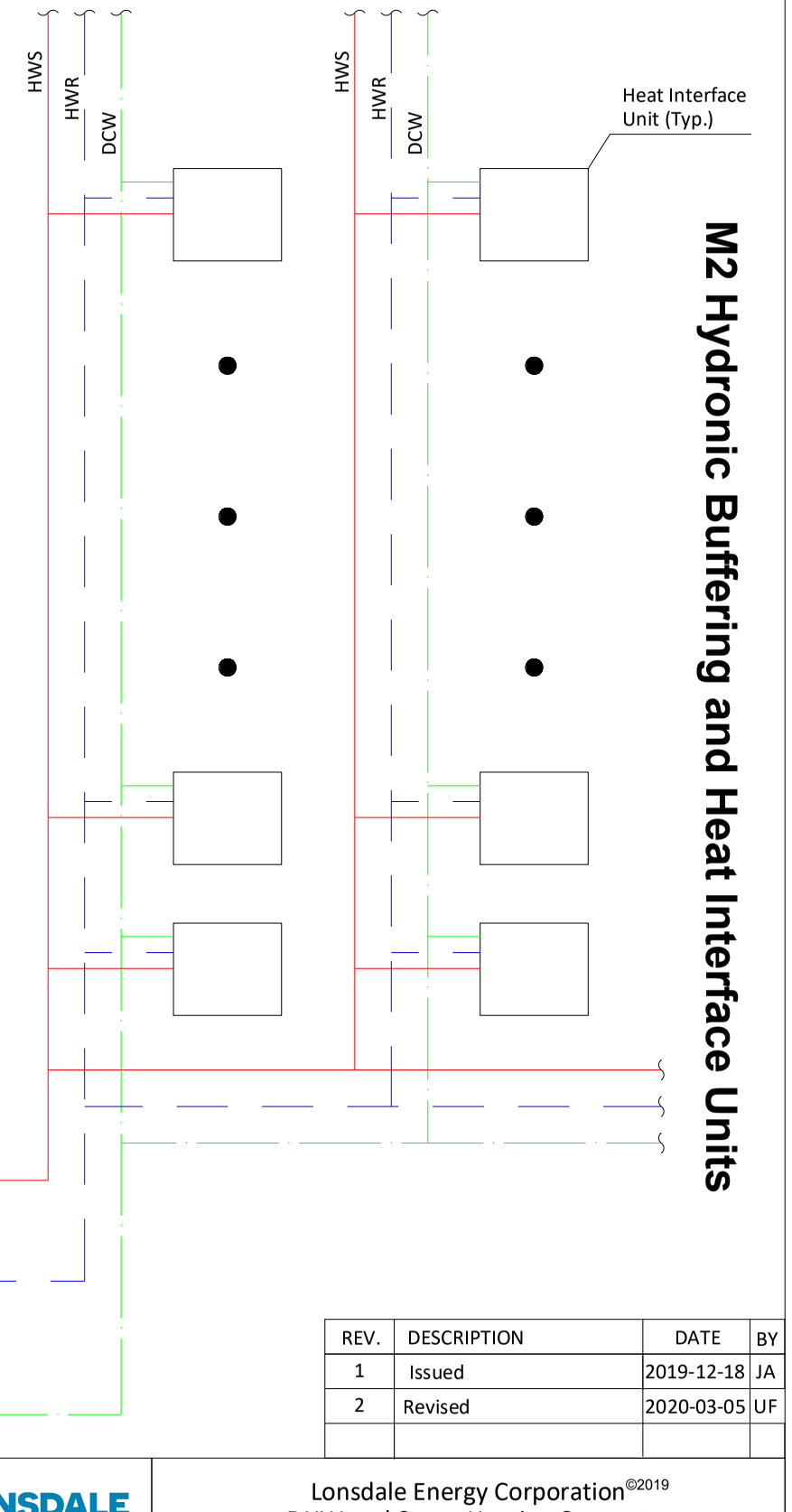
  (maximum flow through pump bypass)
- MV-1 opens to achieve dP set point
- Once MV-1 is at maximum setting, P-2 increases speed to achieve dP set point
- Reverse sequence as necessary to maintain dP set point

Example Heat Interface Units Configuration 1



Example Heat Interface Units Configuration 2





M2 Hydronic Buffering and Heat Interface Units

REV.	DESCRIPTION	DATE	BY
1	Issued	2019-12-18	JA
2	Revised	2020-03-05	UF

LONSDALE energy

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DHW and Space Heating Concept

Hydronic Buffering and Heat Interface Units

Drawn: Jacob Allen	DATE 2019-12-18	DWG NO M-2	
Reviewed: Ivan Tang	SCALE n/a	SHEET 1 of 1	REV 2

Legend

- Plate Heat Exchanger
- Centrifugal Pump
- Electric Actuator
- 2-way Valve
- 3-way Valve
- Butterfly Valve
- Check Valve
- Y-Strainer
- Temperature Element with well
- Flow Switch
- Pressure Transmitter
- Programmable Controller
- Pipe Heating
- Pipe DW
- Field Signal Wire

General Design Notes

1. This system employs the use of scavenging tanks to charge/discharge thermal energy as required to maintain low overall return temperature.

   The scavenging tanks shall be kept as cool as possible as often as possible. Cooler water from the scavenging tank(s) is used for mixing when hydronic return from DHW heating is too warm.

   These tanks are re-cooled from DCW makeup when DHW is demanded. The scavenging tank volume that is required shall be engineered and calculated specifically for the subject building.

2. Refer to notes on M-1.

Example Sequence of Control

DHW Storage Tanks

- P-3 to start when T_H drops below set point
- P-3 to stop when T_L reaches set point

DHW Heating

While P-3 is ON:

- P-1 starts at minimum speed
- PV-1 modulates speed to achieve T_1 set point

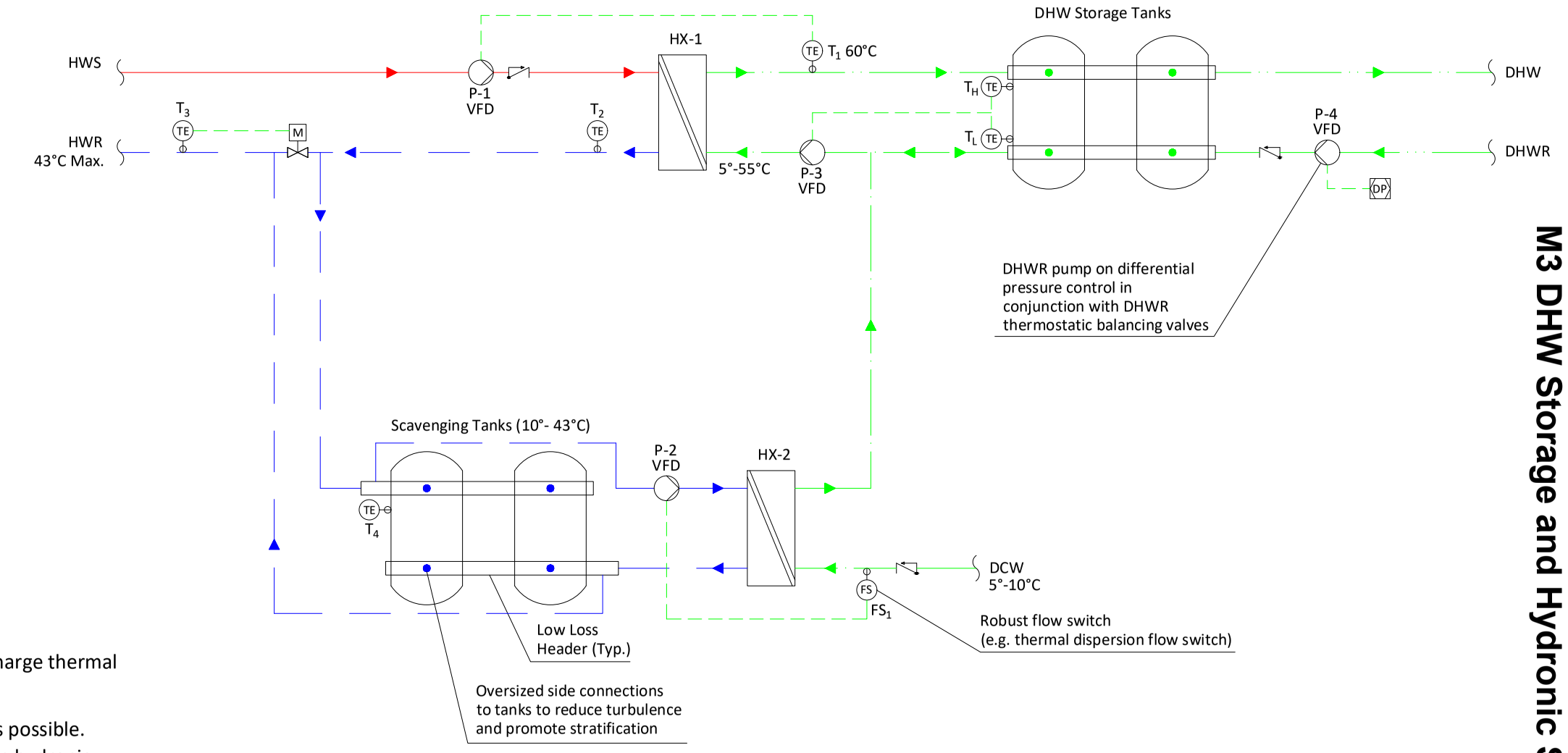
Scavenging

If $T_2 \leq 43°C$, MV-3 is fully open.

If $T_2 > 43°C$, MV-3 modulates to control T3 to 43°C

If Flow is sensed at FS_1, P-2 starts

If no flow is sensed at FS_1, P-2 stops



M3 DHW Storage and Hydronic Side Scavenging

REV.	DESCRIPTION	DATE	BY
1	Issued	2019-12-18	JA
2	Updated	2021-12-14	JA
3	Updated	2022-04-12	JA

LONSDALE energy

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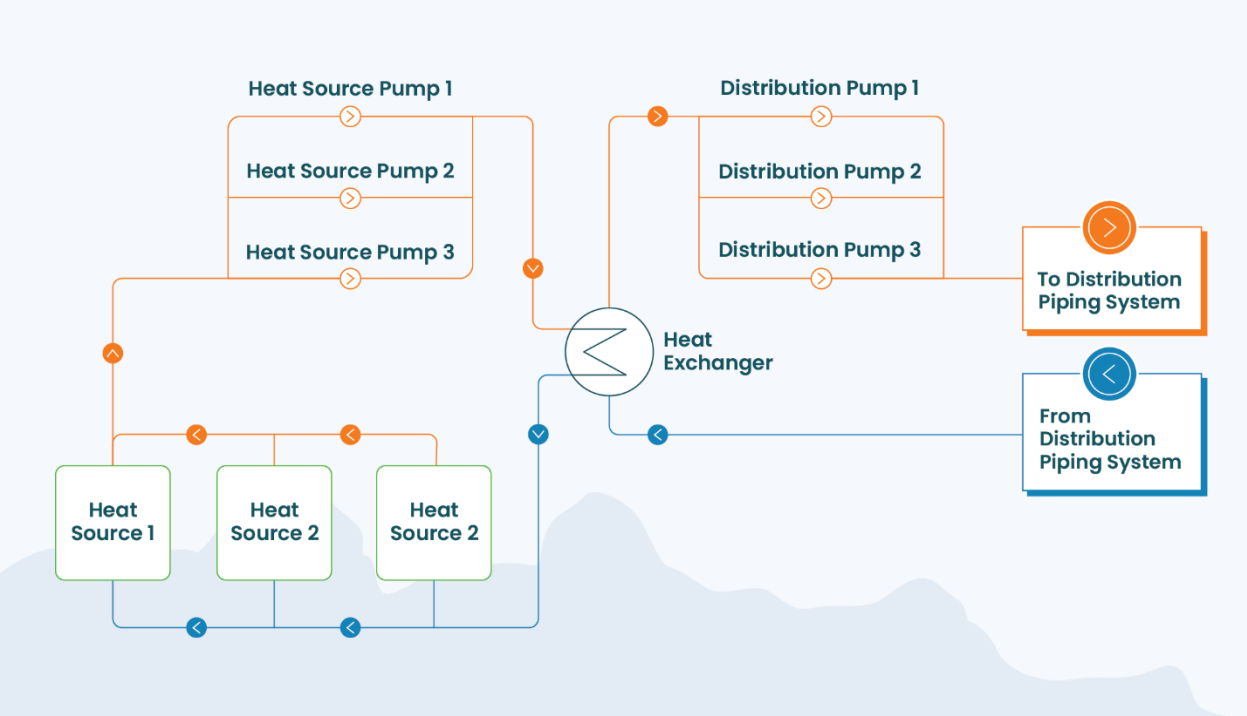
DHW Heating Concept

DHW Storage and Hydronic Side Scavenging

Drawn: Jacob Allen	DATE 2021-09-14	DWG NO M-3	
Reviewed: Ivan Tang	SCALE n/a	SHEET 1 of 1	REV 3

APPENDIX C: Energy Plant Space Requirements



Space and Layout

- The energy plant room should be located near an outside wall, providing easy access to the distribution piping system that will run in the streets and lanes outside the building. If the developer wishes to locate the energy plant room in another location, the developer will be responsible for all additional costs to connect to the distribution piping system.
- The room must have 400 m^2 floor space and a minimum 4.2 m ceiling height including allowance for all heat generating equipment, heat exchangers, meters, controls, pipe work, duct work and related equipment.
- Concrete housekeeping pads are required for thermal energy generation equipment and other mechanical equipment.
- The energy plant room must be sealed to avoid air leakage; walls and ceilings are to be painted white and the floor must be waterproof and sealed.

Fire Protection and Life Safety

- The energy plant room must be fire-rated, according to the BC Building Code.
- The room must contain sprinklers, a venting shaft (if required) and all life safety devices meeting NFPA (National Fire Protection Association) and Building Code standards.

Outdoor Air Ducts

- Louvered openings or intake hoods in the wall or roof and associated space are required to accommodate ducting for outdoor air and exhaust air.
- The energy plant will require two significant louvers for air intake and relief air. While these louvers do not need to be in the wall of the energy plant room, they must be constructed by code to have a fire resistance rating. This enclosure can make the ducts quite large, limiting the ceiling height in the spaces that they run.

Flue Venting (if applicable)

- Insulated and ventilated flue venting shaft terminating at roof level of the building is required. It must be equipped with ladders and platforms for emergency egress and rescue, per our specifications.
- The shaft must be ready for installation of flue venting ducts.
- Flue venting terminations will be in a manner that can be operated at full load without harming buildings, equipment, construction workers, or members of the public. The shaft sizing will be determined by Lonsdale Energy.
- Sleeves through the structure are needed to accommodate flues. The flue venting should not have excessively long horizontal runs (no more than 5 m.) and needs to be vented to the outside. The vents' terminations must be located away from opening windows and outdoor air intakes. Multiple flue vents cannot be combined.
- The developer will notify all stakeholders regarding Lonsdale Energy's plant room and flue venting.

Access

- Adequate access for construction, operation, maintenance, and replacement of equipment must be provided.
- All doors and access hatches must be complete with hardware.
- The energy plant rooms should have easy access to a loading dock (if available) and a wide (double) door or overhead roll up door for the removal or placement of equipment. That means, stairs or standard width corridors are not appropriate.

- All doors to the energy plant room must be lockable. The locks and security system will be provided by Lonsdale Energy.
- The access path from the at-grade loading location to the energy plant room must exhibit minimum clearance dimensions of 8’ wide and 8’ high with adequate structural capacity.

Structural

- Adequate structural capacity (floor and ceiling) must be provided for thermal energy generation equipment, pipe work, heat exchangers, pumps, and related equipment and for construction, operation, maintenance, and replacements. The estimated load for our equipment is 100 psf live load for floor and ceiling. Single loads can be up to 12,000 lb./30 sq. ft.

Electrical Supply

- Electrical conduit and feeders from the main electrical room to the energy plant room are required.
- A separate revenue meter for billing of the electrical service by the electrical utility is required.
- Standard electrical outlets must be provided.
- The minimum electrical capacity as agreed must be provided.
- The main disconnect switch is to be located inside the energy plant room, with the exact location to be coordinated with Lonsdale Energy.

Lighting

- Lighting in the energy plant room and venting shaft lighting and emergency/exit lighting (if required) will be provided.

Floor Drains

- Large floor drains (minimum 6 in.) complete with trap primers at suitable locations are required. A minimum 6 in. sanitary drain connections must be coordinated with Lonsdale Energy.

Natural Gas Supply (if applicable)

- A dedicated 5 psig natural gas service with a gas meter station for delivery of the agreed amount of BTU/h is required. A gas meter station for the energy plant with an

approximate area of 10’ x 15’ will be required for the meter station. The gas meter station should be located near the energy plant room to minimize piping size and length. Natural gas piping shall run through cored or sleeved holes from the meter station into the energy plant room.

City Water Supply

- A minimum 1.5 in. domestic cold-water line complete with isolation valve, minimum 60 psig, is required.

Approvals

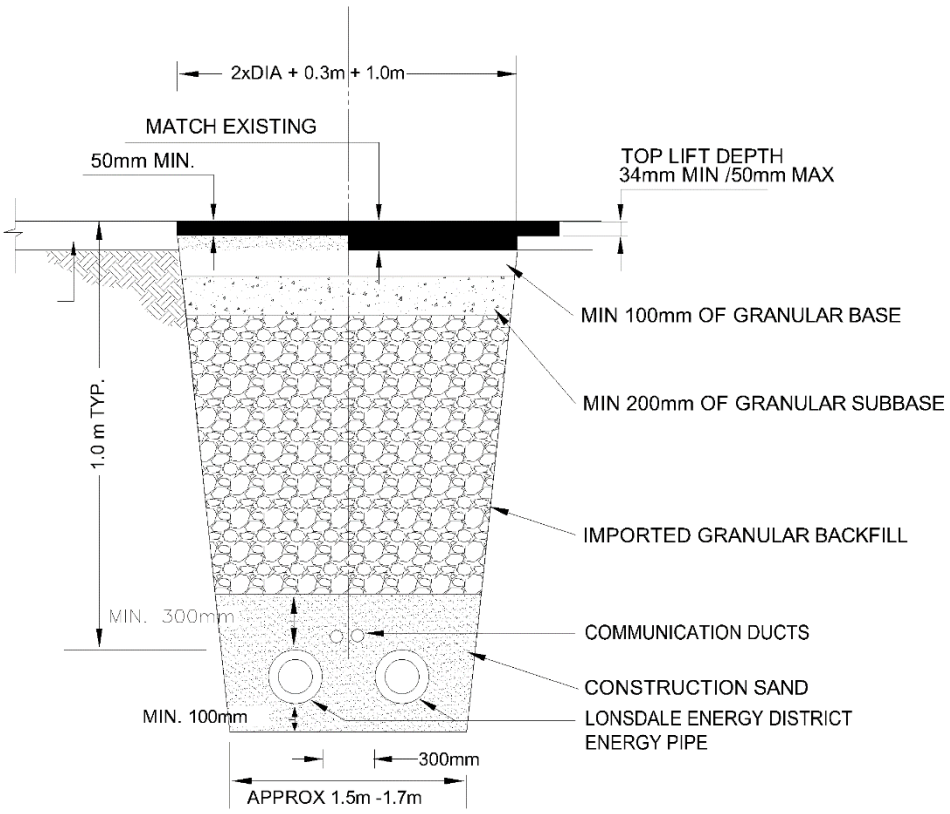
- All legal requirements and documentation are required for the building to operate (e.g., professional approvals, seismic signoffs, occupancy certificates).

Distribution Piping System Requirements

- Civil, mechanical, architectural and landscape plans will show the service connection into the property/building including dimensions from the property line. Civil plans will also show Lonsdale Energy’s distribution system mains for coordination purposes. Mechanical plans will show the proposed coordinated routing of Lonsdale Energy services to the energy transfer station area.

Clearance Requirements

- Permanent structures or objects will not be close to or above Lonsdale Energy’s service connection. Examples include soil cells, trees, large plants, structural elements, stairs, permanent planters, streetlighting and lamp bases, stormwater infiltration facilities, or other utilities. The minimum horizontal clearance from our piping to adjacent buried utilities is 1.5 m. The minimum vertical clearance for utility crossings is 0.3 m. A minimum 1.7 m wide clear corridor is required for the trench.



TRENCH DETAIL

NOT TO SCALE

Penetrations

- The developer is responsible for sealing any penetrations through interior or exterior walls for Lonsdale Energy services, including waterproofing, fireproofing, or smoke sealing. We suggest developers employ a permanent hydrostatic sealing system for our services.
- The developer is responsible for the cost of providing all penetrations through interior or exterior walls for Lonsdale Energy service into the building. The approximate size and location of penetrations must be coordinated prior to construction.
- The developer is responsible for the building design, including structural and architectural considerations. The exact size and location of penetrations are to be field coordinated during construction.

APPENDIX D: PCA Permit Application, Standard Information

PCA Permit Application

Lonsdale Energy Standard Information

Version 3.0, February 3, 2025

15 Chesterfield Pl, North Vancouver
info@lonsdaleenergy.ca | 236-874-0176

1. The proposed development is subject to connection to the Community Energy System in accordance with the Hydronic Energy Service Bylaw (Bylaw No. 7575).

2. All building services heating applications shall be connected to and employ an in-building hydronic heating system served by the Community Energy System, including but not limited to: space heating, ventilation heating, and domestic hot water heating. Other heating energy sources including electricity and natural gas are not permitted and shall not be used for building services applications. This also applies to any commercial spaces on the property. Please contact info@LonsdaleEnergy.ca if there are further questions about the Community Energy System or Lonsdale Energy requirements.

3. The developer shall review Bylaw No. 7575.

4. Refer to Bylaw 7575 for fees and charges related to the Community Energy System and Lonsdale Energy. Also refer to https://www.cnv.org/city-services/lonsdale-energy/about-lec-rates for information on rates and rate structure. Lonsdale Energy strongly recommends that the applicant consider ways to reduce the nominated thermal capacity and thus the associated fees and charges.

5. Refer to Bylaw 7575 for requirements of sub-metering and allocation of hydronic energy fees.

6. The Community Energy Agreement covenant shall be executed prior to Lonsdale Energy signoff on the planning permit application.

7. Civil, mechanical, architectural and landscape site plans shall show the proposed Lonsdale Energy service connection and other utility service connections into the property/building. Civil drawings shall include dimensions from the property line and the proposed invert elevations (0.9m cover typical) for information and coordination. Civil plans shall also show Lonsdale Energy DPS mains for coordination purposes.

8. The Lonsdale Energy service connection into the development shall not be obstructed by permanent objects for reasons of access, construction, inspection, maintenance, and repair. For example: soil cells, trees, large plants, structural elements, stairs, permanent planters, streetlighting and lamp bases, stormwater infiltration facilities, or other utilities shall not be located above or near the Lonsdale Energy service connection or DPS mains. The minimum horizontal clearance from Lonsdale Energy piping to adjacent buried utilities is 1.5m. The minimum vertical clearance for utilities crossings is 0.3m.

9. A dedicated mechanical space for Lonsdale Energy's Energy Transfer Station (ETS) shall be provided. This space should be located directly where the Lonsdale Energy service connection enters the building, on the highest below grade level. A

dedicated ETS room with an out-swinging lockable double door is recommended. If necessary, the space may be located within a building mechanical room with lockable fenced space and a double door wide out-swinging gate provided by the Owner. Access from outside to ETS space to match double door width access.

10. The ETS is provided, owned, and maintained by Lonsdale Energy. An estimated minimum space of 3m x 2.5m x 2.75m high is required (to be confirmed by Lonsdale Energy following the mechanical consultant's total heating load estimate). ETS space shall have double door access or equivalent.

11. Lonsdale Energy strongly suggests locating any centralized in-building mechanical heating equipment (particularly domestic hot water production equipment) directly adjacent to the ETS space to avoid potential temperature performance issues.

12. Architectural plans shall clearly indicate the location of the LEC space for the development permit application.

13. Mechanical plans shall show the proposed and coordinated routing of the interior DPS to the ETS area.

14. Any requested DPS extensions, alternative service connection locations, and alternative ETS locations are subject to Lonsdale Energy review. If deemed feasible by Lonsdale Energy, Lonsdale Energy will recover all associated costs from the Owner at cost plus.

15. Building mechanical rooms shall be adequately sized to accommodate the necessary equipment to adequately serve the building and to operate in compliance with Lonsdale Energy performance requirements, particularly that of maximum heating return water temperature. Consider space for Lonsdale Energy ETS, and clearance space for all equipment maintenance and replacement.

16. The applicant shall notify Lonsdale Energy of the estimated date of heating service and the estimated heating load. A minimum of 18 months' advance notice is required to plan and construct the Lonsdale Energy service connection. Please email info@LonsdaleEnergy.ca.

17. For domestic hot water (DHW) heating, consider using instantaneous DHW heat exchanger stations, one per unit (aka "heat interface units"). This can eliminate DHW and DHW recirculation distribution piping and associated centralized equipment and help to ensure low heating return water temperature to comply with Lonsdale Energy return water temperature performance requirements. It may also

help to reduce ongoing energy usage associated with DHW recirculation heating and standby heat losses.

APPENDIX E: PLN Permit Application, Standard Information

PLN Permit Application

Lonsdale Energy Standard Information

Version 3.0, February 3, 2025

15 Chesterfield Pl, North Vancouver
info@lonsdaleenergy.ca | 236-874-0176

1. The proposed development is subject to connection to the Community Energy System in accordance with the Hydronic Energy Service Bylaw (Bylaw No. 7575).

2. All building services heating applications shall be connected to and employ an in-building hydronic heating system served by the Community Energy System, including but not limited to: space heating, ventilation heating, and domestic hot water heating. Other heating energy sources including electricity and natural gas are not permitted and shall not be used for building services applications. This also applies to any commercial spaces on the property. Please contact info@LonsdaleEnergy.ca if there are further questions about the Community Energy System or Lonsdale Energy requirements.

3. The developer shall review Bylaw No. 7575.

4. Refer to Bylaw 7575 for fees and charges related to the Community Energy System and Lonsdale Energy. Also refer to https://www.cnv.org/city-services/lonsdale-energy/about-lec-rates for information on rates and rate structure. Lonsdale Energy strongly recommends that the applicant consider ways to reduce the nominated thermal capacity and thus the associated fees and charges.

5. Refer to Bylaw 7575 for requirements of sub-metering and allocation of hydronic energy fees.

6. The Community Energy Agreement covenant shall be executed prior to Lonsdale Energy signoff on the planning permit application.

7. Civil, mechanical, architectural and landscape site plans shall show the proposed Lonsdale Energy service connection and other utility service connections into the property/building. Civil drawings shall include dimensions from the property line and the proposed invert elevations (0.9m cover typical) for information and coordination. Civil plans shall also show Lonsdale Energy DPS mains for coordination purposes.

8. The Lonsdale Energy service connection into the development shall not be obstructed by permanent objects for reasons of access, construction, inspection, maintenance, and repair. For example: soil cells, trees, large plants, structural elements, stairs, permanent planters, streetlighting and lamp bases, stormwater infiltration facilities, or other utilities shall not be located above or near the Lonsdale Energy service connection or DPS mains. The minimum horizontal clearance from Lonsdale Energy piping to adjacent buried utilities is 1.5m. The minimum vertical clearance for utilities crossings is 0.3m.

9. A dedicated mechanical space for Lonsdale Energy's Energy Transfer Station (ETS) shall be provided. This space should be located directly where the Lonsdale Energy service connection enters the building, on the highest below grade level. A

dedicated ETS room with an out-swinging lockable double door is recommended. If necessary, the space may be located within a building mechanical room with lockable fenced space and a double door wide out-swinging gate provided by the Owner. Access from outside to ETS space to match double door width access.

10. The ETS is provided, owned, and maintained by Lonsdale Energy. An estimated minimum space of 3m x 2.5m x 2.75m high is required (to be confirmed by Lonsdale Energy following the mechanical consultant's total heating load estimate). ETS space shall have double door access or equivalent.

11. Lonsdale Energy strongly suggests locating any centralized in-building mechanical heating equipment (particularly domestic hot water production equipment) directly adjacent to the ETS space to avoid potential temperature performance issues.

12. Architectural plans shall clearly indicate the location of the LEC space for the development permit application.

13. Mechanical plans shall show the proposed and coordinated routing of the interior DPS to the ETS area.

14. Any requested DPS extensions, alternative service connection locations, and alternative ETS locations are subject to Lonsdale Energy review. If deemed feasible by Lonsdale Energy, Lonsdale Energy will recover all associated costs from the Owner at cost plus.

15. Building mechanical rooms shall be adequately sized to accommodate the necessary equipment to adequately serve the building and to operate in compliance with Lonsdale Energy performance requirements, particularly that of maximum heating return water temperature. Consider space for Lonsdale Energy ETS, and clearance space for all equipment maintenance and replacement.

16. The applicant shall notify Lonsdale Energy of the estimated date of heating service and the estimated heating load. A minimum of 18 months' advance notice is required to plan and construct the Lonsdale Energy service connection. Please email info@LonsdaleEnergy.ca.

17. For domestic hot water (DHW) heating, consider using instantaneous DHW heat exchanger stations, one per unit (aka "heat interface units"). This can eliminate DHW and DHW recirculation distribution piping and associated centralized equipment and help to ensure low heating return water temperature to comply with Lonsdale Energy return water temperature performance requirements. It may also

help to reduce ongoing energy usage associated with DHW recirculation heating and standby heat losses.

18. At the time of Building Permit application, an executed Hydronic Energy Service Agreement and a security deposit are required as conditions for Building Permit signoff. The security deposit is held for a minimum of 18 months following the issuance of the final Certificate of Occupancy. The security is in place to ensure Lonsdale Energy's performance requirements are satisfied. The security will be returned if the requirements are met following the 18-month monitoring period.

19. The mechanical engineer shall notify Lonsdale Energy in writing of the estimated heating load. At the time of Building Permit application, an authenticated Thermal Load Letter is required from the mechanical engineer. The mechanical engineer is to contact Lonsdale Energy prior to design to discuss guidelines and requirements for design and performance of the building heating systems. The letter shall provide breakdowns for each heating end use (e.g. space heating, ventilation heating, DHW heating, pool heating, etc.). Any heating equipment not connected to the Community Energy System shall be described and justified (heating capacity, location, purpose, etc.) and acceptance is subject to Lonsdale Energy review and approval.

20. Lonsdale Energy assumes that one ETS is adequate to service the entire development. As such, Lonsdale Energy would provide one monthly invoice to the Owner. Lonsdale Energy may be able to provide additional ETS or invoices for separate areas of the development; however, additional equipment to facilitate this would be recovered by Lonsdale Energy from the Owner at cost plus and additional space may be necessary.

21. Billing generally commences on the same date as the nominated commencement date for heating service (or cooling service if applicable).

APPENDIX F: Building Permit Checklist

Building Permit Submission Checklist

The following checklist contains standard Building Permit (BP) submission requirements for buildings connected to the City of North Vancouver's community energy system. The following items are required as a minimum, but are not exhaustive. Additional comments will be provided as part of the BP application review.

The Coordinating Registered Professional (CRP) is responsible for completing this checklist. Please email the completed checklist to **info@lonsdaleenergy.ca**. A failure to provide the required information could result in a delay of the permit review and permit issuance.

Building Permit Submission Requirements	Completed
1. General	
1.1. All drawings will be authenticated in accordance with EGBC requirements.	
1.2. All drawings will be submitted following CNV BP submission requirements.	
1.2.1. All revised drawings will be submitted as a full set of drawings with revisions clouded. Indicate revision clouds with a revision triangle & number.	
1.2.2. Do not change page/drawing numbers. If adding additional pages, please number differently.	
2. Architectural	
2.1. Owner is responsible for sealing of any penetrations through interior or exterior walls for Lonsdale Energy's services, including waterproofing, fireproofing, or smoke sealing. Indicate on drawings and provide detail for review.	
2.2. Owner is responsible for the cost of providing penetrations through interior or exterior walls for the Lonsdale Energy service connection. Exact locations to be coordinated with Lonsdale Energy. Indicate on drawings.	
2.3. Indicate proposed Lonsdale Energy service connection location on site plan.	
2.4. Ensure all permanent objects or obstructions are kept 1.5m clear of the proposed Lonsdale Energy service connection (e.g., planters, trees,	

lighting, bicycle parking, soil cells, rain gardens, catch basins, stormwater detention tanks, etc.).	
2.5. Provide dedicated mechanical space for Lonsdale Energy's Energy Transfer Station (ETS). Indicate clear dimensions on drawings.	
2.5.1. An estimated minimum space of 3m x 2.5m x 2.75m high is required (to be confirmed by Lonsdale Energy following receipt of the mechanical consultant's heating load letter).	
2.5.2. Provide either: A dedicated room with out-swinging lockable door, or A lockable fenced space with out-swinging gate located within the building mechanical room.	
2.6. Provide section through Lonsdale Energy space. Indicate clear dimensions on drawings.	
2.7. Ensure proposed interior Lonsdale Energy piping is coordinated with all other services.	
2.8. For level and location where proposed Lonsdale Energy service connection is to enter the building, confirm the following elevations.	
2.8.1. Finished floor.	
2.8.2. Ceiling.	
2.9. Email the following AutoCAD files to Lonsdale Energy:	
2.9.1. Parkade levels	
2.9.2. Grade level	
2.9.3. N-S section through Lonsdale Energy space	
2.9.4. E-W section through Lonsdale Energy space	
3. Civil	
3.1. Show Lonsdale Energy distribution piping and proposed service connection in plan and profile, and all existing and proposed utilities.	
3.2. Ensure Lonsdale Energy distribution piping and proposed service connection are coordinated with other utilities and service connections.	
3.2.1. Provide 1.5m clear separation between Lonsdale Energy service connection and other service connections.	
3.2.2. Minimum vertical clearance for utilities crossings is 0.3m.	
3.2.3. Minimum 1.7m wide clear corridor required for Lonsdale Energy trench.	
3.2.4. Note inverts at all crossovers.	
3.3. Ensure all permanent objects or obstructions are kept 1.5 m clear of proposed Lonsdale Energy service connection (e.g., lighting, soil cells, rain gardens, catch basins, stormwater detention tanks, etc.).	
3.4 Include the following text in drawings: *Please see Lonsdale Energy's pipe requirements:* *If the developer's contractor exposes Lonsdale Energy's pipes, the*	

developer's contractor must backfill pipes per standards (including temporary protection from granular bedding material being washed out) with compacted (Sechelt) sand and proper imported backfill material as per the trench detail as it is/was submitted to them. Note, to have sand available at the construction site at the time of exposing pipes. *Photos and inspection report of backfilling pipes must be provided by the developer's civil engineer. If the contractor doesn't backfill open pipes as per Lonsdale Energy's request, the developer may be held responsible for any broken equipment related within or around Lonsdale Energy's system.* *Contractor will only use hydro-vac equipment (hydro-vacuum truck) for excavation. Lonsdale Energy pipes are 2, pre-insulated steel pipes carry pressurized hot water, generally running along with RPVC communication conduits (2 of Lonsdale Energy's communication conduits). The pre-insulated pipes must be fully embedded (surrounded) in 300mm (Sechelt) sand compacted to 95% Modified Proctor Density. Follow geotechnical recommendations on how to properly embed the pipes with the sand.* *Once Lonsdale Energy's pipes are exposed, Lonsdale Energy is not liable for any bodily injury or company/personal property damage working around pipes. No person is allowed to step on pipes and touch the pipes with bare hands.* *Contractor must contact Lonsdale Energy at 236-874-0176 or info@lonsdaleenergy.ca 72 hours (minimum) prior to start of work.* *If a civil contractor installs a drainpipe (perforated pipe) or storm water infiltration/exfiltration system / soil cells crossing Lonsdale Energy's trench, or the drainpipe/drainage system is in the vicinity Lonsdale Energy's pipes (6.0m within pipes), the contractor must make sure that the trench is not compromised.* *The storm pipe crossing Lonsdale Energy's trench must be a solid pipe. The trench must be protected from storm water drainage/ exfiltration/ infiltration system. The contractor must use non-permeable PVC cloth/membrane (or similar approved equivalent product) to prevent any percolation from the exfiltration/infiltration system. Photos and inspection report of backfilling Lonsdale Energy's pipes must be provided by the developer's civil engineer.* *Lonsdale Energy's pipes require compacted sand around the pipes for protection and thermal restraint.*	

3.5. Provide the following AutoCAD files:	
3.5.1. Topographic survey plans.	
3.5.1.1. Offsite.	
3.5.1.1.1. Roads.	
3.5.1.1.2 Municipal corridor.	
3.5.1.2. Onsite (if the proposed Lonsdale Energy service connection is extended on site).	
3.5.2. Civil drawings.	
3.5.2.1. Key plan	
3.5.2.2. Site servicing plan	
3.5.2.3. Roadworks	
3.5.2.4. Watermain	
3.5.2.5. Sanitary	
3.5.2.6. Storm	
3.5.3. All proposed third-party utilities	
3.6. Developer is responsible for the final trench restoration including mill and overlay and road marking. This should be done as part of the off-site civil work or at anytime upon request by City forces. Provide note on drawings.	
3.7. Developer and its contractors/subcontractors are required to facilitate and follow Lonsdale Energy's traffic management plan during Lonsdale Energy construction. Failure to do so will make developer solely responsible and liable for all additional costs resulting from any construction delays. Provide note on drawings.	
3.8. Developer is responsible to provide Lonsdale Energy with all the approved and proposed third-party utility designs to avoid potential conflicts with Lonsdale Energy's district energy connection alignment. Failure to provide this information, will make the developer responsible and liable for all the additional cost including design changes, extra materials, and construction delays to resolve such conflicts resulting from approved and proposed third-party utility designs. Note that this is additional to the agreed-upon recoverable cost.	
4. Landscape	
4.1. Indicate proposed Lonsdale Energy service connection location on site plan.	
4.2. Ensure all permanent objects or obstructions are kept 1.5m clear of proposed Lonsdale Energy service connection (e.g., planters, trees, lighting, rain gardens, etc.).	

4.3. Ensure Lonsdale Energy's installed valves and junction boxes are not buried by landscaping. Valves and junction boxes will be kept visible and accessible for future maintenance. Provide note on drawings.	
5. Mechanical	
5.1. Indicate proposed Lonsdale Energy service connection on site plan and appropriate floor plan.	
5.2. Indicate Lonsdale Energy heat exchanger on appropriate floor plan.	
5.3. Owner is responsible for the cost of providing housekeeping pad for Lonsdale Energy equipment. Indicate on appropriate plan. Exact size and location to be field coordinated.	
5.4. Ensure proposed interior Lonsdale Energy piping is coordinated with all other mechanical services.	
5.5. Indicate on drawings a clear path to install/access/remove Lonsdale Energy equipment.	
5.6. Provide ventilation for Lonsdale Energy room/space. Allow for 2 kW heat gain from Lonsdale Energy equipment standby losses. Room temperature not to exceed 35C. Provide calculations for review.	
5.7. Lonsdale Energy room/space is dedicated to Lonsdale Energy equipment. Keep all other equipment clear of this space unless required by code. Any items required by code are to be fully coordinated with Lonsdale Energy prior to construction. Provide note on drawings accordingly.	
5.8. Confirm there is sufficient space for building mechanical equipment. An estimated minimum space of 3m x 2.5m x 2.75m high is required for the Lonsdale Energy equipment (to be confirmed by Lonsdale Energy following the mechanical consultant's total heating load estimate).	
5.9. Provide dedicated strainer on building common heating water return piping back to Lonsdale Energy ETS. Locate outside of Lonsdale Energy room/space.	
5.10. Maximum building supply water temperature provided by Lonsdale Energy ETS is 65°C.	
5.11. Maximum building return water temperature permitted is 43°C.	
5.12. Provide building permit drawings complete for their intended purpose with sufficient detail. For example:	
5.12.1. Schematics,	
5.12.2. Riser diagrams,	
5.12.3. Mechanical room plans,	
5.12.4. Equipment schedules,	
5.12.5. Specifications, and	
5.12.6. Sequence of operations for all heating systems including domestic water heating, space heating, ventilation heating, etc.	

6. Electrical	
6.1. Provide one 120V/15A circuit with dedicated neutral to Lonsdale Energy room for Lonsdale Energy control panel.	
6.1.1. Bring power into bottom right of panel (coordinate with Lonsdale Energy on site).	
6.1.2. Lonsdale Energy electrician will land in panel. Label dedicated circuit in circuit breaker with “Lonsdale Energy”.	
6.2. Receptacles located in Lonsdale Energy room are to be Ground Fault Circuit Interrupter (GFCI) type.	
6.3. Ensure proposed interior Lonsdale Energy piping is coordinated with all electrical services.	
7. Structural	
7.1. Indicate proposed Lonsdale Energy service connection location.	
7.2. Provide note on drawings to “coordinate coring and/or block-out locations for Lonsdale Energy service connection with Lonsdale Energy.”	

Please provide the contact information for each consultant listed below.

Architectural Consultant	
Company	
Primary Contact	
Email	
Phone	
Civil Consultant	
Company	
Primary Contact	
Email	
Phone	
Landscape Consultant	
Company	
Primary Contact	
Email	
Phone	
Mechanical Consultant	
Company	
Primary Contact	

Email	
Phone	
Electrical Consultant	
Company	
Primary Contact	
Email	
Phone	
Structural Consultant	
Company	
Primary Contact	
Email	
Phone	

Declaration:

I have completed this checklist and provided all requested information to the best of my knowledge.

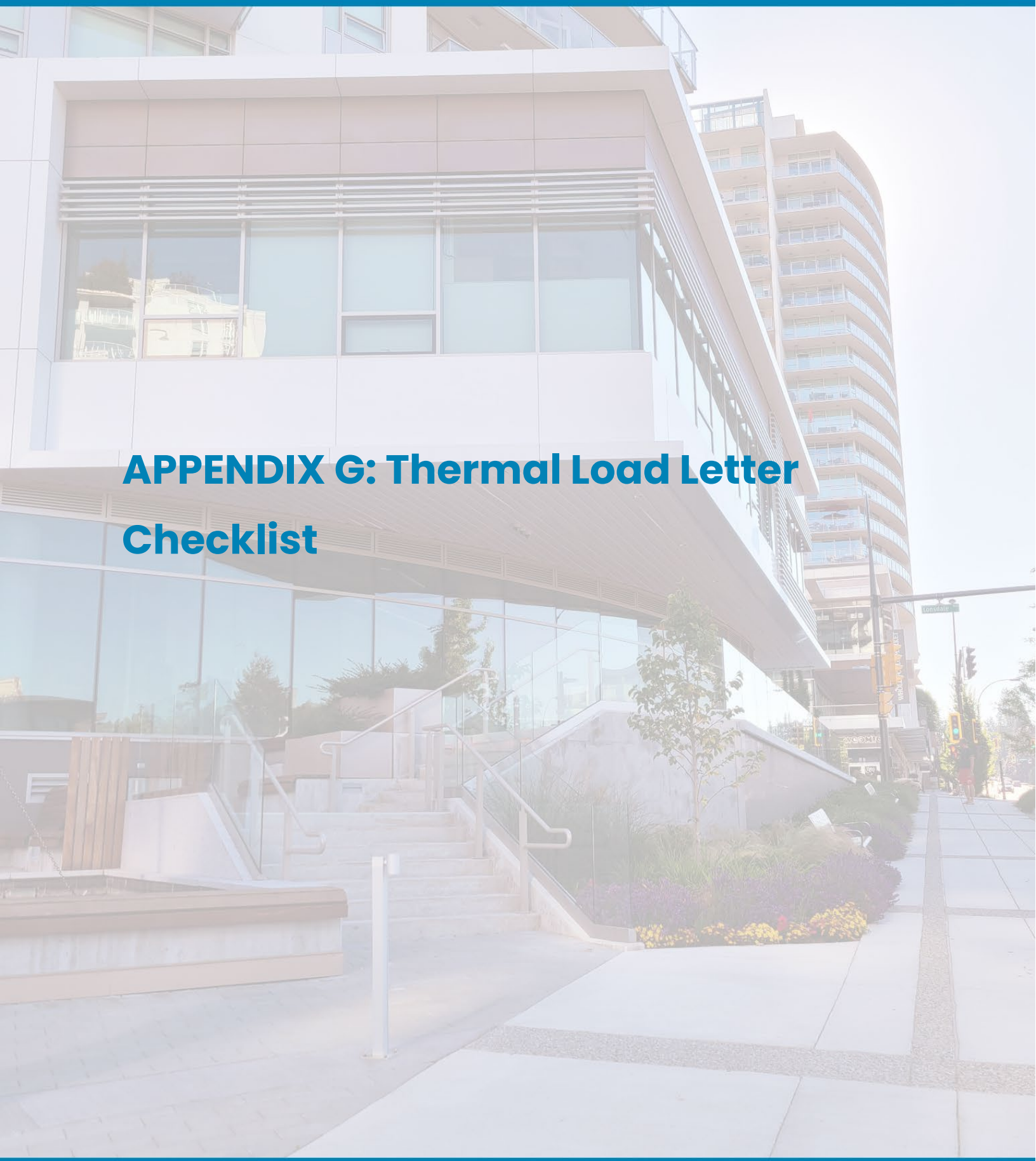
Signature _____

Name _____

Title _____

Company _____

Date _____



APPENDIX G: Thermal Load Letter Checklist

Thermal Load Letter and Checklist

A developer's mechanical engineer is required to complete the following checklist and provide a thermal load letter to Lonsdale Energy. Please submit the letter and completed checklist to **info@lonsdaleenergy.ca**. A draft may be submitted to Lonsdale Energy for review prior to final submission.

The thermal load letter, signed and sealed, will describe all thermal heating and cooling loads as determined based on ASHRAE standards, including those not connected to the community energy system (e.g. electric heating, heat pumps).

Important: The thermal heating load, as nominated by the mechanical engineer, will be used to calculate the upfront service connection fee and a component of the monthly service charge to the customer. Correct and detailed determination of the nominated thermal heating load is strongly recommended. Consider design changes that could result in a lower thermal heating load (e.g. improved building envelope performance, thermal energy storage) to improve efficiency and decrease associated fees and charges.

Submission Requirements

Thermal heating and cooling loads provided; based on ASHRAE standards.	☐
Heating loads (separately, in kW) for each heating end-use (e.g. space heating, ventilation heating, domestic water heating, etc.)	☐
Total heating load (in kW)	☐
Commercial and residential heating load for each heating end-use, listed separately and combined.	☐
Detailed functional description of each heating system (e.g. space heating, ventilation heating, domestic water heating, etc.)	☐
Breakdown of the total unconnected load in a schedule stating location (load in kW) and justification for unconnected load. Include any heat pumps and method of heating mode lockout.	☐
Load letter authenticated in accordance with Engineers and Geoscientists British Columbia (EGBC) requirements.	☐

Applicant

Developer:		Mechanical Consultant:	
Name:		Name:	
Date:		Date:	

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