



**Townhouse Rezoning Applications:
Policy for Energy Efficiency and
Renewable Energy Systems**

**No.: DEVAPPS-07
Date: 2017-01-10**

Purpose:

To inform Townhouse Rezoning applicants of the options available under Section 12.4, Objective 3 of the 2041 Official Community Plan (OCP) which sets out the City of Richmond's policy to improve townhouse energy efficiency and renewable energy systems.

Background:

In 2014, the City of Richmond adopted OCP Policy 12.4, Objective 3 which calls for improved energy efficiency and/or on-site renewable energy systems in all new townhouse rezoning applications. The policy was revised on July 20, 2015 with four distinct options by which proposed rezonings for new townhouse developments can meet Council's goal of achieving a high level of energy efficiency.

Implementation:

All applications to rezone properties to allow for new townhouse development are required to identify which of the following four options will be selected for the proposed townhouse development.

- **Option 1: District Energy (DE)** – Design and build the proposed development so that all units connect to a district energy utility.
- **Option 2: EnerGuide 82 (E82)** – Design and build each proposed townhouse unit so that it scores 82 or higher on the EnerGuide rating 0-100 scale as assessed by a HOT2000 building energy model.
- **Option 3: Energy Star for New Homes (ESNH)** – Design and build each proposed townhouse unit so that it meets the Energy Star for New Homes Standard. This standard can be achieved by either the Performance or the Prescriptive compliance pathways.
- **Option 4: On-site Renewable Energy (RE)** – Design and build the townhouse development such that industry-proven renewable energy systems installed on-site are sufficient to provide at least 51% of the of heating, cooling and/or electrical energy load requirements of the proposed development.

Attachments to this bulletin describes the applicant submission requirements and processes associated with these options, and provide guidelines for documenting energy efficiency upgrades and requirements of the Solar Hot Water Ready regulation on building plans.

See over →

Process Summary:

	District Energy	EnerGuide 82	Energy Star for New Homes	>50% On-site RE
Rezoning (RZ) and Development Permit (DP) process				
Prior to RZ staff report to Planning Committee	Proponent informs Development Applications staff of commitment to build to a specific option under OCP Policy 12.4, Objective 3.	Proponent informs Development Applications staff of commitment to build to a specific option under OCP Policy 12.4, Objective 3.	Proponent informs Development Applications staff of commitment to build to a specific option under OCP Policy 12.4, Objective 3.	Proponent informs Development Applications staff of commitment to build to a specific option under OCP Policy 12.4, Objective 3.
Prior to DP staff report to Planning Committee	Proponent contracts Engineer to provide [project feasibility study].	Proponent contracts EA to provide Building Energy Report.	Proponent contracts EA to provide Building Energy Report.	Proponent contracts Engineer to provide [project feasibility study].
Prior to for rezoning adoption/ Development Permit issuance	<ul style="list-style-type: none"> General Manager, Engineering & Public Works signs off on project design. Staff incorporates district energy commitments into a legal agreement. 	<ul style="list-style-type: none"> General Manager, Engineering & Public Works signs off on Building Energy Report. Staff incorporates energy efficiency upgrade commitments specified in the accepted Building Energy Report into a legal covenant on land title. 	<ul style="list-style-type: none"> General Manager, Engineering & Public Works signs off on Building Energy Report. Staff incorporates energy efficiency upgrade commitments specified in the accepted Building Energy Report into a legal covenant on land title. 	<ul style="list-style-type: none"> General Manager, Engineering & Public Works signs off on project design. Staff incorporates renewable energy and energy efficiency upgrade commitments into legal agreement.
Building Permit (BP) process				
Prior to issuance of Building Permit	<ul style="list-style-type: none"> Engineer/Registered professional incorporates DEU connection commitments into building plans. Staff reviews and accepts building plans. 	<ul style="list-style-type: none"> Proponent documents energy efficiency upgrade commitments on building plans. Staff reviews and accepts building plans. 	<ul style="list-style-type: none"> Proponent documents energy efficiency upgrade commitments on building plans. Staff reviews and accepts building plans. 	<ul style="list-style-type: none"> Engineer/Registered professional incorporates renewable energy/energy efficiency commitments into building plans. Staff reviews and accepts building plans.
Prior to issuance of Final Occupancy Permit	<ul style="list-style-type: none"> City designs and installs the on-site energy transfer station and service connection piping (at cost to developer). City ensures energy efficiency upgrades are fully installed and operating nominally. 	<ul style="list-style-type: none"> Proponent installs energy efficiency upgrade per commitments made. EA certifies that energy efficiency upgrades are fully installed and operating nominally. Staff reviews and accepts EA report. 	<ul style="list-style-type: none"> Proponent installs energy efficiency upgrade per commitments made. EA certifies that energy efficiency upgrades are fully installed and operating nominally. Staff reviews and accepts EA report. 	<ul style="list-style-type: none"> Proponent installs energy efficiency upgrade per commitments made. Coordinating Responsible Professional certifies that energy efficiency upgrades are fully installed and operating nominally.



Option 1: District Energy (DE)

Design and build the proposed development so that all units connect to a district energy utility.

Note: Applicants will be required to connect to a district energy utility if the property is located within an existing District Energy Service Area. All existing City of Richmond District Energy Bylaws and regulations will be applicable.

Note: New townhouse developments proposed under the District Energy option are not required to meet the requirements of the BC Solar Hot Water Ready regulation.

Rezoning and Development Permit Process

Prior to the preparation of the staff report regarding the rezoning application:

Applicants meeting the City’s policy for energy efficiency and renewable energy systems by means of the DE option will be required to commit to this option prior to the preparation of the staff report regarding the rezoning application.

Properties located outside an existing District Energy Service Area that want to connect to a District Energy Utility system are required to complete, at their own cost and in a form satisfactory to the General Manager, Engineering & Public Works, an economic feasibility study analyzing the required extension of the existing system to service their property. Connection approval will be based on the results of this study, as determined by the General Manager, Engineering & Public Works. Additional fees and charges may be required including potential infrastructure costs. All existing City of Richmond District Energy Bylaws and regulations will be applicable.

Prior to fourth reading of the rezoning application:

All upgrade measures (including minimum performance specifications) identified above, as well as servicing agreements shall be secured through legal agreements before the rezoning bylaw is considered for adoption.

All of the components of the district energy system (with their minimum performance specifications) listed in the report shall be included on the relevant building plans for the proposed development.

To find out more about the District Energy option for new townhouse developments, please contact Kevin Roberts, Project Engineer (District Energy) at KRoberts@richmond.ca or 604-204-8512.

Option 2: EnerGuide 82 (E82)

Design and build each proposed townhouse unit so that it scores 82 or higher on the EnerGuide Rating System as assessed by a building energy model.

Rezoning and Development Permit Process

Prior to the preparation of the staff report regarding the rezoning application:

Applicants shall commit to meeting the requirements of the City policy. It is not necessary to select between the E82 and the ESNH options at this stage.

Prior to fourth reading of the rezoning application:

Applicants will be required to commit to either the E82 or the ESNH option.

Applicants choosing the E82 option shall commit to designing and building a townhouse development in which all units score 82 or higher on the EnerGuide rating 0-100 scale, as assessed by Version 10.51 of the HOT2000 building energy model. In addition all units are to meet the requirements of the BC Solar Hot Water Ready Regulation.

Applicants shall submit a Building Energy Report, prepared by a Certified Energy Advisor in good standing, which includes the following content:

- Information on the proposed development;
- The energy performance of one or more modelled units in the proposed development, if built to building code minimum requirements (Base Case). If only one unit in the proposed development is modelled, the unit modelled must have the poorest Base Case energy performance of all those in the proposed development;
- At least one set of well-defined energy efficiency upgrades (i.e. all measures with specifications in excess of minimum BC Building Code requirements for energy efficiency) that are proposed for units in the proposed development;
- What the energy performance of each modelled unit in the proposed development would be if it incorporated each identified set of energy efficiency upgrades, (Policy Compliance Case);
- A site plan of the proposed development, identifying the specific units modelled;
- Full HOT2000 reports for the Base Case and each Policy Compliance Case for each unit, included as appendices.

All energy modelling is to be done by a Certified Energy Assessor in good standing, reporting to a Service Organization currently licenced by NRCan to deliver the EnerGuide program. The EA shall use Version 10.51 of the HOT2000 building energy modelling program to assess the energy performance of the modelled units. The energy performance of the modelled units shall be reported out in terms of the EnerGuide rating 0–100 scale (i.e. EnerGuide Rating System v.15).

The Building Energy Report and appendices submitted must be satisfactory to the General Manager, Engineering & Public Works.

Before the rezoning bylaw is considered for adoption, the beyond-code energy efficiency upgrades listed in the approved Building Energy Report shall be included as a restrictive covenant registered on land title.

A detailed checklist for the content of a Building Energy Report is included as *Appendix B*.

A mock example of an EnerGuide 82 Building Energy Report is included as *Appendix E*.

Building Permit Process

Prior to issuance of the Building Permit:

Applicants shall ensure that the Building Plans for the proposed development include appropriate documentation of all measures described in the City-approved EnerGuide 82 Building Energy Report for the development.

- All upgrade measures in the identified set of upgrades to be installed shall be listed on the front sheet of the plans.
- Each upgrade measure, together with its minimum performance specifications, shall also be noted on each relevant sheet of the plans.
- The building plans must be satisfactory to the General Manager, Engineering & Public Works.

Guidance on documenting beyond-code energy efficiency upgrades on building plans is included as *Appendix C*.

Applicants shall ensure the Building Plans are in accord with the BC Solar Hot Water Ready regulation.

- For each unit in the proposed development, the plans shall identify:
 - An area on a flat roof, or a south-facing, east-facing or west-facing roof of the required area and dimension allowing for the future installation of solar collectors;
 - The location of the conduit runs specified in in the regulation;
 - The Building Plans shall also note minimum roof truss requirements noted in the regulation for roof areas designated for the future installation of solar collectors.

Guidance on implementing the BC Solar Hot Water Ready Regulation is included as *Appendix D*.

Prior to award of final Occupancy Permit (Construction phase):

The EA shall confirm by means of a signed, written document that:

- All components of a set of upgrades identified in the EnerGuide 82 Building Energy Report have been installed;
- The minimum performance specifications provided in the EnerGuide 82 Building Energy Report and on the building plans and on have been met;
- The upgrades are operating as intended.

In the case of an air-tightness target, the EA shall confirm by means of blower-door tests on a random sample of not less than 5 units, or 15% of the units in the development (whichever is greater), that the air-tightness target has been met.

To find out more about the EnerGuide 82 option for new townhouse developments, please contact Nicholas Heap, Sustainability Project Manager at NHeap@richmond.ca or 604-276-4267.

Option 3a: Energy Star for New Homes (ESNH) – Performance Pathway

Design and build each proposed townhouse unit so that it meets the Energy Star for New Homes Standard.

Rezoning and Development Permit Process

Prior to the preparation of the staff report regarding the rezoning application:

Applicants shall commit to meeting the requirements of the City policy. It is not necessary to select between the E82 and the ESNH options at this stage.

Prior to fourth reading of the rezoning application:

Applicants will be required to commit to either the E82 or the ESNH option.

Applicants choosing the ESNH option shall commit to designing and building a townhouse development in which all units meet or exceed the requirements to achieve the Energy Star for New Homes standard (Version 12.6), and meet the requirements of the BC Solar Hot Water Ready Regulation.

Applicants shall submit a Building Energy Report, prepared by a Certified Energy Advisor in good standing that includes the following content:

- Information on the proposed development;
- The energy performance of one or more modelled units in the proposed development, if built to building code minimum requirements (Base Case). If only one unit in the proposed development is modelled, the unit modelled must have the poorest Base Case energy performance of all those in the proposed development;
- All mandatory upgrades in the Energy Star for New Homes standard, including minimum performance specifications for these upgrades;
- If required, all additional beyond-code elements proposed such that the modelled unit achieves an EnerGuide score of 81 (as assessed by HOT2000 v10.51 software) including minimum performance specifications for these upgrades;
- The EnerGuide score for each modelled unit in the proposed development with all of the upgrades installed (policy compliance case);
- A site plan of the proposed development, identifying the specific units modelled;
- Full HOT2000 reports for the Base Case and each Policy Compliance Case for each unit, included as appendices.

All energy modelling is to be done by a Certified Energy Assessor in good standing, reporting to a Service Organization currently licenced by NRCAN to deliver the EnerGuide for New Houses rating system. Version 10.51 of the HOT2000 building energy modelling program shall be used to assess the energy performance of the modelled units. The energy performance of the modelled units shall be reported out in terms of the EnerGuide rating 0–100 scale (i.e. EnerGuide Rating System v.15).

The Building Energy Report and appendices submitted must be satisfactory to the General Manager, Engineering & Public Works.

Before the rezoning bylaw is considered for adoption, the beyond-code energy efficiency upgrades listed in the approved Building Energy Report shall be included as a restrictive covenant registered on land title.

A detailed checklist for the content of a Building Energy Report is included as *Appendix B*.

Building Permit Process

Prior to issuance of the Building Permit:

Applicants shall ensure that the Building Plans for the proposed development include appropriate documentation of all measures described in the City-approved Building Energy Report for the development.

- All upgrade measures in the identified set of upgrades to be installed shall be listed on the front sheet of the plans.
- Each upgrade measure, together with its minimum performance specifications, shall also be noted on each relevant sheet of the plans.
- The building plans must be satisfactory to the General Manager, Engineering & Public Works.

Guidance on how to document beyond-code energy efficiency upgrades on building plans is included as *Appendix C*.

Applicants shall ensure the Building Plans are in accord with the BC Solar Hot Water Ready regulation.

- For each unit in the proposed development, the plans shall identify:
 - An area on a flat roof, or a south-facing, east-facing or west-facing roof of the required area and dimension allowing for the future installation of solar collectors;
 - The location of the conduit runs specified in in the regulation;
 - The Building Plans shall also note minimum roof truss requirements noted in the regulation for roof areas designated for the future installation of solar collectors.

Guidance on the interpretation of the BC Solar Hot Water Ready Regulation is included as *Appendix D*.

Prior to award of final Occupancy Permit (Construction phase):

The EA shall confirm by means of a signed, written document that:

- All components of a set of upgrades identified in the Building Energy Report have been installed;
- The minimum performance specifications provided in the Building Energy Report and on the building plans and on have been met;
- The upgrades are operating as intended.

In the case of an air-tightness target, the EA shall confirm by means of blower-door tests on a random sample of not less than 5 units, or 15% of the units in the development (whichever is greater), that the air-tightness target has been met.

To find out more about the District Energy option for new townhouse developments, please contact Nicholas Heap, Sustainability Project Manager at NHeap@richmond.ca or 604-276-4267.

Option 3b: Energy Star for New Homes (ESNH) – Prescriptive Pathway

Design and build each proposed townhouse unit so that it meets the Energy Star for New Homes Standard.

Rezoning and Development Permit Process

Prior to the preparation of the staff report regarding the rezoning application:

Applicants shall commit to meeting the requirements of the City policy. It is not necessary to select between the E82 and the ESNH options at this stage.

Prior to fourth reading of the rezoning application:

Applicants will be required to commit to either the E82 or the ESNH option.

Applicants choosing the ESNH option shall commit to designing and building a townhouse development in which all units meet or exceed the requirements to achieve the Energy Star for New Homes standard, and meet the requirements of the BC Solar Hot Water Ready Regulation.

Applicants shall submit a Building Energy Report, prepared by a Certified Energy Advisor in good standing that includes the following content:

- Information on the proposed development;
- All mandatory upgrades in the Energy Star for New Homes standard, including minimum performance specifications for these upgrades;
- The total number of Builder Option Points required;
- All Builder Option Points upgrades selected for inclusion in the proposed development, noting the points associated with each upgrade, and including minimum performance specifications for these upgrades.

The Building Energy Report and appendices submitted must be satisfactory to the General Manager, Engineering & Public Works.

Before the rezoning bylaw is considered for adoption, the beyond-code energy efficiency upgrades listed in the approved Building Energy Report shall be included as a restrictive covenant registered on land title.

A detailed checklist for the content of a Building Energy Report is included as *Appendix B*.

Building Permit Process

Prior to issuance of the Building Permit:

Applicants shall ensure that the Building Plans for the proposed development include appropriate documentation of all measures described in the City-approved Building Energy Report for the development.

- All upgrade measures in the identified set of upgrades to be installed shall be listed on the front sheet of the plans.
- Each upgrade measure, together with its minimum performance specifications, shall also be noted on each relevant sheet of the plans.
- The building plans must be satisfactory to the General Manager, Engineering & Public Works.

Guidance on how to document beyond-code energy efficiency upgrades on building plans is included as *Appendix C*.

Applicants shall ensure the Building Plans are in accord with the BC Solar Hot Water Ready regulation.

- For each unit in the proposed development, the plans shall identify:
 - An area on a flat roof, or a south-facing, east-facing or west-facing roof of the required area and dimension allowing for the future installation of solar collectors;
 - The location of the conduit runs specified in in the regulation;
 - The Building Plans shall also note minimum roof truss requirements noted in the regulation for roof areas designated for the future installation of solar collectors.

Guidance on the interpretation of the BC Solar Hot Water Ready Regulation is included as *Appendix D*.

Prior to award of final Occupancy Permit (Construction phase):

The EA shall confirm by means of a signed, written document that:

- All upgrades identified in the Building Energy Report have been installed;
- The minimum performance specifications provided in the Building Energy Report and on the building plans and on have been met;
- The upgrades are operating as intended.

To find out more about the Energy Star for New Homes – Prescriptive Pathway option for new townhouse developments, please contact Nicholas Heap, Sustainability Project Manager at NHeap@richmond.ca or 604-276-4267.

Option 4: On-site Renewable Energy

Design and build the townhouse development such that industry-proven renewable energy systems installed on-site are sufficient to provide at least 51% of the of heating, cooling and/or electrical energy load requirements of the proposed development.

Rezoning and Development Permit Process

Prior to the preparation of the staff report regarding the rezoning application:

Applicants meeting the City's policy for energy efficiency and renewable energy systems by means of the on-site renewable energy will be required to commit to this option prior to the preparation of the staff report regarding the rezoning application.

Prior to fourth reading of the rezoning application:

Applicants shall submit a Building Energy Report, prepared by a Certified Energy Advisor in good standing that includes the following content:

- Information on the proposed development;
- The total annual energy demand for all units in the proposed development when built strictly to minimum BC Building Code requirements (base case);
- All measures beyond minimum BC Building Code requirements and current building practices needed to ensure that at least 51% of the of heating, cooling and/or electrical energy load requirements of the proposed development will be provided by industry-proven renewable energy systems installed on-site. Information on the measures noted above shall include:
 - The technology used, and the minimum performance specifications required;
 - The size, location and placement of this renewable energy system;
 - The modelled energy production for this system, based on local resource data (e.g. wind speeds, insolation, etc.);
 - Performance specifications for these upgrades;
- The total annual energy demand for all units in the proposed development incorporating the measures listed above;
- **Note:** for the purposes of the Townhouse Rezoning Policy, industry-proven renewable energy systems are defined as geexchange, solar water heating, photovoltaic energy, sewer heat recovery (when in compliance with setback requirements and other regulations).

New townhouse developments proposed under the District Energy option are not required to meet the requirements of the BC Solar Hot Water Ready regulation.

The Building Energy Report and appendices submitted must be satisfactory to the General Manager, Engineering & Public Works.

Before the rezoning bylaw is considered for adoption, the beyond-code measures listed in the approved Building Energy Report shall be included as a restrictive covenant registered on land title.

A detailed checklist for the content of a Building Energy Report is included as *Appendix B*.

Building Permit Process

Prior to issuance of the Building Permit:

All of the beyond-minimum-code measures (with their minimum performance specifications) listed in the report shall be included on the relevant building plans for the proposed development.

To find out more about the on-site renewable energy option for new townhouse developments, please contact Nicholas Heap, Sustainability Project Manager at NHeap@richmond.ca or 604-276-4267.



Street Address: _____ RZ/DP File No.: _____

Report Draft Dated: _____

All upgrade measures included in an accepted Building Energy Report, including minimum performance specifications for these upgrades, shall be registered as a covenant on land title prior to adoption of the rezoning and issuance of the Development Permit.

1. General information is provided.

- The name, company and qualifications of the Energy Assessor (EA) writing the report.
- Statement that the EA is currently registered with Natural Resources Canada.
- The name of the Service Organization reviewing the HOT2000 building energy models in the report.
- Statement that the Service Organization is currently licensed by Natural Resources Canada to deliver the Ministry's [energy efficiency housing initiatives](#).

2. Townhouse units are identified.

- Developer of the proposed townhouse development.
- Street address of the proposed townhouse development.
- Number of units in the proposed townhouse development.
- Unit(s) being modelled are identified.
- Statement that the unit assessed to have the poorest energy performance under the Base Case is modelled.

3. Building code requirements are followed / all improvements are identified.

- Building code requirements are followed / all improvements are identified.
- Statement that the Base Case is fully compliant with BC Building Code requirements.
- Statement that only minimum BCBC requirements and common building practices are included in the Base Case model.
- Only upgrades relative to the Base Case are included in the list of upgrades for the Compliance Case.
- Statement that all upgrades used in the Policy Compliance Case model are listed in the report.
- Compliance with the BC Solar Hot Water Ready Regulation is included in the list of upgrades for the Compliance Case.
- Minimum performance specifications are included for every measure.

- If increased air-tightness is specified: Commitment that units as built shall achieve the stated air-tightness target, verified by means of blower door tests performed by the EA.
- If drain water heat recovery (DWHR) units are specified: Commitment that plumbing layouts shall be designed and built to enable DWHR units to achieve the projected energy savings.
- If Air Source Heat Pumps (ASHPs) are specified: Statement that this upgrade requires the project's mechanical Professional Engineer to provide a letter to the City which a) specifies the equipment model proposed, b) reports the noise levels produced by this equipment, and c) confirms that the equipment complies with Noise Regulation Bylaw No. 8856.

4. Data from the HOT2000 model are included in the Summary report.

	Base Case	Compliance Case
<input type="checkbox"/> Design Heat Loss (BTU/hr).	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Estimated Annual Space Heating + DHW Energy Consumption.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Estimated Annual Fuel Consumption totals for every fuel consumed.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> EnerGuide rating score.	<input type="checkbox"/>	<input type="checkbox"/>

5. Commitments for implementation and verification are provided.

- Statement that the EA shall submit the "P-files" for all units modelled to NRCan via the EA's Service Organization (per the EnerGuide for Homes protocol), and inform the City once these files have been received by NRCan.
- Statement that all measures in the Policy Compliance Case, together with their minimum performance specifications, shall be noted on the appropriate building plans.
- Statement that during construction, the EA shall ensure that all measures in the Policy Compliance Case are properly installed, and that the EA shall provide a report to Building Inspections staff verifying the installation of all Policy Compliance Case measures.
- Statement that should there be any change to the list of upgrades proposed for the Policy Compliance Case (see above), an appropriate substitution will be made in order to ensure the final EnerGuide Rating remains 82 or higher for all units in the proposed development. A revised building energy report detailing these changes and modelling their energy performance shall be submitted to the City of Richmond by the EA.

6. Appendices are included with the Building Energy Report.

- Site plan of the proposed development, labelling each modelled unit.
- For each modelled unit, full HOT2000 reports for both the Base Case and Policy Compliance Case are included as appendices to the report.



To inform proponents of new townhouse developments subject to the City’s Townhouse rezoning policy about requirements at the Building Permit stage.

In 2014, the City of Richmond adopted OCP Policy 12.4, Objective 3, which calls for improved energy efficiency and/or on-site renewable energy systems in all new townhouse rezoning applications. The policy was revised on July 20, 2015 with four distinct options by which proposed rezonings for new townhouse developments can meet Council’s goal of achieving a high level of energy efficiency.

As a condition of rezoning, proponents are required to have an Energy Assessor (EA) develop and energy model for one or more of the proposed townhouse unit, in order to identify a specific set of energy efficiency upgrades that would enable every townhouse unit in the proposed development to achieve either a) an EnerGuide rating of 82¹ or better, or b) achieve the Energy Star for New Homes standard.

To meet this condition, the EA shall provide a building energy report acceptable to the City which identifies specific energy efficiency upgrades above the minimum requirements of the BC Building Code, including the minimum performance specifications that each upgrade must have in order to achieve the EnerGuide 82 or Energy Star for New Homes performance requirements. Building energy reports also include commitments to incorporate the requirements of the Solar Hot Water Ready regulation within the townhouse development, and to document all of the upgrades on the building plans for the development.

The list of upgrades and their minimum performance specifications in the accepted building energy report for the project (including solar hot water ready requirements) is incorporated into a covenant on the land title of the properties being developed. Once other requirements are met, the rezoning can be adopted, and a Development Permit for the townhouse project issued.

At the Building Permit stage, this list of energy-efficiency upgrades included in the covenant on title (including solar hot water ready requirements) is to be documented appropriately on the building plans submitted for plan-checking.

(For guidance on the requirements of the BC Solar Hot Water Ready regulation, and how to document these elements on building plans, please see *Appendix C*).

General requirements:

- On the front sheet of the Building Plans, list all energy efficiency upgrade measures (i.e. relative to BC Building Code minimum requirements) identified in the covenant on title;
 - Include the minimum performance criteria provided for each of these upgrades;
- For each upgrade, annotate the appropriate plan sheets to indicate:
 - Where the upgrade is to be installed (as appropriate);
 - How it connects with other building components (as appropriate);
 - The minimum performance specifications for each upgrade. In many cases, the minimum performance criteria can be included within tables (“schedules”) for these devices.

¹ Note: The City of Richmond’s policy references the 0-100 scoring system used prior to V.15 of the EnerGuide for Houses rating software, e.g. V.10.51.

Specific Guidance

Air Source Heat Pumps (ASHPs)

General:

- If ASHP devices are included in the covenant on title, ASHPs and the minimum performance specification set out for these devices in the covenant on title should be included in the list of “EnerGuide 82’ upgrades placed **on the front sheet of the Architectural building plans**;
- The location of all components of the ASHP should be noted on the appropriate mechanical plans.

Include minimum performance specifications:

- Include an equipment schedule for the ASHP devices, and specify the minimum performance specifications set out in the covenant on title, i.e. in terms of HSPF (Heating Season Performance Factor) and SEER (Seasonal Energy Efficiency Ratio) ratings;
- State if the minimum specification applies to outdoor condenser, furnace and indoor coil in combination.

Verification requirements:

- The EA is to certify correct installation of required devices meeting or exceeding the minimum performance specification set out in the covenant on title. All required devices are to be checked in at least 5 units, or 15% of units (whichever is larger), with units selected at random immediately prior to inspection. All instances of failure to achieve the standard shall be noted in a communication to the City.

Air-Tightness (i.e. air changes per hour/ACH @ 50 Pa)

General:

- If an air-tightness target more stringent than (i.e. lower than) 5.5 ACH @ 50 Pa is included by the EA in the Building Energy Report accepted by the City, ASHPs should be included the list of “EnerGuide 82’ upgrades placed **on the front sheet of the Architectural building plans**.

Include minimum performance specifications:

- **Note:** minimum performance requirements in terms of air changes per hour at 50 Pascals of air pressurization (e.g. 2.5 ACH @50Pa).

Verification requirements:

- The EA is to certify achievement of air-tightness target by means of blower-door tests. Pre-drywall blower door testing is strongly recommended to assess air-tightness, identify air leaks and enable cost-effective mitigation of leaks;
- The EA shall check air-tightness in at least 5 units, or 15% of units (whichever is larger), with units selected at random immediately prior to inspection. All instances of failure to achieve the air-tightness target, if not resolved by fixing air leaks (as confirmed by follow-up tests), shall be noted in a communication to the City.

Domestic Hot Water (DHW)

General:

- If a DHW unit more efficient than BC Building Code minimum requirements (see BCBC Table 9.36.4.2.) is recommended by the EA in the Building Energy Report accepted by the City, DHWs should be included in the list of “EnerGuide 82’ upgrades placed **on the front sheet of the Architectural building plans**;
- The location of the DHW units should be located on appropriate plumbing and mechanical plans.

Include minimum performance specifications:

- Within a Domestic Hot Water equipment schedule, specify the minimum performance specification for the the unit identified by the EA (e.g. Standby Loss (SL), Energy Factor (EF), or Thermal Efficiency (Et)) within the schedule.

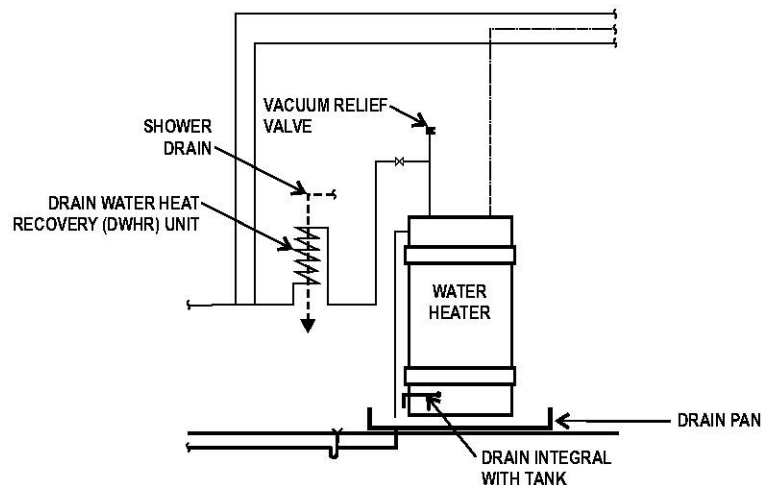
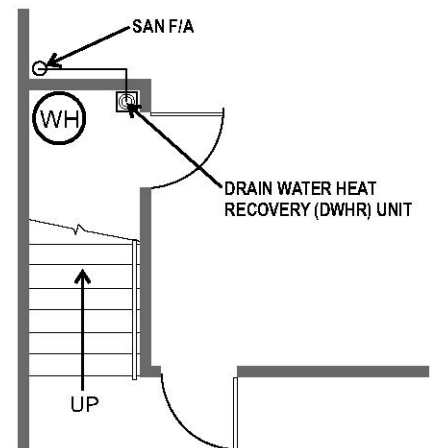
Verification requirements:

- The EA is to certify that DHW units meeting or exceeding the minimum performance specification are installed. Compliance is to be checked in at least 5 units, or 15% of units (whichever is larger), with units selected at random immediately prior to inspection. All instances of failure to achieve the standard, if not resolved after a discrepancy is identified, shall be noted in a communication to the City.

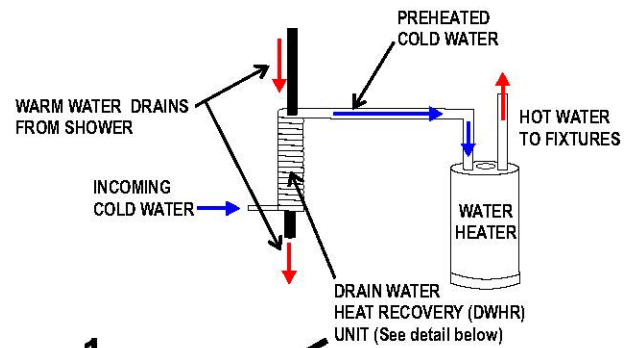
Drain Water Heat Recovery (DWHR) Units

General:

- If DWHR units are included by the EA in the Building Energy Report accepted by the City, DWHRs should be included the list of “EnerGuide 82’ upgrades placed on the front sheet of the Architectural building plans;
- The placement of the DWHR units should be indicated on the appropriate plumbing plans, i.e. plumbing layout plans, and plumbing layout schematics;
- Ensure that placement of the HRV is consistent with the minimum specifications provided by the EA (e.g. minimum length of the DWHR; correct drain diameter, and/or that the DWHR’s location on drainpipes will access drain water from two showers);
- If the pre-heated water from the DWHR is to be routed to the DHW heater, the DWHR (and one or more sanitary drains draining showers) should be located close to the unit’s DHW heater;

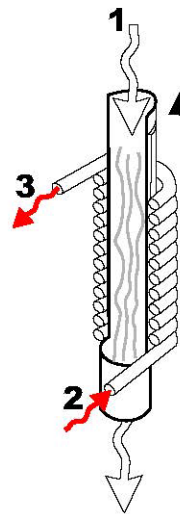


- Include the DWHR unit on a plumbing schematic plan, ensuring that placement of the HRV is consistent with efficient performance (i.e. pre-heated cold water supply exiting the DWHR may flow either into a DHW storage tank, or the cold water line of the shower(s) being drained);
- A simplified schematic diagram detailing the design of the DHWR unit and how it connects to the fresh water and sanitary plumbing may also be included for clarity.



Include minimum performance specifications:

- Include a DWHR equipment schedule on the appropriate plan sheet. Specify the minimum performance standard specifications provided by the EA in terms of thermal efficiency (in %), minimum length of DWHR device, width of the DWHR device and the minimum of showers to be drained through HWDR devices per townhouse unit.



- 1 Warm wastewater from shower drains through a length of copper drain pipe wrapped with copper tubing.
- 2 Heat transfers from the hot water in the shower drain to incoming cold water passing through the copper tubing.
- 3 Preheated incoming water flows to water heater (or directly to shower cold water tap), reducing additional hot water heating required.

Drain Water Heat Recovery (DWHR) Unit Detail

Verification requirements:

- The EA is to certify correct installation of DWHR devices meeting or exceeding the minimum performance specification. All devices are to be checked in at least 5 units, or 15% of units (whichever is larger), with units selected at random immediately prior to inspection. All instances of failure to achieve the standard, if not corrected, shall be noted in a communication to the City.

Energy Star Appliances and Lighting

General:

- If Energy Star appliance and/or lighting is included by the EA in the Building Energy Report accepted by the City, these requirements should be included the list of “EnerGuide 82” upgrades placed on the front sheet of the Architectural building plans.

Include minimum performance specifications:

- **Note:** there is an EnerGuide 82 requirement for Energy Star appliances/lighting;
- Appliances: must be Energy Star-certified, and have Energy Star label on device;
- Lighting: must be Energy Star-certified, and come in Energy Star labelled packaging.

Verification requirements:

- EA to certify correct installation of required devices meeting or exceeding the minimum performance specification. All required devices are to be checked in at least 5 units, or 15% of units (whichever is larger), with units selected at random immediately prior to inspection. All instances of failure to achieve the standard, if not corrected, shall be noted in a communication to the City.

Heat Recovery Ventilators (HRV)

General:

- If HRV devices are included by the EA in the Building Energy Report accepted by the City, ASHPs should be included the list of “EnerGuide 82’ upgrades placed on the front sheet of the Architectural building plans;
- The location of the HRV should be noted on the appropriate mechanical plans.

Include minimum performance specifications:

- Include an equipment schedule for the HRV devices, and specify the minimum performance specifications provided by the EA.

Verification requirements:

- The EA is to certify correct installation of required devices meeting or exceeding the minimum performance specification. All required devices are to be checked in at least 5 units, or 15% of units (whichever is larger), with units selected at random immediately prior to inspection. All instances of failure to achieve the standard, if not corrected, shall be noted in a communication to the City.

Insulation

General:

- If increased foundation slab, foundation wall, wall, or ceiling insulation levels are included by the EA in the Building Energy Report accepted by the City, these increased insulation requirements should be included the list of “EnerGuide 82’ upgrades placed on the front sheet of the Architectural building plans;
- Where increased insulation levels require changes to building design or construction practices, this must be clearly noted on the appropriate building plans, and details of affected building assemblies need to be included in the plans.

Include minimum performance specifications:

- **Note:** there is an EnerGuide 82 requirement for increased insulation in the architectural details panel, and specify the minimum performance specification required, noting whether it is a nominal or effective RSI-rating.

Verification requirements:

- The EA is to certify correct installation of above-code insulation that meets or exceeds the minimum performance specification set by the EA. Insulation levels shall be checked by the EA at a time when a full inspection is practical (e.g. after installation is installed, and pre-drywall) in at least 5 units, or 15% of units (whichever is larger), with units selected at random immediately prior to inspection. All instances of failure to achieve the standard, if not corrected, shall be noted in a communication to the City.

Windows

General:

- If windows more efficient than BC Building Code minimum requirements (see BCBC Table 9.36.2.7.A. and Table 9.36.2.7.C.) is recommended by the EA in the Building Energy Report accepted by the City, higher-efficiency windows should be included in the list of “EnerGuide 82’ upgrades placed **on the front sheet of the Architectural building plans**;
- Include minimum window energy efficiency requirements on window schedule;
- **Note:** labels with USI ratings are to be left attached to windows after installation.

Include minimum performance specifications:

- **Note:** there is an EnerGuide 82 requirement for increased window performance in the window schedule, and specify the minimum performance standard identified by the EA (i.e. minimum USI rating required (per BCBC 9.36.2.7.A. and/or component specifications per BCBC (9.36.2.7.C.)).

Verification requirements:

- The EA is to:
 - Check that labels on factory-produced installed windows meeting the minimum performance specification set out in the covenant on title are present and/or;
 - Check that all energy efficiency components of site-built windows included in the minimum performance specification set out in the covenant on title are present;
- All windows are to be checked in at least 5 units, or 15% of units (whichever is larger), with units selected at random immediately prior to inspection. All instances of failure to achieve the standard, if not addressed, will be noted in a communication to the City.

Natural Gas Furnaces

General:

- If a natural gas furnace device more efficient than the minimum BC Building Code requirement (see BCBC Table 9.36.3.10.) is recommended by the EA in the Building Energy Report accepted by the City, the natural gas furnace with its minimum performance criteria should be included in the list of “EnerGuide 82’ upgrades placed **on the front sheet of the Architectural building plans**;
- The location of the natural gas furnace should be located on appropriate plumbing and mechanical plans

Include minimum performance specifications:

- Within a Natural Gas Furnace equipment schedule, specify the minimum performance specification for the unit identified by the EA (e.g. Annual Fuel Utilization Efficiency (AFUE), Thermal Efficiency (Et), Thermal Performance Factor (TPF).

Verification requirements:

- The EA is to certify that natural gas furnace devices meeting or exceeding the minimum performance specification set out in the covenant on title are installed. Compliance is to be checked in at least 5 units, or 15% of units (whichever is larger), with units selected at random immediately prior to inspection. All instances of failure to achieve the standard, if not resolved after a discrepancy is identified, shall be noted in a communication to the City.



BC's Solar Hot Water Ready Regulation contains several specific requirements:

1. Designated solar collector areas. Section 3 of the regulation states that an area of not less than 9.3 m^3 , with no dimension less than 2.7 m, be designated for future installation of solar collectors for a solar domestic hot water system.
2. Structural requirements to address the additional loads on roofs or other areas resulting from the installation of solar collector units. See Section 4 of the regulation.
3. Install conduits within the home to accommodate future piping for a solar hot water system. See Section 5 of the regulation.

The City of Richmond expects all of these requirements to be implemented within the building plans submitted for approval during the Building Permit process such that they would facilitate the installation of a solar hot water system at some point in the future.

The text of the Solar Hot Water Ready Regulation, B.C. Reg. 163/2013, June 21, 2013 can be found here:

www2.gov.bc.ca/gov/content/industry/construction-industry/building-codes-standards/the-codes/other-regulations/solar-hot-water-ready

The Provincial government guide to BC Solar Hot Water Ready regulation can be found here:

www2.gov.bc.ca/gov/content/industry/construction-industry/building-codes-standards/the-codes/other-regulations/solar-hot-water-ready

The City has also developed the following guidelines to assist architects when developing building designs and documenting building plans.

1. Designated Solar Collector Areas

Guidelines for Placement of Future Collector Areas on Building Rooftops – General

For each dwelling unit in a new development, the City expects building plans to identify at least one potential area for future installation of solar collectors.

This area must be at least as large as the minimum size set out in the regulation:

- A total area of not less than 9.3 m^3 ;
- With no dimension less than 2.7 m.

The City expects to be these areas to be situated on south, east or west-facing¹ roofs.

The designated solar collector area should be oriented so that the top and bottom are level.

¹ i.e. between 45° and 315° , where absolute North is defined as 0° .

Wherever possible the designated solar collector area should be located on a single roof plane.

Where this is not possible, placing a collector area such that it is evenly bisected at a right angle by a ridgeline may be acceptable. It is not acceptable to have a collector area bisected by a trough.

Guidelines for Placement of Future Collector Areas on Building Rooftops – for Buildings Containing More than One Unit

To avoid the need for pipes servicing one unit to pass through another unit or traverse a roof above the roof deck, the City has developed the following guidance:

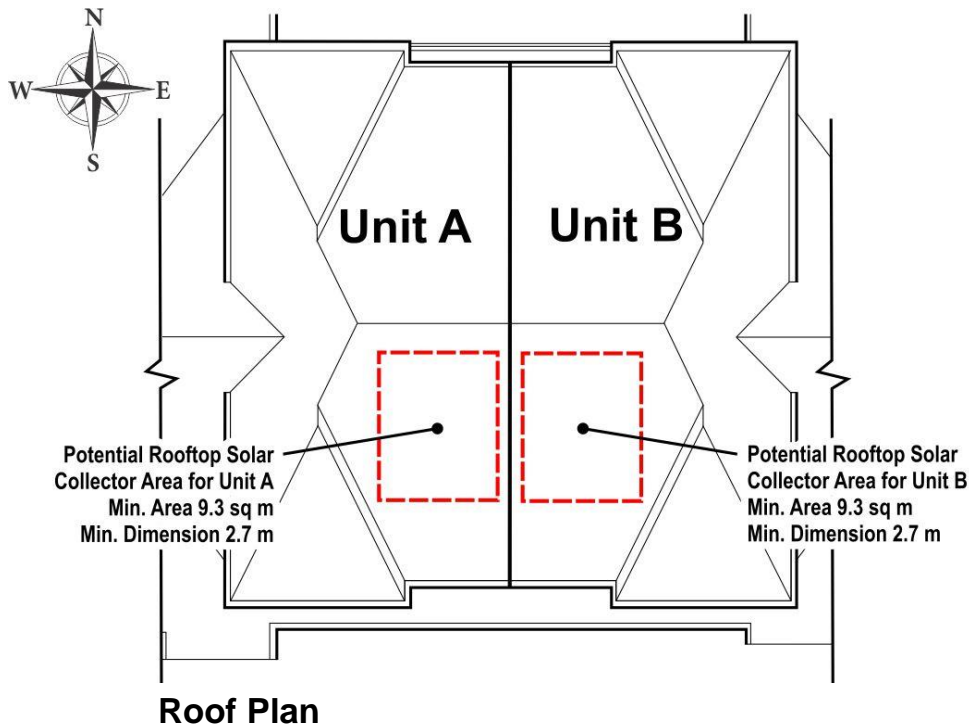
For each unit in the proposed townhouse development:

1. Can a solar hot water collection area of the required size be located on a south, west or east facing roof² (in that order of preference) so that the entire area is directly above the unit?
 - If yes, designate this as the potential future solar collector area for that unit on the building plans, and note which unit is to use the collector area.
 - If no, see point 2 below.
2. Can a solar hot water collection area of the required size be located on a south, west or east facing roof (in that order of preference) of the building containing the unit, such that at least part of the designated area is situated directly above the unit?
 - If yes, see point 3 below.
 - If no, see point 4 below.
3. Is the roof deck of the building designated as common property in the strata plan for the proposed development?
 - If yes, designate the area identified in point 2 above as the potential future solar collector area for that unit. Note which unit is to use the collector area. The applicant shall be required to document that the roof deck of the affected building shall be designated as common property in the strata plan for the development.
 - If no, see point 4 below.
4. Per Section 2.1 of the BC Solar Hot Water Ready Regulation, the City of Richmond shall determine that the Solar Hot Water Ready regulation does not apply to this unit.

Documenting Rooftop Designated Solar Collector Areas on Building Plans

Roof plans should indicate the location of the designated solar collector area and label it accordingly, noting the minimum size requirement in the regulation. In multi-unit buildings, the collector area should also be labelled with the housing unit it is intended for.

² Ibid.



2. Structural Requirements

Appropriate sheets within the set of building plans (e.g. truss schedules or elevation plans) should clearly state that roof trusses and other areas expected to support installed solar collectors (i.e. the designated solar collector areas identified above) are to meet the requirements of the regulation.

Minimum structural requirements are defined in Section 4 of the regulation.

Sample Wording for Note Regarding the Truss Load Requirements

Structural Engineer to review truss certificates to ensure compliance with the Solar Hot Water Ready regulation, B.C. Reg. 163/2013.

3. Install Conduits for Future Installation of Piping for Solar Hot Water System

Please refer to the Provincial guide for information on conduit requirements, and where the conduit should terminate (depending on the location of the designated collector area).

Routing Conduit within the Building

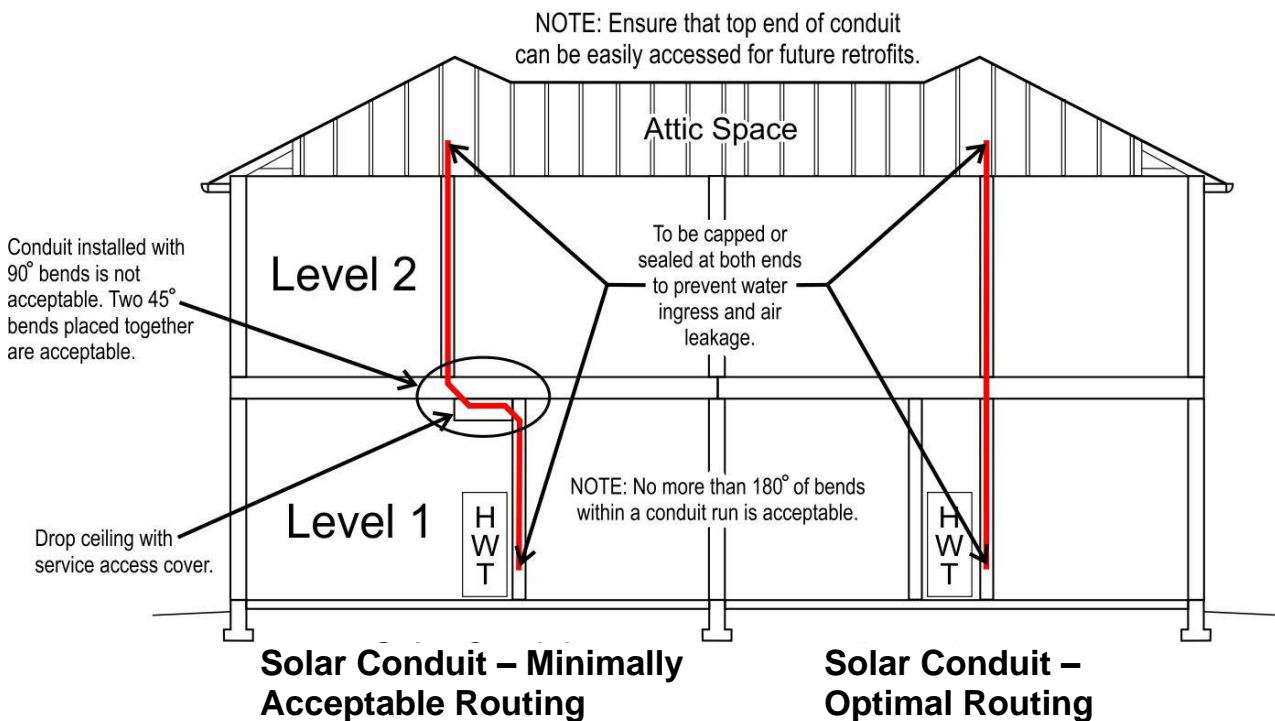
- A straight vertical routing between the attic and the location of the hot water tank is strongly preferred.
- There can be no more than one vertical offset in the routing of the conduit.
- If the location of the conduit must be offset between floors, this offset should be accomplished wherever possible such that the conduit travels laterally a 45° angle to the floor.
- Conduit installed with an ABS 90° bend piece is not acceptable.
- Conduit installed with two ABS 45° bends placed together is acceptable.
- It is not acceptable to use two 90° bends (i.e. two sets of two 45° bends placed together) between verticals less than 10” apart: two 45° bends should be used instead.

If conduit is routed in an external wall:

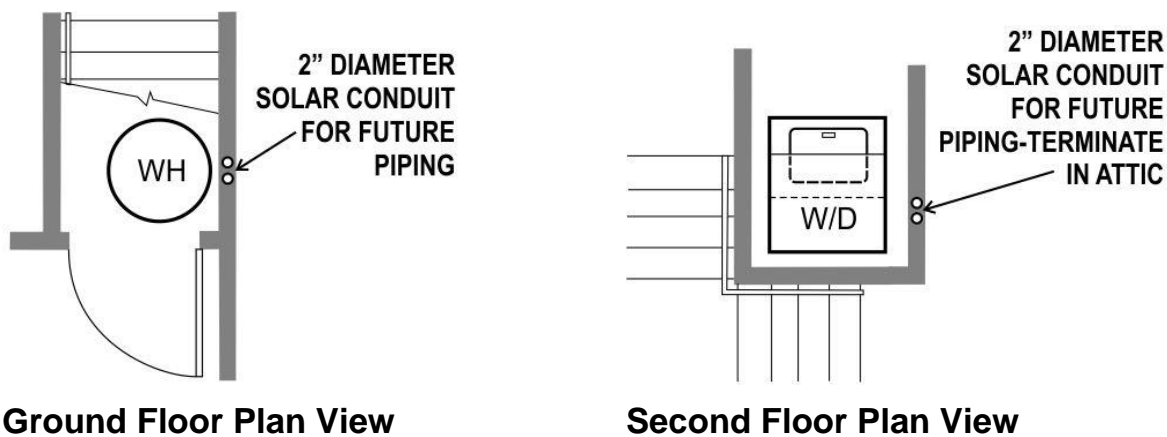
- Add a design detail to the plans showing how code-compliant levels of insulation will be provided at this location; OR
- Route the conduit by means of a furred-in wall.

If conduit is routed in a party wall:

- Ensure that the conduit will meet fire-safety provisions of the BC Building Code (e.g. materials used must be non-combustible); OR
- Route the conduit by means of a furred-in wall.



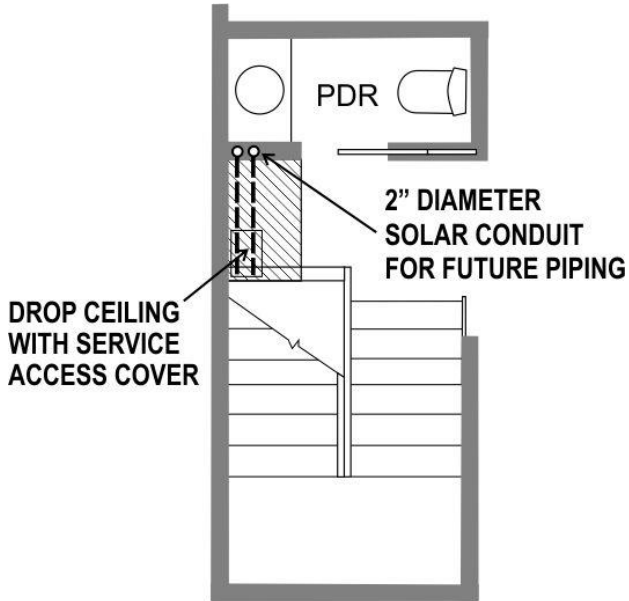
Documenting Solar Conduit on Building Plans



Add the following notes to relevant plan sheets:

- Solar conduit to be capped or sealed at both ends to prevent water ingress and air leakage;
- Ensure conduit ends can be easily assessed for future retrofits.

Detailing an Offset in Solar Conduit Routing



Vertical Offset – Plan View



Modelled Townhouse Energy-Efficiency Performance and EnerGuide 82 Upgrade

Recommendations for:
7888 Oakbridge Road, Richmond, BC
(RZ 13-647246)

August 19, 2016

Prepared for:

Bob Smith
Principal
Bobco Development
9002 Cedar Street,
Vancouver, BC V6A 1Z4

By:

Jim Black, EA
Building Energy Assessment Company, Inc.
2020 Foresight Lane,
Richmond, BC V6Y 1N3

Introduction

Building Energy Assessment Company, Inc. was asked by Bobco Development to identify upgrade measures that would enable all units in Bobco’s proposed new townhouse development at 7688 Oakbridge Road to achieve an EnerGuide for New Homes rating of 82 or better, as modelled with HOT2000 software (Version 10.51).

The townhouse development proposed by Bobco for 7688 Oakbridge Rd. consists of twenty (20) units.

Based on an initial assessment of the project, Building Energy Assessment selected two sample units for energy modelling.

Unit A is one of several small end units with large north-facing windows, *making these units inherently less energy efficient than the other units proposed for the development. If the proposed development were built to minimum BC Building Code requirements, Unit A would produce the lowest level of energy performance relative to the other units in the development.*

Unit B is a middle unit. *If the proposed development were built to minimum BC Building Code requirements, Unit B would have better-than-average energy performance relative to the other units in the development.*

Units A and B, and all units assessed to have an energy performance equivalent to or better performance than Unit B, are labelled on the site plan attached to this report (see *Appendix I*).

“Vancouver” was selected as the Weather Location in the HOT2000 software.

Base Case

The base case models the energy performance of the proposed development if it were built strictly to the minimum requirements of the 2012 BC Building Code, and to current common building practices.

Base Case	Unit A	Unit B
Design Heat Loss at 15.80 °F (1.56 BTU/hr / Ft3) (Source: Annual Space Heating Summary section of HOT2000 report)	24,500 BTU/hr	20,000 BTU/hr
Estimated Annual Space + DHW Energy Consumption (Source: EnerGuide For Houses Energy Consumption Summary Report section of HOT2000 report)	12,500 kWh	10,000 kWh
Total Natural Gas (Source: Estimated Annual Fuel Consumption Summary section of HOT2000 report)	0 MCF	0 MCF
Total Electricity (Source: Estimated Annual Fuel Consumption Summary section of HOT2000 report)	21,000 kWh	18,500 kWh
EnerGuide Rating (0 to 100) (Source: EnerGuide For Houses Energy Consumption Summary Report section of HOT2000 report)	77	79

Policy Compliance Case

The policy compliance case models all of the upgrades to the Base Case which, if installed together, shall improve the energy performance of every unit within the proposed development to an EnerGuide rating of 82 or better. Minimum performance specifications are provided for all upgrades, as appropriate.

Schedule of Upgrade Commitments

All units: The following list of upgrades is identified for installation in all units.

Component	Upgrade
Solar Hot Water Ready requirement	Per requirements of the BC Solar Hot Water Ready regulation.

Unit B: The following list of upgrades has been identified for installation in Unit B. If all of the upgrades listed below are installed in Unit B, and in all other units identified as having better energy performance than Unit B, energy modelling indicates these units will achieve or exceed an EnerGuide 82 rating.

Component	Upgrade
Increased Air-tightness	≥3.5 ACH@50Pa. Units as built shall achieve the stated air-tightness target, verified by means of blower door tests performed by the EA.
Space Heating	Heat Recovery Ventilator (HRV) sized and installed per BCBC Section 9.32.
Domestic Hot Water (DHW)	Drain Water Heat Recovery (DWHR) unit; efficiency ≥50%, draining two showers [1500 kWh/yr.]. Plumbing layouts shall be designed and built to enable DWHR units to achieve the projected energy savings.
Energy Star Lighting	All lighting fixtures to be Energy Star qualified or equipped with Energy Star qualified bulbs [420 kWh/yr. credit]

Unit A: The following list of upgrades has been identified for Unit A. If all of these upgrades are installed in Unit A, and in all other units not already identified, energy modelling indicates the units will achieve or exceed an EnerGuide 82 rating.

Component	Upgrade
Insulation	R22 nominal above-grade walls
Windows	USI=1.6
Increased Air-tightness	≥3.5 ACH@50Pa. Units as-built shall achieve the stated air-tightness target, verified by means of blower door tests performed by the EA.
Space Heating	Air Source Heat Pump (ASHP); SEER: ≥16; HSPF ≥6.7. This upgrade shall require the project's mechanical Professional Engineer to provide a letter to the City which specifies the equipment model proposed, reports the noise levels produced by this equipment, and confirms that the equipment complies with Noise Regulation Bylaw No. 8856.
Domestic Hot Water (DHW)	Natural gas-fired water heater; energy factor ≥ 0.80
Energy Star Appliances	Fridge, dishwasher and clothes washer are Energy Star certified appliances [95 kWh credit].

Additional Commitments

- The EA shall submit the “P-files” for all units modelled to NRCan via ACME Building, the EA’s Service Organization (per the EnerGuide for Homes protocol), and inform the City once these files have been received by NRCan.
- All measures in the Policy Compliance Case, together with their minimum performance specifications, shall be noted on the appropriate building plans.
- During construction, the EA shall ensure that all measures in the Policy Compliance Case are properly installed. The EA shall provide a report to Building Inspections staff verifying the installation of all Policy Compliance Case measures.
- Should there be any change to the list of upgrades proposed for the Policy Compliance Case (see above), an appropriate substitution will be made in order to ensure the final EnerGuide Rating remains 82 or higher for all units in the proposed development. A revised building energy report detailing these changes and modelling their energy performance shall be submitted to the City of Richmond by the EA.

Modelled Outcomes of Policy Compliance Case

With all of the upgrades listed above integrated into the townhouse development, the modelled townhouse units achieve the following EnerGuide ratings:

Policy Compliance Case	Unit A	Unit B
Design Heat Loss at 15.80 °F (1.56 BTU/hr. / Ft3) (Source: Annual Space Heating Summary section of HOT2000 report)	18,000 BTU/hr	16,000 BTU/hr
Estimated Annual Space + DHW Energy Consumption (Source: EnerGuide For Houses Energy Consumption Summary Report section of HOT2000 report)	10,000 kWh	9,000 kWh
Total Natural Gas (Source: Estimated Annual Fuel Consumption Summary section of HOT2000 report)	0 MCF	0 MCF
Total Electricity (Source: Estimated Annual Fuel Consumption Summary section of HOT2000 report)	19,000 kWh	17,500 kWh
EnerGuide Rating (0 to 100) (Source: EnerGuide For Houses Energy Consumption Summary Report section of HOT2000 report)	82	82

Jim Black of Building Energy Assessment Company, Inc. is currently registered with Natural Resources Canada as an Energy Assessor. Jim conducts EnerGuide home evaluations on behalf of ACME Building which is currently licensed by Natural Resources Canada to deliver NRCan's [energy efficiency housing initiatives](#).

Jim Black, EA

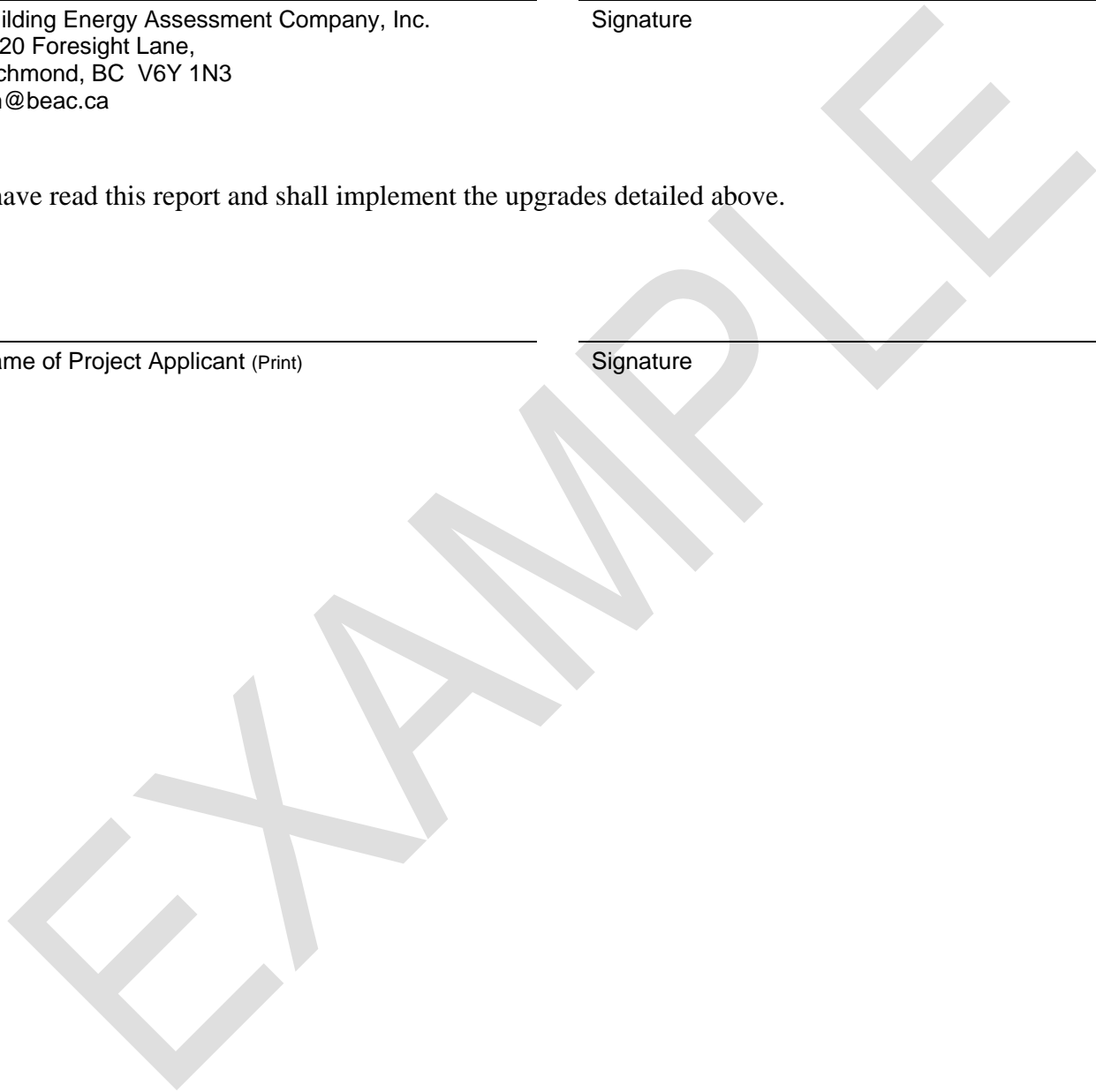
Building Energy Assessment Company, Inc.
2020 Foresight Lane,
Richmond, BC V6Y 1N3
jim@beac.ca

Signature

I have read this report and shall implement the upgrades detailed above.

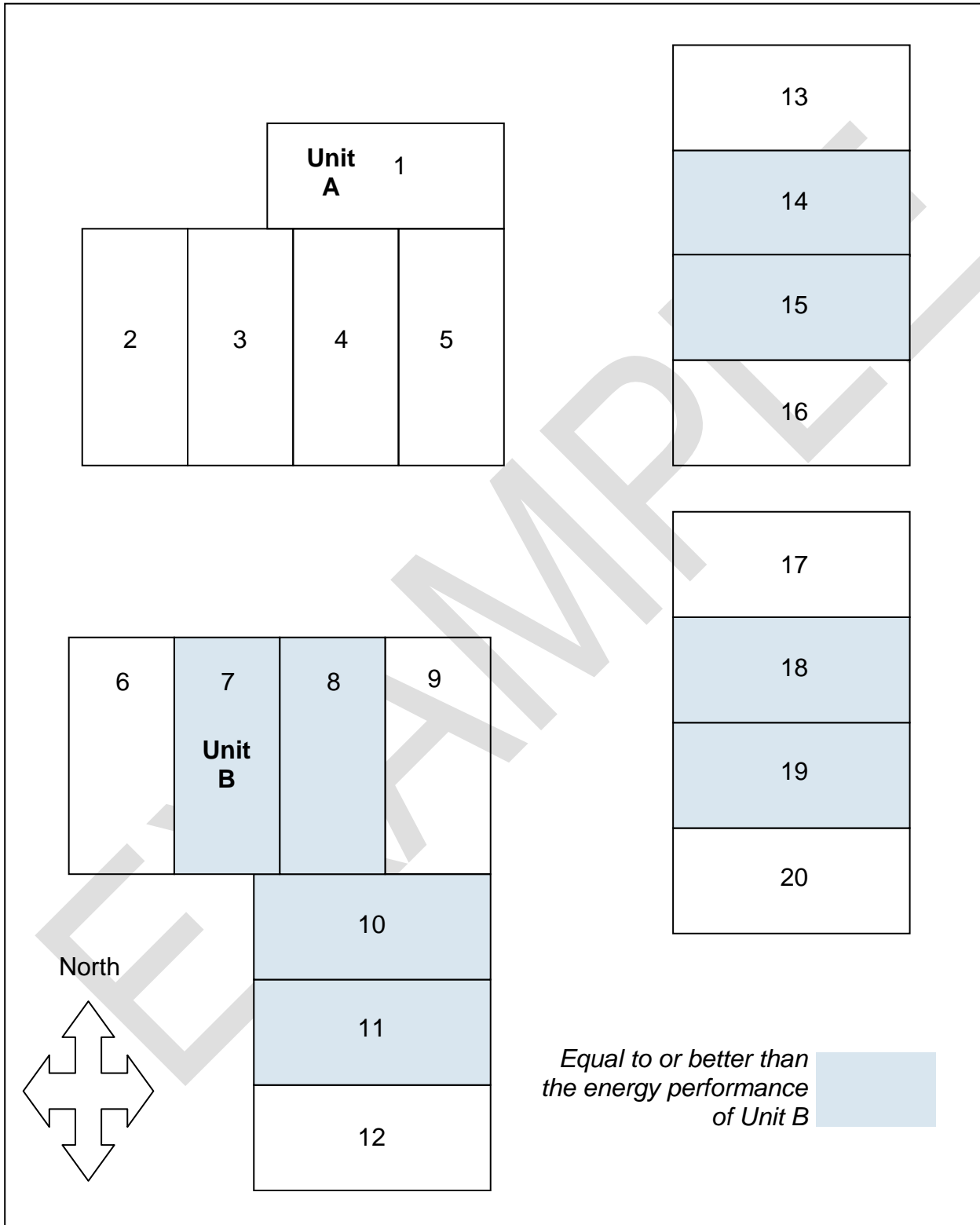
Name of Project Applicant (Print)

Signature



Appendix 1: Site Plan

Site Plan for 7688 Oakbridge Road, Richmond, BC



Appendix 2: Full HOT2000 report for Unit A –
Base Case

Appendix 3: Full HOT2000 report for Unit A –
Policy Compliance Case

Appendix 4: Full HOT2000 report for Unit B –
Base Case

Appendix 5: Full HOT2000 report for Unit B –
Policy Compliance Case

EXAMPLE