ATTACHMENT 1

ENERGY MODEL ASSUMPTIONS

1. GENERAL ENERGY MODELING INFORMATION

(a) Project Co. will use one of the following eligible energy modelling software tools:

(1) eQUEST;

(2) IES-VE; and

(3) EnergyPlus

(b) Project Co will use a single energy modelling software for the Facility at all stages of the Project.

(c) Project Co may:

(1) use additional supplementary software tools, such as RetScreen or Excel, in conjunction with one of the above eligible energy modelling software tools; and

(2) modify the underlying simulation code for the purposes of modeling systems and energy efficiency measures not managed by the modelling software, in which case Project Co will fully describe and justify any such changes to the Province.

(d) For preparation of the Energy Model, Project Co will retain an individual that is either:

(1) An approved energy modeller on the CaGBC Experienced Modellers List; or

(2) An energy modeller that is Building Energy Modeling Professional (BEMP) certified.

2. ENERGY CONSUMPTION REPORTING

Energy end-uses to be reported as part of the total energy modeling results should include:

(a) Interior lighting

(b) Exterior lighting

(c) Heating – by fuel source

(d) Cooling

(e) Heat rejection

(f) Fans

(g) Pumps

(h) Domestic hot water – by fuel source

(i) Plug loads and electrical process loads

(j) Elevators

(k) Other process load (as applicable) – by fuel source

Energy results should report on:

(l) Total Facility Energy Consumption – per fuel source

(m) Total Facility Energy cost per fuel source

(n) Total Facility greenhouse gas emissions – per fuel source

(o) Total Facility area, conditioned and un-conditioned used in the energy model

3. ENERGY MODEL ASSUMPTIONS

Item	General Assumptions	
1. Climate Zone and Weather File	CWEC standard weather file for Abbotsford, BC	
2. Building Geometry	As per building design to determine total building area. All parking areas to be excluded from any Energy intensity reporting (kWh/m^2 or GJ/m^2), however all Energy Consumption associated with parking (lighting, fans, etc.) will be included in the total Energy Consumption.	
3. Utility Rates and Emission Factors	Electricity: Large General Service (July 1st 2017) Consumption Charge: $0.055/kWh Demand Charge: $11.21/kW $0.2429/day 5% rate rider 5% GST Emissions Factor: 9 tCO2e/GWh (BC Hydro 2015 rates)	Natural Gas: Fortis BC, Mainland Service Area Rates (July 1st 2017) $9.01/GJ (including taxes) Emission Factor: 180 tCO2/GWh
4. Building Setpoints	Temperature: - Occupied areas: 22°C all year, night setback, 16°C (winter) 27°C (summer),	

<table>
<tr><th>Item</th><th>General Assumptions</th></tr>
<tr><td></td><td>- Occupied areas: Humidity 30-60%

Stairs and unoccupied areas: 16°C
Garbage/recycling areas: 5°C</td></tr>
<tr><td>5. Envelope</td><td>Take-offs and building constructions as per design.

Glazing areas to represent the total area of the rough opening including glass + frame.

Any windows, curtainwall and spandrel walls must include the thermal bridging impact of framing.

Building opaque thermal performance must account for:
- variations in construction types and assemblies, above and below ground.

- major structural penetrations, such as balcony slabs, beams, girders, columns, and ornamentation or appendages that must completely penetrate the building envelope to perform their intended function should be taken into account, provided that the sum of the cross-sectional areas at such major structural penetrations exceeds 2% of the above-ground building envelope area.

- structural penetrations that partly penetrate the building envelope assembly, such as slab edges, should be accounted for if such areas exceed 2% of the above-ground building envelope area.</td></tr>
<tr><td>6. Infiltration</td><td>0.25 (L/s)/m² façade, NECB 2011 default</td></tr>
<tr><td>7. Ventilation rates</td><td>Minimum ventilation 62.1-2001 with Addendum n, as per BC Building Code, unless other ventilation rates have been required for specific areas.

Holding Areas: 6ACH

Occupancy count for ventilation rates:
<table>
<tr><th>Zone</th><th>Min</th><th>Max</th><th>Average</th></tr>
<tr><td>Court Admin</td><td>2</td><td>115</td><td></td></tr>
<tr><td>JAC</td><td>17</td><td>51</td><td></td></tr>
<tr><td>Public Services</td><td>97</td><td>97</td><td></td></tr>
<tr><td>Courtrooms</td><td>50</td><td>934</td><td>392</td></tr>
<tr><td>Crown Counsel</td><td>23</td><td>108</td><td></td></tr>
<tr><td>Sheriff Services</td><td>30</td><td>30</td><td></td></tr>
<tr><td>Accused holding</td><td>3</td><td>144</td><td></td></tr>
<tr><td>Library</td><td>6</td><td>17</td><td></td></tr>
<tr><td>Building Services</td><td>1</td><td>1</td><td></td></tr>
<tr><td>Secure Parking</td><td>5</td><td>30</td><td></td></tr>
<tr><td>Judiciary</td><td>6</td><td>36</td><td></td></tr>
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Item	General Assumptions
	<table><tr><td>Counsel Services</td><td>8</td><td>15</td><td></td></tr><tr><td>Community Corrections</td><td>54</td><td>121</td><td></td></tr><tr><td>TOTAL OCCUPANTS</td><td>302</td><td>1699</td><td></td></tr></table>
8. HVAC System Operation	Assume that fans are on as per NECB 11, Table A-8.4.3.2.(1) A, Operating Schedule A. Adjustments to be made for cycling on/off as per HVAC design selection for project as appropriate to meet setpoints. Exception, where 24hr fan operation or other scheduling is required as per assumptions or explicit design requirement.
9. Occupancy	Occupancy: - Courtrooms: as per ALC design information, translated into a 3 m^2/person area on average with a schedule. - Other areas: NECB 11, Table A-8.4.3.3.(1)B occupancy densities per space type, m^2/person. Schedules: - Courtrooms as per ALC occupancy information with variation over the day. - Other areas: NECB 11, Table A-8.4.3.2.(1) A, Operating Schedule A.
10. Interior Lighting	Lighting load as per design per space-by-space method, including modeling of occupancy and daylight sensors. Task lighting included in the total W/m2 applied with schedule. Daylight controls should be modeled explicitly in the software if the software utilized has this capability. Occupancy sensors energy credit applied as per ASHRAE 90.1-2010 Appendix G, Table G3.2. Lighting Schedules as per NECB 11, Table -8.4.3.2.1(A) Schedule A. With exception of spaces having 24 hr lighting requirement.
11. Exterior Lighting	Lighting load as per design with schedule based on photocells as per modeling software.
12. Electrical Plugloads –	Assume default plug loads as per NECB 11, Table-8.4.3.3.1(B) based on space-by-space type, including but not limited to separate values for: offices/admin, courtrooms, holding areas, corridors, lobby, storage/filing,

Item	General Assumptions
	library, stairs, washrooms, mechanical/electrical, IDF rooms. Schedules use NECB 11, Table-8.4.3.2.1(A) Schedule A. Use a modeling approach that takes into account the appropriate portion of loads that directly contribute to the gains in the conditioned space.
13. Process Loads	IDF rooms assumed 5kW per space, applied with NECB 11 Schedule A and diversity factor of 0.6.
14. Elevators	10HP per each elevator. Use ASHRAE 90.1-2010, Table G-I, schedule for elevator as default assumption.
15. Parkade – exhaust fans and lighting	Include total parking area for below and above grade. Underground parkade exhaust assumed 6 hrs daily exhaust fan operation controlled by CO sensors. Lighting is to be continuously available and consumption to be reduced by proposed application of appropriate occupancy and daylight controls.
16. Service hot water	Service Hot water does not need to be applied on a space-by-space basis, but should account for total peak occupancy of the building. NECB 11 defaults for Courthouse building, Table-8.4.3.3.1(A), 60W/person with Schedule A. Adjust as appropriate based on to which degree actual fixture selection reduce hot water consumption.