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June 25, 2020

VIA ELECTRONIC MAIL

British Columbia Utilities Commission
6th Floor, 900 Howe Street
Vancouver, B.C. V6Z 2N3

Direct Line: 604 691-7557
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Our File: 23841/0229

Attention: Marija Tresoglavic, Acting Commission Secretary

Dear Sirs/Mesdames:

Re: FortisBC Inc. Application for a Certificate of Public Convenience and Necessity for the Kelowna Bulk Transformer Addition Project

We are counsel to the Commercial Energy Consumers Association of British Columbia (the "**CEC**"). Attached please find the CEC's first set of Information Requests with respect to the above-noted matter.

If you have any questions regarding the foregoing, please do not hesitate to contact the undersigned.

Yours truly,

OWEN BIRD LAW CORPORATION

Christopher P. Weafer

CPW/jj

cc: CEC
cc: FortisBC Inc.
cc: Registered Interveners

COMMERCIAL ENERGY CONSUMERS ASSOCIATION OF BRITISH COLUMBIA ("CEC")

INTERVENER INFORMATION REQUEST NO. 1 TO FORTISBC INC.

FortisBC Inc. ("FortisBC") Application for a Certificate of Public Convenience and Necessity for the Kelowna Bulk Transformer Addition Project Project No. 1599088

June 25, 2020

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1. Reference: Exhibit B-1, page 1

1. APPLICATION

1.1 EXECUTIVE SUMMARY

In this application (the Application) FortisBC Inc. (FBC or the Company) is seeking approval of the British Columbia Utilities Commission (BCUC) for a Certificate of Public Convenience and Necessity (CPCN) for the Kelowna Bulk Transformer Addition Project (referred to as the KBTA Project or the Project).

In summary, FBC seeks approval from the BCUC to install a third terminal transformer at the F.A. Lee Terminal Station (LEE) on McCurdy Road in Kelowna, BC, including the reconfiguration of the 138 kV bus into an industry standard ring bus configuration. The estimated total cost of the Project in as-spent dollars is $23.288 million, which includes Allowance for Funds Used During Construction (AFUDC) and the cost of equipment removal.

If the Application is approved, FBC plans to initiate the detailed design, procurement and construction for the Project early in the first quarter of 2021. The new transformer is scheduled to be in service by the end of 2022, with Project completion and close-out during the second quarter of 2023.

1.1 What is FortisBC's financial threshold for CPCNs?

1.2 Does the application comply with all the Guidelines required for CPCN applications? Please explain.

1.2.1 If not, please identify any areas that do not meet CPCN Guidelines, and explain why.

1.2.2 Please explain the costs of providing and the benefits of the ring bus configuration in relation to the Project costs.

2. Reference: Exhibit B-1, page 10 and page 18

3.1 OVERVIEW

FBC has experienced high levels of customer load growth in the Kelowna area[5] and it expects electricity demand will exceed system planning reliability criteria by the summer of 2022. Specifically, FBC will not be able to meet the N-1 system reliability planning criteria in order to reliably maintain service to the area load during peak periods in the event of an outage or failure of one of the two existing 230/138 kV transformers at the F.A. Lee Terminal Station. Therefore, without expanding FBC's current resources, load will need to be shed in 2022 in the event of an outage or failure of one of the two existing transformers at LEE, as explained in Section 3.4 below. During an N-1 contingency event, the consequences of the required load shedding will increase as load grows in the Kelowna area.

The normal operation (N-0) contingency planning criteria applies to all transmission facilities. The single contingency (N-1) planning criteria apply to all transmission facilities that are part of the FBC interconnected system, which excludes radial transmission lines. FBC plans and constructs its interconnected transmission system to meet and maintain its N-1 planning contingency criteria. The recently-approved Grand Forks Reliability Project[17] similarly proposed the addition of a new terminal transformer in order to meet the same planning criteria.

The Kelowna load area is part of the interconnected system (that is, it is supplied from more than one 230 kV source, in this case 73 Line and 72/74 Lines as shown in Figure 3-2 above); therefore, the N-1 planning criteria applies. In addition, as discussed in Section 3.2, Kelowna is the largest load centre in FBC's service territory and includes a number of important institutional and other major customers, which emphasizes the importance of N-1 contingency planning.

2.1 Please explain at peak conditions what % of additional load would be required to cause a failure to be operationally consistent with N-1 criteria?

2.2 Please provide the oversight body, if any, that defines how far the utility needs to be away from failing to meet the N-1 system reliability and therefore potentially to be shedding load, for the interconnected system.

2.3 Please provide a service area map showing the areas for which FortisBC does not have N-1 system reliability.

3. Reference: Exhibit B-1, page 12

Compared to other regions in FBC's service territory, the Kelowna load area covers a relatively small geographic area, but has the highest load concentration. It accounts for almost 50 percent of the total FBC summer peak load and more than 40 percent of the winter peak load.

FBC has approximately 76,600 direct customers in the Kelowna area, shown by rate class in Table 3-1:

Table 3-1: FBC Kelowna Load Area Customers by Class

Rate Class	Customer Count
Small Commercial / Commercial	9,781
Large Commercial	22
Irrigation	212
Lighting	467
Residential	66,133
Total	76,615

Included in these customers in the Kelowna area are the following major customers:

- Kelowna General Hospital;
- University of British Columbia Okanagan;
- Okanagan College;
- Kelowna International Airport; and
- Big White Ski Resort.

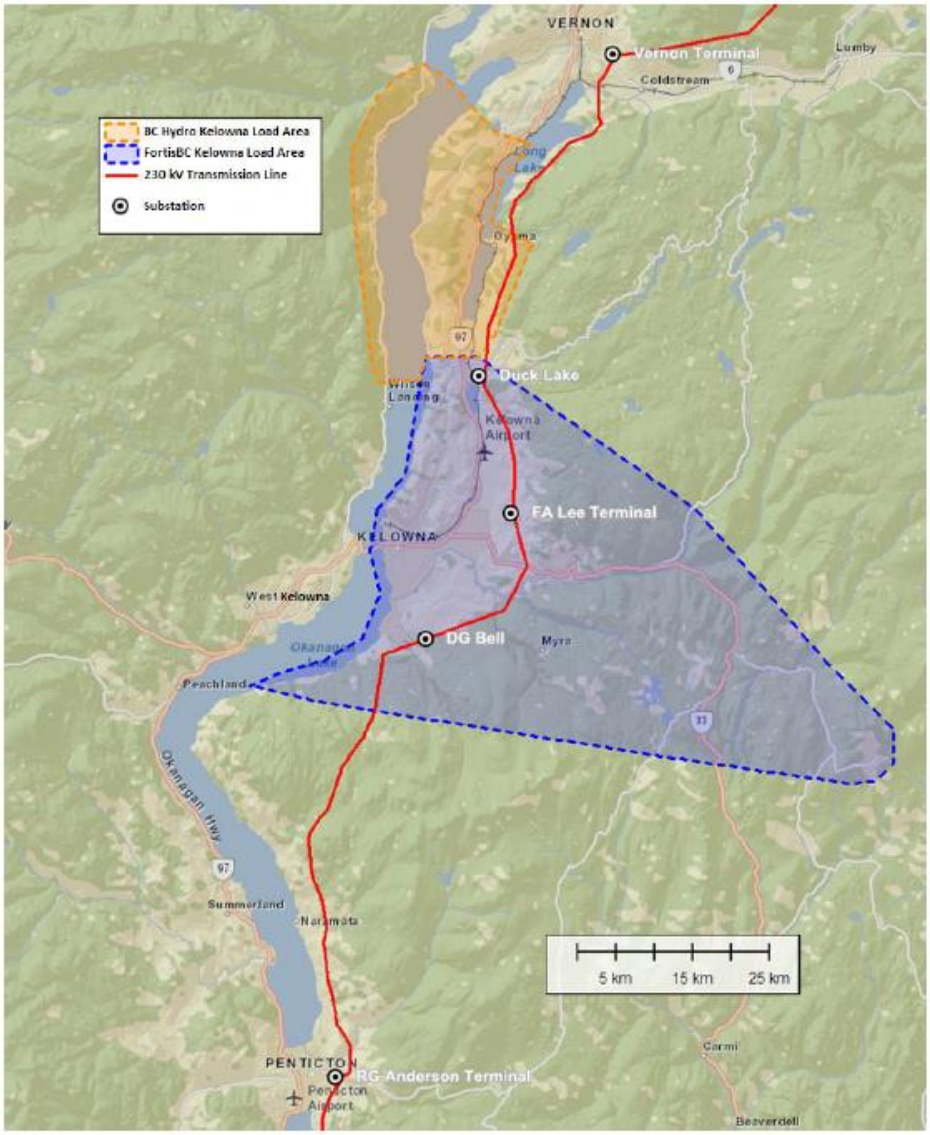
In addition, FBC provides electricity to BC Hydro for service to its approximately 8,000 customers in the Duck Lake area[6], which can also be seen in Figure 3-1.

3.1 Please provide the total number of customers FortisBC has by rate class.

3.2 Please provide information on the back-up generation capabilities of each of the five major customers listed and explain whether or not they would be part of a load shedding contingency and how any "customer" generation capability is factored into N-1 planning, if at all.

4. Reference: Exhibit B-1, page 11 and page 14

Figure 3-1: Map of Kelowna Load Area



3.3.1 Population and Housing

The Kelowna area is the fastest growing region in FBC's service area. The City of Kelowna and surrounding area has a population base of more than 140 thousand and is the largest urban centre in the British Columbia interior and the twenty-first largest metropolitan area in Canada. Kelowna has been one of the fastest growing cities in Canada during the last decade,[7] and has grown by an average annual rate of 1.6 percent during the 20-year period 1996-2016. As shown in Table 3-2, the population is forecast to continue to grow at a similar rate in the subsequent 20 year period to 2036.

Table 3-2: Actual and Forecast Kelowna Area Population 1996-2041[8]

Year	Population	Annual Avg Growth Rate	20-Yr Avg Growth Rate
1996	102,021		
2001	110,995	1.7%	
2006	120,392	1.6%	
2011	131,835	1.8%	
2016	141,022	1.4%	1.6%
2021	149,705	1.2%	
2026	164,711	1.9%	
2031	177,072	1.5%	
2036	188,445	1.3%	1.5%
2041	[illegible]	[illegible]	

Other sources demonstrate a consensus view of continued, consistent growth in the Kelowna area. For example, in 2011 the City of Kelowna adopted the Kelowna 2030 Official Community Plan,[9] anticipating the addition of 8,565 single / two unit homes and 11,520 multiple unit homes by 2030. In 2018, the City of Kelowna further predicted that the total number of new housing units required by 2040 will be between 23,000 and 25,000 units.[10]

[7] Statistics Canada, Table 17-10-0135-01, Population estimates, July 1, by census metropolitan area and census agglomeration, 2016 boundaries. July 1, 2018 data.

[8] Population projections prepared for FBC by BC Stats.

[9] https://apps.kelowna.ca/CityPage/Docs/PDFs/Bylaws/Official%20Community%20Plan%202030%20Bylaw%20No.%2010500/Chapter%2003%20-%20Growth%20Projections.pdf

[10] https://www.kelowna.ca/sites/files/1/docs/related/ff-population_and_housing.pdf

4.1 Please provide the rationale and any additional evidence FortisBC has to support the 1.9% forecast growth rate in 2026.

4.2 Please confirm that in the Great Recession growth rates were significantly and structurally reduced from prior planning estimating and please quantify where possible.

4.3 Please provide the company’s views as to whether or not the COVID pandemic and resultant worldwide economic slow-downs anticipated may end up affecting growth rates in the City of Kelowna, particularly given the pandemic impacts on destination attraction economies and please quantify where possible.

4.4 Please confirm that the key issue with N-1 reliability and growth projections primarily relates to the City of Kelowna, rather than the other affected areas? Please explain.

4.4.1 If no, please provide details of the potential impacts of growth in the other areas.

5. Reference: Exhibit B-1, page 16

Historical summer and winter peak loads for the Kelowna area are shown in Table 3-4 below.

Table 3-4: FBC Kelowna Area Summer and Winter Peak Loads, 2014-2019

	2014	2015	2016	2017	2018	2019
Summer (MW)	276.4	283.7	281.4	288.1	301.0	300.5
Winter (MW)	277.0	268.3	306.9	283.6	298.6	324.9

The Kelowna area load forecast for 2020-2028 is shown below:

Table 3-5: Kelowna Load Area Summer and Winter Peak Load Forecast, 2020-2028

	2020	2021	2022	2023	2024	2025	2026	2027	2028
Summer (MW)	309.5	314.6	319.8	325.5	331.5	336.5	343.3	349.4	355.5
Winter (MW)	340.4	343.9	348.3	352.9	357.0	361.3	365.8	370.3	374.5

After forecasting peak load from historical data, FBC includes the impact of known or highly probable load developments, such as community developments that have an expected connection date and defined loads. It is reasonable to expect that other incremental loads may materialize in the near to medium term. For example, FBC has received transmission service interconnection inquiries related to cannabis, cryptocurrency and data processing facilities. Additionally, electric vehicle (EV) adoption and electrification of transit fleets and new government policy all have the potential to result in further increases to the Kelowna area load forecast.

In the last two years, FBC has received five preliminary inquiries from cannabis and data processing facilities for transmission service in the Kelowna area or with the flexibility to locate anywhere in the FBC service territory. The potential load associated with these facilities is approximately 500 MW. While most of these inquiries are considered to be speculative and to have a fairly low probability of proceeding to completion, as an example, one potential connection in the range of 40 MW is considered to be feasible and to have a reasonable probability of proceeding. FBC includes this information to illustrate the potential impact of new large loads on the Kelowna area transmission facilities. None of these potential incremental loads has been included in the forecast above, since none has been confirmed.

Figure 3-3 below indicates the existing summer and winter transformer limits relevant to the KBTA Project and the actual and forecast summer and winter peak loads (the difference between summer and winter seasons and their respective limits is explained in Section 3.4). The summer peak load is

5.1 Is the forecast weather normalized? Please explain.

5.2 Please confirm the CEC's interpretation, or otherwise explain, that only those loads from known events with defined loads and expected connection dates are included in the forecast.

5.2.1 If confirmed, in table 3-5, please break out the new load from load developed from historical data.

5.2.2 If not confirmed, please break out from load developed from historical data:

a) the load from known events that have a connection date and defined loads;

b) the load from other expected incremental loads such as the cannabis, cryptocurrency, data processing;

c) load from EV; and

d) load from any other potential load included in the load forecast.

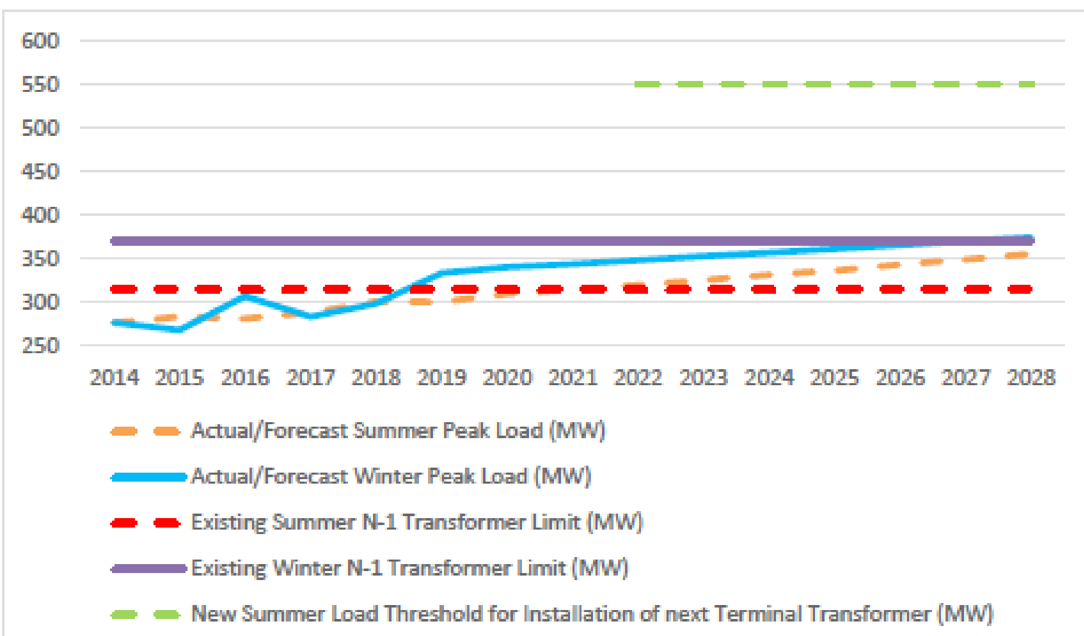
5.3 Please provide FortisBC's expectation of how the EV charging will develop with quantification.

6. Reference: Exhibit B-1, pages 16-17

Figure 3-3 below indicates the existing summer and winter transformer limits relevant to the KBTA Project and the actual and forecast summer and winter peak loads (the difference between summer and winter seasons and their respective limits is explained in Section 3.4). The summer peak load is

forecast to reach the transformer limit of 315 MW in 2021 and to exceed the limit in 2022 as set out in Table 3-5, and the forecast winter peak load will exceed the winter transformer limit of 370 MVA in 2027. Finally, the incremental summer transformer capacity to be gained from the KBTA Project (assuming the preferred alternative) can be seen beginning in 2022. The incremental capacity increase is 235 MW (550 MW less the existing 315 MW).

Figure 3-3: Kelowna Area Peak Loads and N-1 Transformer Limits (Preferred Alternative)



6.1 Please provide in the graph the New Winter Load Threshold of next Terminal Transformer.

6.2 Please provide Figure 3-3 assuming peak load from historical data only, and including the New Winter Load Threshold.

6.3 Please comment on the variability being seen in the Actual/Forecast Winter Peak Load. What caused the changes from 2014-2018, and why does FortisBC forecast ongoing increases instead of variability going forward?

7. Reference: Exhibit B-1, page 17

3.3.2.1 Impact of COVID-19 on Load Forecast

FBC's peak demand forecast was prepared in 2019, before the onset of the COVID-19 pandemic. FBC acknowledges that the immediate and near-term impacts of the pandemic may be significant for some rate classes and economic sectors. However, the Company is optimistic about the timeline for recovery from these impacts in its service territory and believes that the execution of this critical transmission project should not be deferred as a result of the COVID-19 situation, particularly as the Project is not expected to be in service until the end of 2022. As of the date of filing, there is insufficient data to quantify the COVID-19 impact during 2020, or to forecast future impacts on energy consumption or, more importantly for system planning, on peak loads.

In the near term, COVID-19 may result in commercial loads declining due to business closures (in compliance with public health orders or as a result of general economic conditions). However, there are also some of the factors that may mitigate the economic impacts of COVID-19 as they relate to energy and peak load forecasting, For example, there is expected to be some offsetting increase in residential loads, as a result of individuals working from home or spending more time at home due to job losses. Further, some of these impacts will be temporary and are likely to be resolved during 2020 but the timing and magnitude of full recovery cannot be forecast. Similarly, the reduction in load for some large commercial customers (such as educational institutions) will be temporary and may in fact have a limited impact on 2020 and future summer peak loads. At this time FBC has no information available to quantify the impact on other customer classes or economic sectors.

FBC noted above a number of possible factors that could act to increase load above the baseline forecast presented above, including residential developments, cannabis, cryptocurrency and data processing facilities, EV adoption and government electrification policy. Since the occurrence of COVID-19 FBC continues to receive inquiries and requests for preliminary planning for certain projects. FBC cannot conclude that COVID-19 will result in the deferral or cancellation of these potential additional loads.

In summary, given the lack of firm information on COVID-19 related impacts on the summer peak load in 2022 and future years, the continuing potential for significant new loads in the Kelowna load area, and the lead time required for a project of this nature, FBC concludes that it would not be prudent to delay the addition of transmission capacity in the Kelowna load area and that the KBTA Project should proceed as set out in this Application.

7.1 Please provide the commercial reductions that have been experienced to date likely as a result of COVID-19, if any.

7.2 Please provide any range of impact scenarios that FortisBC has developed with respect to the impact of COVID-19.

7.3 Please show a sensitivity in Figure 3-3 assuming commercial load reductions of 10%, 20%, 30%, and gradual recovery with final recovery occurring in years 3, 5, 7, and 10.

8. Reference: Exhibit B-1, page 19

3.4.1 Seasonal Peaks Forecast to Reach Emergency Limits in N-1 Conditions

For the 138 kV transmission system in the Kelowna area, seasonal peaks will reach system emergency limits during the summer season before the seasonal peaks will reach system emergency limits in the winter season. This is because higher ambient temperatures reduce the summer emergency limits below the winter emergency limits. For example, summer emergency limits for LEE T3 and T4 are both much lower in summer at 159 MW, as compared to their respective winter emergency limits of 189 MW and 195 MW.

Power flow simulation studies were used to analyse single contingency scenarios. When either of the two existing LEE terminal transformers[18] is out of service, the loading on the remaining transformer is 191 MVA (91 percent of its emergency limit) when the total Kelowna area load reaches 315 MW, which is just marginally higher than the forecast summer peak load forecast in 2021[19], as provided in Table 3-5. The loading on the remaining LEE transformer can be lowered by adjusting the load supply configuration in the Kelowna 138 kV system to transfer additional load to DGB. After system reconfiguration, the flow on the remaining LEE transformer is 168 MVA, which is 80 percent of the emergency limit and 100 percent of normal rating.

8.1 Please provide further elaboration on why higher ambient temperatures reduce the summer emergency limits below the winter emergency limits.

8.2 What factors contribute to the level of emergency limits? Please explain.

9. Reference: Exhibit B-1, page 19 and page 22

As Kelowna area load increases, an N-1 event in 2022 and beyond would result in loading above 168 MVA on the remaining LEE transformer, even after the reconfiguration described above. FBC's operating procedures allow operation above the normal rating for only six hours[20], and plans to reduce the loading must be implemented within this time frame. If loading above the normal rating of 168 MVA is expected to persist for longer than six hours, the facility loading must be reduced below 168 MVA as soon as practicable by shedding customer load during peak load periods. Initially, the requirement for such load shedding would be confined to only part of the peak load period on summer peak days. However, as Kelowna area load increases, the duration and frequency of required load shedding events would increase. As shown in Figure 3-3, load shedding events could also be required on winter peak days beginning in winter 2027; the forecast winter peak load in load in 2027 is 370.3 MW (Table 3-5) compared to the winter emergency limit of 370 MW. FBC's Kelowna area transmission system will then be in violation of its transmission planning criteria unless additional 138 kV capacity is added.

b) ***Demand Response:*** Demand Response (DR) can be an effective means of reducing or shifting peak load and FBC is investigating the potential use of DR for mitigating system peaks. A DR pilot is currently underway in the Kelowna area, however as explained in FBC's 2019-2022 Demand Side Management Expenditures application, the DR pilot is a proof-of-concept initiative and the magnitude of the proposed target of 1.75 MW capacity is insufficient to defer the KBTA Project. Accordingly, DR is not a reasonable alternative for this Project.

9.1 Please provide quantification of FortisBC's history of outages related exceeding N-1 conditions lasting longer than 6 hours for the last 10 years.

9.2 Could Time of Use ("**TOU**") pricing also be used to reduce or shift peak? Please explain.

9.2.1 If yes, what actions has FortisBC taken to implement TOU pricing?

9.3 What capacity target would FortisBC need to set for a Demand Response ("**DR**") or TOU pricing program in order to defer the KBTA project? Please explain and provide quantification relating the target to the duration of the deferral.

9.4 Would it be feasible to increase the capacity targets of the DR to useful levels for deferring this project? Please explain why or why not.

9.5 Please provide order of magnitude estimates of the cost of DR or TOU programs.

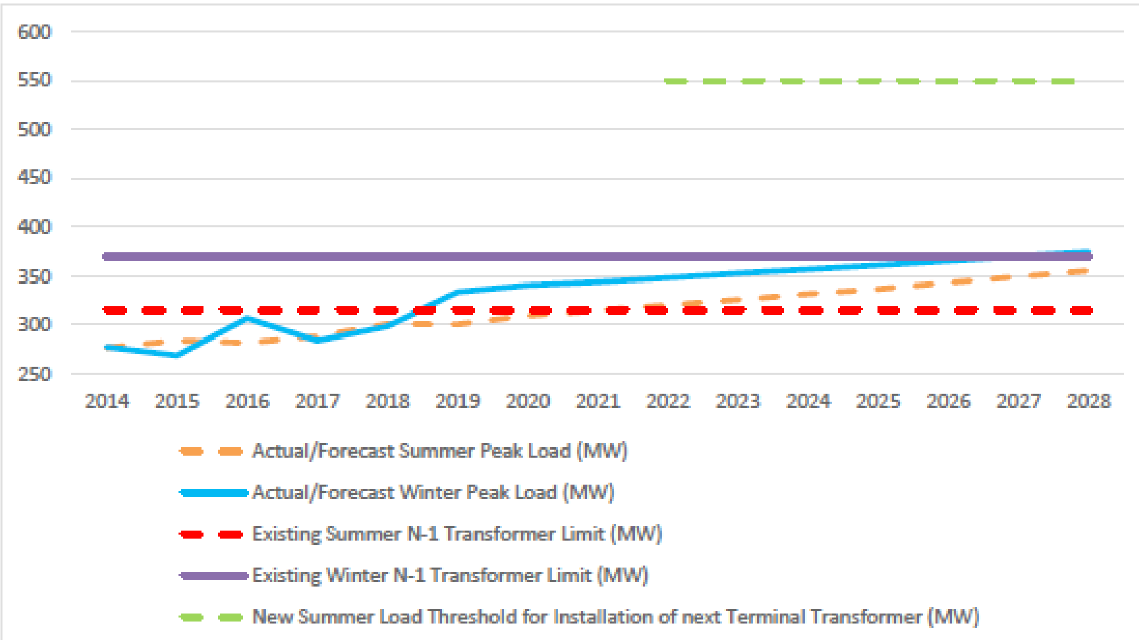
9.6 Please provide approximations of the time it would take to implement DR or TOU programs that could potentially address the issue instead of the current project.

10. Reference: Exhibit B-1, page 19 and page 24

> Finally, in the event of a LEE terminal transformer failure, it would likely take more than a year to procure and install a replacement transformer. Since FBC does not own a mobile transformer of suitable size and voltage, such a failure would require customer outages for the Kelowna area under peak load conditions to prevent excessive operation of the transformers within emergency limits. The number of customers affected and the duration of the outages would depend on load conditions at

> the time; one option to manage loading through peak periods would be to rotate blackouts between substations or feeders in the area to reduce loads to less than 168 MVA.

Figure 4-1: Kelowna Area Peak Loads and N-1 Transformer Limits (LEE Alternatives)



10.1 Does FortisBC have other mobile transformers that may not be suitable? Please explain and identify how many mobile transformers it has and what makes such mobile transformer suitable.

10.2 In what ways could a suitable mobile transformer be used to address the current issues? Could it be used to temporarily meet peak lead when required? Could it replace or defer the project?

10.3 Please discuss the costs and benefits of using mobile transformer(s) and provide the expected cost of a mobile transformer of suitable size and voltage.

10.4 Could a mobile transformer address multiple risks within FortisBC service territory by addressing various issues when they arise? Please explain how it could be used to do so.

10.4.1 If feasible, why did FortisBC not assess purchasing a mobile unit as an alternative?

10.4.2 If feasible, please provide figure 4-1 with the New Summer Threshold using a mobile unit.

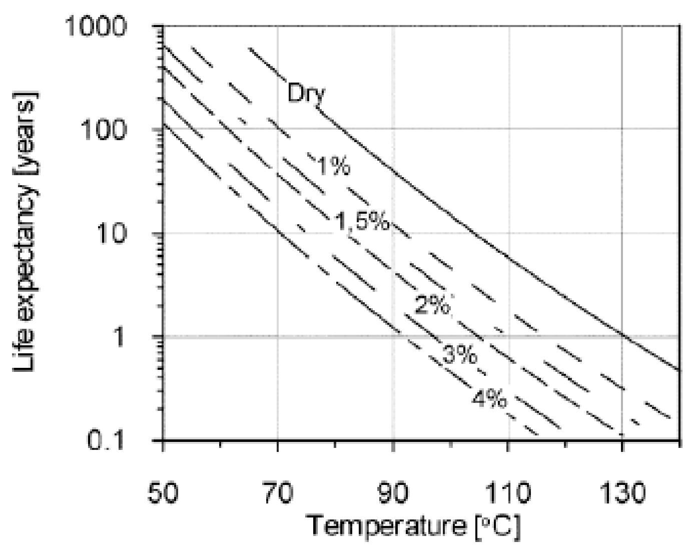
11. Reference: Exhibit B-1, page 20

3.5 OVERLOADING THE TERMINAL TRANSFORMER WILL SHORTEN ITS LIFESPAN

Loading of substation transformers above the normal nameplate rating has a significant impact on their remaining expected lifespan. As noted in Section 3.4, even after reconfiguration of the Kelowna network in the event of an outage of one of the LEE transformers, the remaining LEE transformer could be overloaded, beginning in summer 2022.

Prolonged loading in the emergency range increases winding hot spot temperature[21] and decreases the expected remaining life of the transformer. For transformers of the type installed at LEE and DGB, this relationship between temperature and life expectancy is exponential, as can be seen below in Figure 3-4. While transformers have an average life of 40 years, if a transformer is lightly loaded throughout its in-service life, the winding insulation can be expected to last longer; conversely, insulation life would be expected to be less than a year if the transformer is overloaded on a consistent basis. Each hour that a transformer is loaded above nameplate rating brings a corresponding increase in winding hotspot temperature that has a substantial negative impact on remaining expected lifespan.

Figure 3-4: Expected life for solid insulation and its dependence upon moisture and temperature.[22]



11.1 Please provide the current remaining life of the transformers in question.

11.2 Is the average life expectancy of 40 years that of FortisBC's history, standard to the industry, or both? Please explain.

11.3 Please provide FortisBC's full range of life expectancy for all of its transmission transformers.

11.4 Is it possible for transformers to be repaired, such as replacing the winding insulation in order to extend their working lives? Please explain.

11.4.1 If yes, please provide an estimate of the costs to do so.

12. Reference: Exhibit B-1, page 24

In each alternative, the transformer to be installed is a 230/138 kV transformer with a rating of 120/160/200 MVA, which is the modern standard size for transformers in applications of this type, and matches the rating of the transformers at DGB and other FBC terminal stations. The new transformer rating needs to match or exceed the 168 MVA rating of the existing LEE transformers so that its rating would not be the limiting factor in future N-1 scenarios.

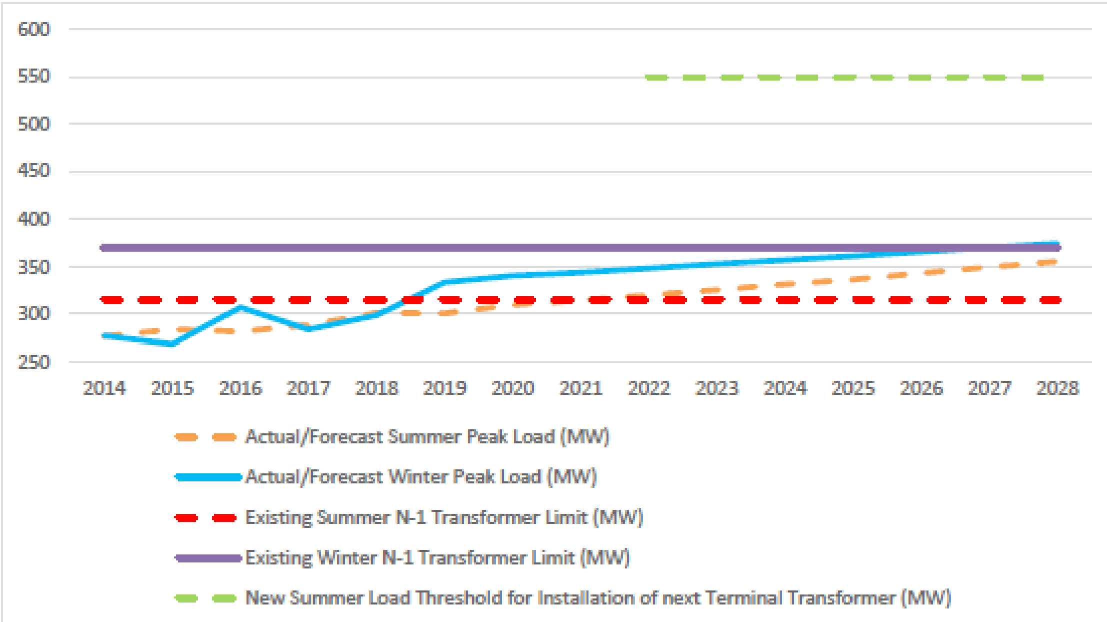
12.1 Please provide an explanation as to 'future N-1' scenarios.

12.2 Please provide further details of the future risk to N-1 if the transformer rating did not match or exceed the 168 MVA rating, and provide quantification of the risk. How would it affect the ability to meet the forecast summer peak?

13. Reference: Exhibit B-1, page 24 and page 25

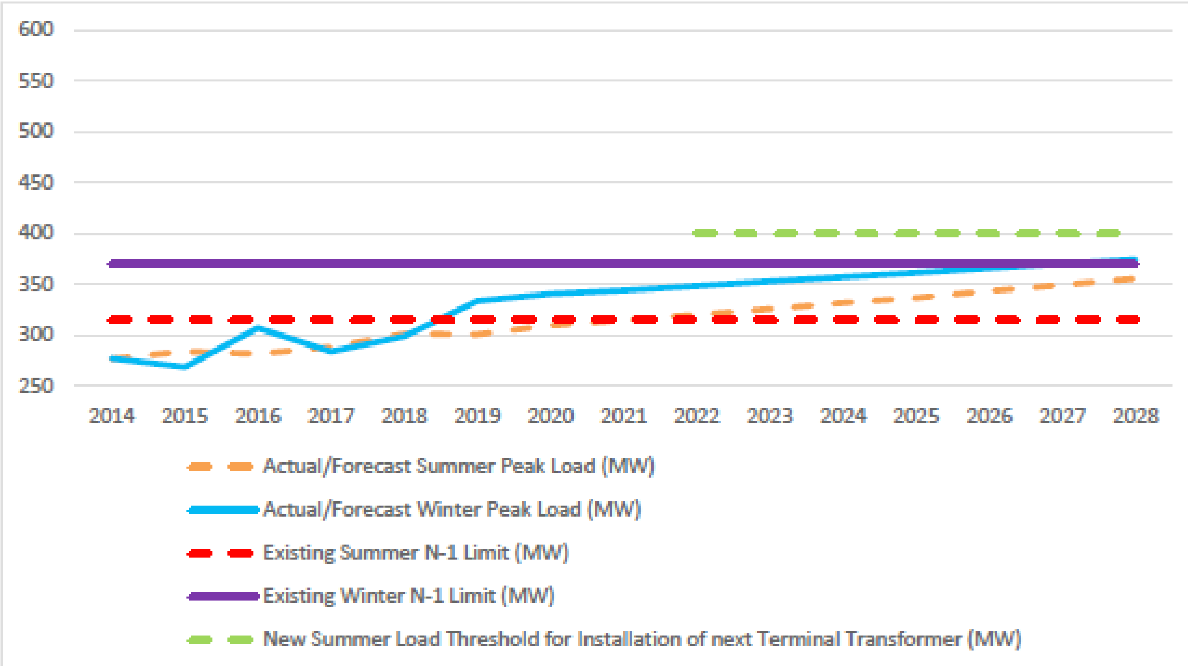
Figures 4-1[23] and 4-2 below show the incremental 138 kV capacity that would be achieved by installing the transformer at LEE (Alternatives A and B) and at DGB (Alternative C), respectively. The figures show the actual and forecast summer and winter peak loads for the Kelowna area, along with the existing limits for N-1 reliability and the new load thresholds after installation of the additional transformer at each station.

Figure 4-1: Kelowna Area Peak Loads and N-1 Transformer Limits (LEE Alternatives)



After installation of an additional transformer at LEE, the next terminal transformer addition would not be required for the Kelowna area until the summer peak load reaches 550 MW, which provides for an incremental emergency capacity of 235 MW.

Figure 4-2: Kelowna Area Peak Loads and N-1 Transformer Limits (DGB Alternative with 60L and 51L Reconductoring)



13.1 Please confirm that both Alternatives A and B are represented by Figure 4-1, and Alternative C is represented by Figure 4-2.

13.2 Please provide a forecast of when FortisBC expects that summer peak might reach 550 MW.

13.3 Please provide a forecast of when FortisBC expects the summer peak to exceed 400 MW.

14. Reference: Exhibit B-1, page 33

Table 4-1: KBTA Project Alternatives Comparison

Evaluation Criteria (Section 4.5.1)	PARAMETERS FOR RATING	WEIGHT	OPTION A RATING	OPTION B RATING	OPTION C RATING	GENERAL COMMENTS / RATIONALE FOR RATING
	Technical Criteria					
1	N-1 Criteria Considerations	10%	3	3	1	All alternatives allow FBC to serve load growth in the Kelowna area while continuing to meet N-1 planning criteria. Alternatives A & B provide 235 MW of incremental capacity in the event of a LEE transformer failure, while Alternative C provides only 85 MW of incremental capacity.
2.1	Safety	10%	3	1	3	As described in Section 4.3.1, the ring bus configuration in Alternatives A and C reduces safety risk as compared to split bus.
2.2	Operability	20%	3	2	3	As described in Section 4.3.1, the ring bus configuration in Alternatives A and C is easier to operate and maintain than split bus.
2.3	Complexity of protection and switching schemes	5%	3	1	3	As described in Section 4.3.1, the ring bus configuration in Alternatives A and C reduces the risk of misoperation incidents due to simpler protection and switching schemes.
2.4	Removal of legacy infrastructure	5%	3	2	1	Alternatives A & B address end-of-life 13 kV distribution equipment at LEE. Alternative A also addresses obsolete 138 kV breakers at LEE, as four end-of-life breakers are salvaged.
3	Potential for future expansion	20%	3	1	2	**Alternative A:** The seven breaker 138 kV ring bus could be converted in future to a nine breaker ring without expanding the bus. A nine breaker ring bus would create two additional nodes for connection of new transmission line(s) and/or a 138 kV/13 kV distribution transformer. **Alternative B:** 138 kV split bus would not provide the ability to add future nodes for the installation of a distribution transformer and/or transmission line(s). **Alternative C:** The construction of the new 230 kV yard leaves ample space for future equipment installation. The removal of 230 kV equipment from the existing station creates space for the installation of future 138 kV equipment.
4	Reliability	20%	3	2	3	As described in Section 4.3.1, the ring bus configuration in Alternatives A and C is more reliable than split bus.
	Subtotal Technical Criteria Score	**90%**	**2.70**	**1.55**	**2.2**	
	Project Risks					
5.1	Schedule Risk	2.5%	2	3	2	Transformer for all alternatives has a lead-time in excess of a year and will need to be ordered in early design stage. Construction activities for Alternative B are the less complex than Alternatives A and C, so schedule risk is lowest.
5.2	Lands Risk	2.5%	3	3	3	Agricultural Land Commission approval is required for station expansion in all alternatives.
5.3	Environmental Risk	2.5%	3	3	3	None of the alternatives require environmental permitting.
5.4	Archaeological Risk	2.5%	3	3	3	There are no known archaeological sites near LEE or DGB.
	Subtotal Risk Criteria	10.0%	0.275	0.3	0.275	
	Total Technical and Risk Criteria Score (Max 3.0)	**100%**	**2.98**	**1.85**	**2.48**	

Table 4-2: KBTA Project Alternatives Financial Comparison

	Financial Considerations					
			OPTION A	**OPTION B**	**OPTION C**	
6	**Annual O&M Costs**	**N/A**	**$0.028M reduction**	**$0.023M reduction**	**$0.020M increase**	
7	**Present Value Incremental Revenue Requirement**	**N/A**	**$23.0M**	**$17.1M**	**$44.0M**	
8	**Levelized Rate Impact**	**N/A**	**0.39% $0.00045 /kWh**	**0.29% $0.00034 /kWh**	**0.75% $0.00086 /kWh**	

14.1 Please provide a discussion of how FortisBC determined the appropriate weight to be applied to each of its Evaluation Criteria parameters. Was this based on judgement, or on some other formulaic measure? Please elaborate on the rationale for each criterion and explain the weighting relative to the others. For instance, why is N-1 Criteria Consideration provided with only 10%, while Potential for Future expansion is provided with double that, at 20% weighting.

14.2 Please provide a discussion of how FortisBC selects its Parameters for Rating. Are these standard parameters, or are they developed for each project?

14.3 Did FortisBC select the scale of 3 because there are 3 Alternatives being considered? Please explain and provide FortisBC's rationale for the size of the scale. Is this how FortisBC typically determines its scale?

14.4 Please provide a discussion of how FortisBC determined the Rating values for each Evaluation Criteria.

14.5 Please provide justification for the 20% weight given to the 'Potential for Future Expansion.' Please consider the following and provide quantification to support the statements.

14.5.1 Under what circumstances can FortisBC expect to require Future Expansion?

14.5.2 What is the likelihood of that occurring?

14.5.3 What would be the expected additional costs to meet this requirement?

14.6 Please provide empirical data demonstrating the likelihood that there will be a need for Future Expansion and when.

14.7 The 'ring bus' difference appears to be the source of nearly all the Technical Criteria, please explain the reasons for this.

15. Reference: Exhibit B-1, page 33 and 35

Table 4-2: KBTA Project Alternatives Financial Comparison

	Financial Considerations					
			OPTION A	OPTION B	OPTION C	
6	Annual O&M Costs	N/A	$0.028M reduction	$0.023M reduction	$0.020M increase	
7	Present Value Incremental Revenue Requirement	N/A	$23.0M	$17.1M	$44.0M	
8	Levelized Rate Impact	N/A	0.39% $0.00045 /kWh	0.29% $0.00034 /kWh	0.75% $0.00086 /kWh	

4.6.3 The Preferred Solution is Alternative A

The Company's preferred solution is Alternative A, under which FBC would purchase and install a new 230/138 kV 200 MVA transformer at LEE and would reconfigure the 138 kV bus into an FBC and industry standard ring bus configuration.

From a financial perspective, the rate impact of Alternative A is approximately 0.10 percentage points higher than Alternative B.[27] However, FBC maintains that Alternative A provides a number of technical advantages that justify the additional cost. The difference in the annual bill impact for an average residential customer using 11,000 Kwh is $1.27 between Alternative A and Alternative B.

Of the three alternatives considered, Alternative A provides the best technical solution. It meets the Company's transmission planning criteria, delivers the most reliable, operable and safe final station configuration, and provides better potential for future expansion. On this basis, Alternative A is selected as the preferred solution for the KBTA Project.

15.1 Please confirm that there is no significant flaw with Alternative B, such that it would not meet the key requirements of the project, be acceptable to various regulators or perform adequately.

15.2 Please provide the basis upon which FortisBC determines that the total cost difference of about $6 million, or a 35% premium over the lower-cost solution, is justified by the improvements in the Technical analysis.

16. Reference: Exhibit B-1, page 46-47

5.6 OTHER APPROVALS REQUIRED

City of Kelowna

A municipal building permit will be required for the new control building that will be constructed within the station.

Ministry of Transportation and Infrastructure Permits

Highways and areas under the jurisdiction of the Ministry of Transportation and Infrastructure may require permits. Once the extent of any transportation impact is determined during detailed design, permits will be prepared and submitted for approval by either FBC or its vendor(s), as required. The terms and conditions outlined in these permits will be adhered to during the construction of the Project.

Agricultural Land Commission (ALC)

LEE is within the provincial Agricultural Land Reserve, and approval will be required for the station expansion. ALC approval is expected to be granted as the site is approved for non-farm use and the substation expansion will take place entirely on the existing FBC-owned property.

There are no other federal, provincial, or municipal approvals, permits, licenses or authorizations required to complete the Project.

16.1 Please confirm or otherwise explain that FortisBC does not anticipate any issues receiving the Other Approvals Required and why.

17. Reference: Exhibit B-1, page 48

Table 5-1: Risk Register

Type of Risk	Risk Description	Mitigating Actions	Likelihood of Occurrence (Low / Medium / High)
Scope	Scope creep due to existing conditions not reflecting that of existing as-built drawings on record	FBC will validate existing conditions on site by surveying and reviewing substation drawings to reflect existing infrastructure	Medium
Safety	Contractors not familiar with FBC safe work practices resulting in injury or violations	Selection of contractor with FBC substation experience or train selected contractor prior to work commencing. FBC will provide a CAT 6[28] worker to act as a site safety watch for construction work	Low
Quality	Poor quality installations	FBC will have dedicated resources monitoring construction activities as scheduled by the Construction Manager. As well an Inspection & Test plan will be implemented with installation contractor for Hold and Witness points[29]	Low
Cost	Raw materials cost increase due to inflation/market value	Purchase all equipment from established suppliers and, where possible, with agreed purchase prices. Competitive tendering will be used to ensure lowest cost at best value products. Contingency may be used in the case of higher than anticipated foreign exchange or raw material escalation	Low
	Actual costs of construction higher than estimated	Detailed class three estimate completed for construction	Low

17.1 Please explain how FortisBC determines the risk levels in the risk register. Is this based on FortisBC judgement, or has there been a third party analysis undertaken?

17.2 Please confirm that the Risk Register identifies the likelihood of the risk, but does not identify the scale of the potential impact.

17.3 Please confirm that for a complete risk analysis the potential impacts need to be considered and evaluated and please provide the FortisBC assessment of the consequences in financial quantitative terms and or in quantitative load shedding terms.

17.3.1 Please assign an approximate quantitative range for the scale of low, medium and high.

17.4 Please provide another column in Table 5-1 identifying the potential magnitude of the cost risk associated with each Risk.

18. Reference: Exhibit B-1, pages 49 and 50

Type of Risk	Risk Description	Mitigating Actions	Likelihood of Occurrence (Low / Medium / High)
Schedule	Availability of resources	External contractors will be used with support from internal FortisBC crews. FBC anticipates availability of qualified external resources	Low
	Delivery of services and materials	Schedule and order long lead-time materials in the early stages of the design to allow for ample time for delivery to site before required	Low
	Meeting construction windows for transmission outages	In depth planning and scheduling of outages will be used to reduce this risk along with provisions of schedule buffers to mitigate impacts	Low
	Scheduling conflicts with other system outages	Early involvement and awareness from all internal groups well before construction to align outage requirements with system constraints	Medium
	Project completion delayed	Insert milestones in the contract with contractor and consider implementing liquidated damages or bonus structure to achieve schedule	Medium
	Agricultural Land Commission (ALC) approval	Application to ALC for approval of station expansion (the property is currently approved for non-agricultural use)	Low
Environment & Archaeological	Contaminated soils around existing oil filled equipment	Early recognition by soil sampling to identify any contaminated areas	Low
	Wildfire risk when relocating transmission structures and completing site expansion	In depth planning and scheduling this portion of work outside of wild fire season when possible. The work is confined to the substation property which has limited vegetation	Low
	Ground water issues may cause construction delays	In depth planning and scheduling work outside of the peak spring runoff times. Review of station environmental ground water survey	Medium
	Unforeseen environmental or archaeological discoveries during construction	Early consultation and exploration of unforeseen archaeological sites in the area of construction	Low

18.1 Please confirm that there is no known risk to wildlife as a result of the project.

18.2 Would any of the risks have changed significantly under a different alternative? Please explain.

19. Reference: Exhibit B-1 page 55-56

6.4.2 Incremental Revenue Requirements and Rate Impact

The Project construction period is between 2021 and 2022 with the majority of assets entering rate base in 2023. A 40 year cost of service model, equivalent to the life of the assets, was used to evaluate the rate impact. The rate impact in 2024, the year when all assets have been transferred into plant asset accounts is estimated at 0.54 percent. This equates to an annual bill increase of $6.87 for an average residential customer using 11,000 kWh. The levelized 40 year rate impact is 0.39 percent or approximately $0.45 per MWh. The annual bill impact for an average residential customer using 11,000 kWh at the 40 year levelized rate would be approximately $4.96.

6.5 *SUMMARY*

In this section, FBC has described the Project cost estimate, the financial evaluation, accounting treatment, and the estimated rate impact. The Project is estimated to cost $23.288 million in as-

spent dollars including net removal costs. The levelized rate impact of Alternative A is projected to be 0.39 percent or approximately $0.45 per MWh, and will add approximately $4.96 to the annual bill for the average customer using 11,000 kWh.

19.1 Please explain if there would be any change in treatment or other impacts depending on the form of regulation (i.e. cost of service or MRP).

20. Reference: Exhibit B-1, page 58 and 59

7.2 *KEY STAKEHOLDERS*

The Key Stakeholders for the KBTA Project have been identified as:

- City of Kelowna elected officials and staff;
- Residents and businesses at the Tower Ranch subdivision and Tower Ranch Golf & Country Club, and other residents adjacent to or in close proximity to LEE; and
- Indigenous Communities as identified through the Provincial Consultative Areas Database.

20.1 Please provide the number of Residents and businesses at the Tower Ranch subdivision and Tower Ranch Golf & Country Club, and other business or residents adjacent to or in close proximity to LEE. Please separate by Rate Class.

21. Reference: Exhibit B-1, page 58

7.4 CONSULTATION WITH LOCAL RESIDENTS

With the assistance of the Tower Ranch Community Association (TRCA), FBC has had an opportunity to reach a very high percentage of local residents. The TRCA maintains a contact list covering 100 percent of the residents living in the subdivision, including e-mail addresses. The Company has been able to work through the TRCA to send consultation information directly to the affected customers. This is of particular importance since many of the residents were absent from the area during the consultation phase of the Project.

To date, activities included the following:

- Development of a Project webpage, providing an email address where questions/ inquiries can be submitted to the Company, and a link to a short survey where residents can provide their input on the Project;
- Sending notification letters to area residents and businesses directly impacted by the Project; and
- Hosting a virtual Town Hall / Information Session for area residents.

21.1 Did FortisBC offer businesses an equivalent survey to residents? Please explain.

21.2 What proportion of businesses was FortisBC able to reach?