SIXTH FLOOR, 900 HOWE STREET, BOX 250
VANCOUVER, B.C. V6Z 2N3 CANADA
web site: http://www.bcuc.com

BRITISH COLUMBIA UTILITIES COMMISSION

ORDER NUMBER C-4-07

TELEPHONE: (604) 660-4700
BC TOLL FREE: 1-800-663-1385
FACSIMILE: (604) 660-1102

IN THE MATTER OF
the Utilities Commission Act, R.S.B.C. 1996, Chapter 473

and

An Application by FortisBC Inc.
for a Certificate of Public Convenience and Necessity
for the Ellison Substation Project

BEFORE: L.F. Kelsey, Panel Chair & Commissioner
L.A. O'Hara, Commissioner May 9, 2007

CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

WHEREAS:

A. On October 27, 2006 FortisBC Inc. ("FortisBC") applied (the "Application") to the British Columbia Utilities Commission ("Commission") for a Certificate of Public Convenience and Necessity ("CPCN") for the Ellison Substation Project ("the Project"); and

B. By Order No. G-140-06 the Commission established an Oral Public Hearing process and Regulatory Timetable for the review of the Application; and

C. By Order No. G-171-06 dated December 20, 2006, in response to requests from the Quail Ridge Residents' Association ("QRRA") and Mr. Hans Karow, the Commission established a Revised Regulatory Timetable for the review of the Application; and

D. By letter dated January 3, 2007, Counsel for the Concerned Citizens of Quail Ridge and Lochrem Road ("CCQRLR") advised that he had just been retained by the CCQRLR and, citing a number of concerns, submitted that the scheduled Oral Hearing for February 6, 2007 is premature; and

E. On January 9, 2007, the Commission held a Workshop on the Project in Kelowna, which provided FortisBC an opportunity to explain the details of the Application and for attendees to ask questions of FortisBC; and

F. On January 9, 2007, the Commission held a Pre-hearing Conference in Kelowna to hear submissions from Intervenors and Interested Parties, to address procedural matters and to develop an Issues List for the Oral Public Hearing; and

G. The Commission Panel considered the written submissions received prior to January 9, 2007 as well as the submissions made by FortisBC, Intervenors and Interested Parties during the Pre-hearing Conference, and determined that a further extension to the Revised Regulatory Timetable set down in Order No. G-171-06 to allow for further examination of the Application and, more specifically, possible siting alternatives as suggested by Intervenors, was warranted and established by Commission Order No. G-1-07, an Extended Regulatory Timetable; and

H. The Commission Panel considered the submissions for Hearing Issues, including consultation concerning the Application and an expansive review of EMF issues and determined a Hearing Issues List related to the decision that it must make with respect to the Application and set Monday, April 2, 2007 for the Oral Public Hearing; and

I. An Oral Public Hearing was held in Kelowna on April 2, 2007, including an evening session to hear submissions from the Intervenors, followed by written Final Arguments, Reply Argument by FortisBC and further Reply Argument by CCQRLR and QRRA.

NOW THEREFORE the Commission orders as follows with reasons to be issued at a later date.

1. Pursuant to Sections 45 and 46 of the Utilities Commission Act the Commission grants a CPCN to FortisBC to construct the Ellison Project - Option 1 as described in the Application on the terms that follow.

2. A decision by the Commission Panel on the siting of the substation will be made after it reviews the assessment of the Airport site by the Applicant and the submissions of the Parties. FortisBC is directed to submit a written report by June 6, 2007, which includes the issues listed in Attachment A. Intervenors are to file comments on the report by June 13, 2007, followed by FortisBC's reply on June 20, 2007.

3. FortisBC is to collaborate with the City of Kelowna and affected QRRA members and Quail Ridge residents, to determine, considering the current and/or future plans for the development of McKinley Road, the alignment for Ellison Feeder 4 with the least impact as it passes the northern section of the Quail Ridge development and to make available to the QRRA members and residents full details of an undergrounding option for this section of Feeder 4 and the arrangements by which these members and residents could access this option. FortisBC is directed to file a report on progress on the collaboration on and/or resolution of this matter by September 28, 2007. Intervenor comments are to be submitted by October 10, 2007 and FortisBC reply by October 18, 2007. A decision by the Commission Panel on the alignment of Feeder 4 will be made after it reviews the report from the Applicant and the submissions of the Parties.

4. Pursuant to item 3 above, FortisBC is to confirm in its report that the alignment of any Ellison Feeder 4 under consideration and/or proposed to the Commission is in compliance with the WHO and ICNIRP EMF standards.

DATED at the City of Vancouver, in the Province of British Columbia, this 10th day of May 2007.

BY ORDER

Original signed by:

L.F. Kelsey
Panel Chair & Commissioner

Attachment

FORTISBC INC.
ELLISON SUBSTATION PROJECT

Report Comparing Siting Alternatives for the Substation

Topics to be included in Report by FortisBC on the Airport Site

1. Availability of the Airport Site for purchase to construct a substation, substantiated cost of acquisition and any zoning and/or regulatory issues.

2. Access alternatives including substantiated costs.

3. Technical issues, unique to the Airport Site, which must be addressed.

4. Detailed cost estimate including net result of necessary changes to transmission and distribution routings as proposed in Option 1.

5. Discussions with the Ministry of Transportation.

6. Completion of the following Template comparing the Lochrem Road Site with the Airport Site.

FORTISBC INC.
ELLISON SUBSTATION PROJECT

Report Comparing Siting Alternatives for the Substation

Please provide a table similar to the following that compares the sites on the basis of non-financial criteria. FortisBC should provide a definition for each criterion, and suggest additional or revised criteria, where necessary. The criteria should be clearly defined and non-redundant. A score of 5 is suggested for the best performing alternative, and the weighting factors for the criteria should sum to 100.

	Criterion	**Weighting Factors**	**Lochrem Road**		**Airport**	
			Rank	**Weighted Rank**	**Rank**	**Weighted Rank**
1.	Reliability					
2.	Operations & Safety					
3.	Public Health					
4.	Risk of Delay					
5.	First Nations					
6.	Terrestrial Habitat					
7.	Aesthetics					
8.	Property Values					
9.	EMF					
10.	Effects during Construction					
11.	Flexibility for Future Growth					
12.	**Totals**	**100**				

FORTISBC INC.
Certificate of Public Convenience and Necessity
for the Ellison Substation Project

REASONS FOR DECISION

1.0 BACKGROUND AND REGULATORY PROCESS

The north Kelowna area has experienced strong load growth during the last decade, with further rapid growth forecast over FortisBC Inc.'s ("FortisBC" or the "Company") system planning horizon. Within two years, the Company states, the growth cannot be accommodated without adding system capacity.

The north Kelowna area is currently served by Duck Lake and Sexsmith substations, which are supplied from the FA Lee Terminal Station in Kelowna by the 138 kV 50 Line and 46 Line transmission lines, respectively. These substations have a total of six 13 kV distribution feeders that serve customers along the Highway 97 corridor to Sexsmith Road and Old Vernon Road, and all points north of the Sexsmith, Old Vernon and Ellison areas up to and including the northernmost border of the City of Kelowna.

FortisBC has updated its forecast average annual load growth rate for the north Kelowna area from 1.6 MVA per annum to approximately 4.0 – 5.0 MVA per annum for the next ten years. This significant difference is attributable to the most recent developments in north Kelowna, which include the University of British Columbia ("UBC") campus, the Pier Mac Commercial Development, the North Kelowna Industrial Complex, the 20/20 Properties Development, and a five year advancement of the Vintage Landing Development. These developments will cause the Sexsmith Substation capacity to be exceeded by winter 2008/09.

In addition to satisfying capacity requirements, the need to meet system reliability criteria under contingency conditions, which is critical for the existing single-source radial supply system of the north Kelowna area, is also important. FortisBC states that, due to load growth, the area substation backup planning criteria have been exceeded since 2003/04.

On October 27, 2006, FortisBC applied to the British Columbia Utilities Commission ("Commission") for a Certificate of Public Convenience and Necessity ("CPCN") for the Ellison Substation Project ("the Project") to reinforce the distribution system in the north Kelowna area ("the Application") (Exhibit B-1).

1.1 Regulatory Process

Following receipt of the Application for a Certificate of Public Convenience and Necessity ("CPCN") for the Ellison Substation Project ("the Application") the Commission, on November 9, 2006, issued Order No. G-140-06. The Order established an oral public hearing process for the review of the Application and a Regulatory Timetable that included a date for the oral public hearing commencing January 9, 2007.

On December 15, 2006, Counsel for the Quail Ridge Residents Association ("QRRA") requested an adjournment of approximately one month, citing a scheduling conflict, the potential benefit of "some form of additional public consultation," and a need for an additional round of Information Requests (Exhibit C1-7). Intervenor Mr. Karow also requested an adjournment and raised several other procedural issues (Exhibit C152-2).

Having considered these requests the Commission Panel determined that a short adjournment and an adjustment to the Regulatory Timetable were warranted and by Order No. G-171-06, dated December 20, 2006, established a Revised Regulatory Timetable. The revision allowed for both a Workshop, wherein FortisBC would explain the details of the Application and a Pre-hearing Conference on January 9, 2007; and an Oral Hearing starting February 6, 2007.

Following the Workshop and Pre-hearing Conference, the Commission Panel determined that a further extension to the Regulatory Timetable was warranted to allow time for further examination of the Application (more specifically, possible siting alternatives) and the potential submission of evidence as suggested by Intervenors, particularly the Concerned Citizens of Quail Ridge and Lochrem Road ("CCQRLR"). The Extended Regulatory Timetable was established and the Hearing Issues List formalized by Commission Order No. G-1-07, with the Oral Hearing scheduled for April 2, 2007 in Kelowna. The Hearing was well attended and included an evening session to hear submissions from Intervenors.

Following the Oral Public Hearing, Argument was submitted by FortisBC on April 13, 2007 and by Intervenors on April 20, 2007. The Reply by FortisBC was submitted on April 27, 2007. QRRA and the CCQRLR filed Rebuttal Reply Arguments as well on April 28, 2007 and May 3, 2007, respectively. Despite FortisBC's objection to the additional arguments, the Commission Panel accepted the two Rebuttals to FortisBC's Reply as evidence.

The Commission Panel regrets the delay in the proceedings. However, it was concerned that the consultation process was not sufficiently comprehensive, inclusive and effective as evidenced by the number of complaints about the consultation process.

The consultation process described in the Application (Exhibit B-1, pp. 48, 49) as the public information session, resulted in FortisBC abandoning its original proposed substation site on Dry Valley Road and selecting an alternate site on Lochrem Road. When FortisBC subsequently met with members of the QRRA to discuss the Lochrem Road site during the pre-scheduled Annual General Meeting of the Association, it was without comprehensive and proper notice of the standard FortisBC set previously when it announced the public information session. In the view of the Commission Panel, both the commentary at the meeting and the answers provided by FortisBC during the question and answer period seem to be well intended but confusing nevertheless (Exhibit B-3, BCUC 1.20.3, Appendix A20.3). The Airport site was raised at the QRRA meeting as a possibility but was dismissed by FortisBC. The rational for dismissal did not stand up to cross examination and therefore, before the Commission Panel could make a full comparison of the Lochrem Road and Airport sites, FortisBC was required to carry out additional analysis that could have been completed during the site selection process. The Commission Panel issued Order No. C-4-07 which approved the Ellison Substation Project using the Option 1 configuration and directed FortisBC to file reports on substation siting and the alignment of a certain section of Feeder 4, with Reasons for Decision to follow. These are those Reasons.

The result of the unfortunate delays is an increase in cost for the project and a time consuming process for Intervenors, FortisBC and the Commission. The Commission Panel is of the view that both the increased time and the additional cost could have been avoided had FortisBC been thorough in its analysis of siting alternatives and planned and executed a comprehensive, informative and proactive consultation process with affected property owners and residents. The Commission Panel believes that Intervenors also contributed to the delays by requesting extensions to the proceeding schedule and not delivering on intentions to file evidence on siting alternatives.

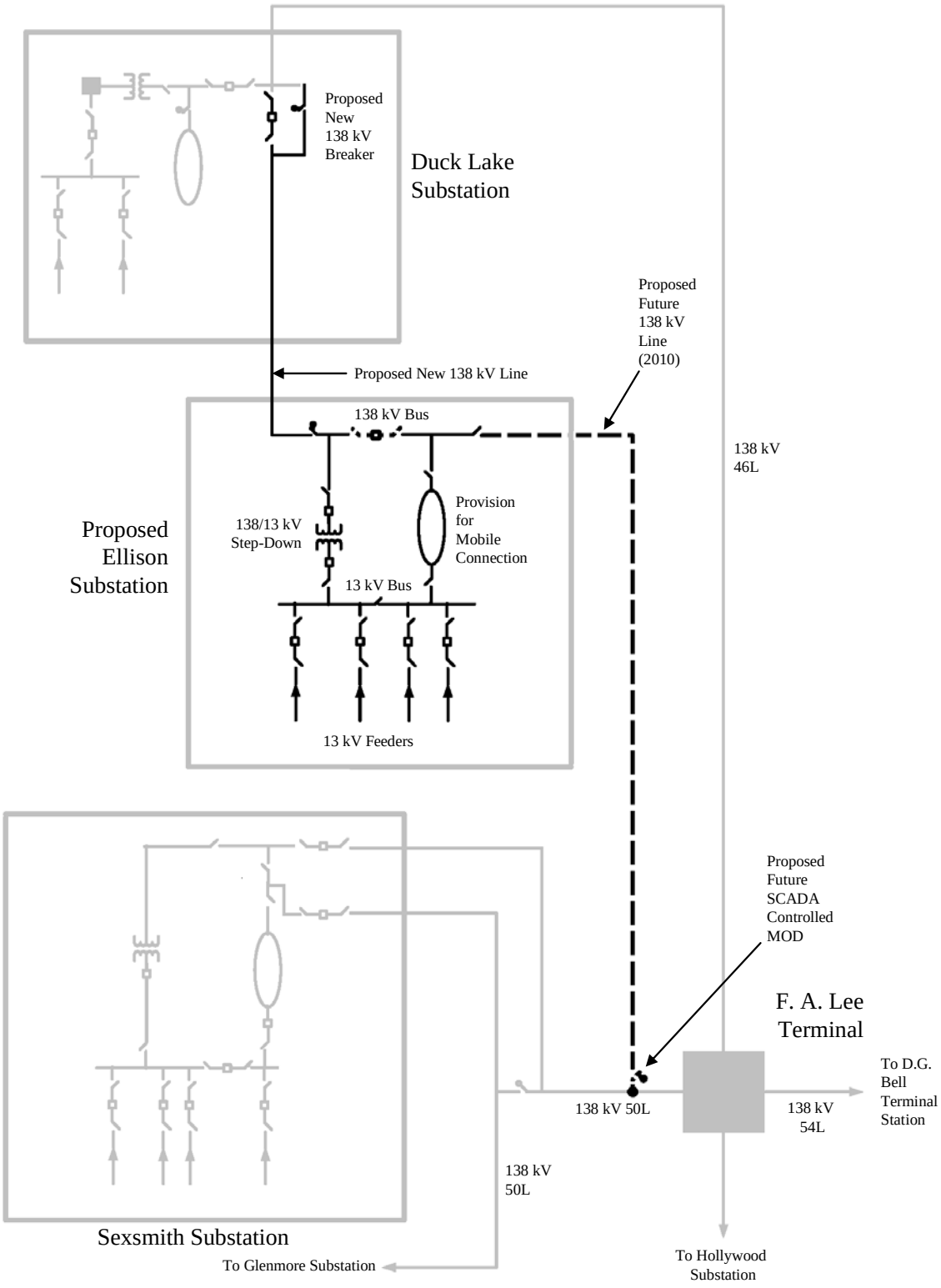
2.0 THE APPLICATION

As noted above, the Kelowna area is one of the fastest growing urban centres in British Columbia. The north part of the city, which is currently supplied by the Sexsmith and Duck Lake substations, has experienced strong load growth during the last decade. FortisBC expects growth in the range of 4 to 5 MVA per year to continue over its planning horizon and submits that, within two years, the additional growth cannot be accommodated without adding system capacity (Exhibit B-1, p. 2). FortisBC expects that the capacity of Sexsmith Substation will be exceeded by the winter of 2008/09, and notes that the area substation backup planning criterion has been exceeded since 2003/04.

2.1 Project Description

The solution to the capacity constraints recommended by FortisBC consists of a new substation in the Ellison area ("Ellison" or "Ellison Substation") across Highway 97 from the Kelowna Airport that is connected to the Duck Lake Substation by a 138 kV transmission line, along with the distribution facilities necessary to connect the substation into the existing distribution network. The recommended solution also proposes a 138 kV transmission link between the Ellison and Sexsmith Substations, though the Company will submit this component of the project in a separate capital expenditure application in the future. FortisBC submits that the proposed substation will provide flexibility for future load growth, be geographically positioned to effectively serve the region, and ensure adequate system backup under contingency conditions. A schematic Diagram No. 1 showing the proposed project is provided on the next page (Exhibit B-1, p. 6); it shows existing facilities in grey and proposed facilities in black. The facilities proposed for 2010 are shown as dashed lines.

Diagram No. 1


Proposed New 138 kV Breaker
Duck Lake Substation
Proposed Future 138 kV Line (2010)
Proposed New 138 kV Line
138 kV Bus
138 kV 46L
Proposed Ellison Substation
138/13 kV Step-Down
Provision for Mobile Connection
13 kV Bus
13 kV Feeders
Proposed Future SCADA Controlled MOD
F. A. Lee Terminal
To D.G. Bell Terminal Station
138 kV 50L
138 kV 54L
138 kV 50L
Sexsmith Substation
To Glenmore Substation
To Hollywood Substation

The transmission component of the project consists of converting 6.0 km of existing distribution and transmission circuits to 138 kV. Of that, approximately 5.2 km of the existing 13 kV distribution tie from Duck Lake Substation to Sexsmith Substation will be converted to a double-circuit transmission/distribution line by incorporating the transmission line as an overbuild on the existing 13 kV circuit. This will tie into an existing 0.8 km section of line that is already constructed to 138 kV standards. The addition of the 138 kV transmission circuit will not require any additional poles or widening of the right-of-way.

FortisBC proposes that a second transmission line, which would run from Ellison Substation to Sexsmith Substation, be constructed. However, as this second transmission line is required for reliability backup and not as the primary source for the Ellison Substation, FortisBC recommends deferring it to 2010 to minimize current costs (Exhibit B-1, pp. 8-9). The Application requests approval for right-of-way expenditures related to the transmission line, but the construction of this line will be the subject of a separate application in the future.

At the proposed Ellison Substation, the new transmission source (61 Line) from Duck Lake Substation will supply a 138/13 kV, 32 MVA transformer. The proposed substation will initially contain a single transformer. Space will be provided for a second unit, and facilities will be provided to connect a mobile substation in the event of a transformer failure or when substation maintenance is required. The low-voltage side of the substation will house one main breaker and four 13 kV feeder breakers, and there will be provision for two more 13 kV breakers in the future. The balance of the distribution work will consist of rebuilding or adding circuits along existing or planned road corridors. A small section of off-road work is required, and some trees will have to be removed for safety purposes. The Duck Lake Substation will require a modification to allow for terminating the proposed transmission line to Ellison Substation.

The Project will split the distribution system at the Ellison Substation into four separate load areas, with provision for two more in the future. The proposed feeders are as follows:

Ellison Feeder 1 will exit the substation and head south toward Sexsmith Substation along Highway 97, and will tie into the existing Sexsmith Feeder 1 just south of the university. Approximately 3 km of 2/0 underbuild will be reconductored to 477 MCM ACSR. Approximately 2500 kVA of load from Sexsmith Feeder 1 and approximately 1000 kVA of load from Duck Lake Feeder 1 will be transferred to this feeder, which will serve the airport, the university, and other developments including the south university area and the Pier Mac commercial development (Exhibit B-1, p. 12).

Ellison Feeder 2 will exit the substation and head east and then south along Old Vernon Road toward Sexsmith Substation at the tie point of FA Lee Feeder 1 and Sexsmith Feeder 1. This feeder will not require any upgrades to satisfy load requirements. Load of approximately 2200 kVA from Sexsmith Feeder 1 and 1800 kVA from Duck Lake Feeder 1 will be transferred to this feeder, which will serve the Ellison area and the Sunset Ranch development (Exhibit B-1, p. 12).

Ellison Feeder 3 will exit the substation and head north along the CN railroad tracks as the underbuild of the Ellison/Duck Lake transmission line. This feeder will not require any upgrades to satisfy load requirements. Approximately 500 kVA of load will be transferred from Duck Lake Feeder 1 to Ellison Feeder 3 (Exhibit B-1, p. 13).

Ellison Feeder 4 will exit the substation and head west to Glenmore Drive. This is an entirely new feeder, 3.5 km in length and conductored with 477 MCM ACSR (Exhibit B-1, p. 13). This feeder will pass north of the Quail Ridge development, along the route for McKinlay Road that the City of Kelowna plans for this area.

Approximately 2500 kVA from Sexsmith Feeder 3 and 2500 kVA from Duck Lake Feeder 2 will be transferred to this feeder, which will likely serve the north Glenmore area and McKinley Landing, and serve as an alternate feed to Duck Lake Feeder 12. It will serve the Melcor and Vintage Landing developments, as well as the north section of Wilden Properties.

2.2 Summary of Costs

The October 2006 Application by FortisBC included the following cost summary for the recommended solution (Exhibit B-1, p. 16).

Table 1
Summary of Cost

	COMPONENT OF PROJECT	2006	2007	TOTAL	Reference Appendix D
		($million)			
1	61 Line - Construction at 138 kV as double circuit overbuild	0.48	0.88	**1.36**	**Table D1**
2	Modifications at Duck Lake Substation to allow proposed 61 Line		1.85	**1.85**	**Table D2**
3	Ellison Substation		6.19	**6.19**	**Table D3**
4	Land and Environmental Cost for Ellison Substation	1.17		**1.17**	
5	Transmission ROW Cost		0.29	**0.29**	
6	Building of Greenfield Distribution Lines / Re-conductor of existing distribution lines / Construction of double circuit distribution lines and substation egress	0.7	3.63	**4.33**	**Table D4**
7	**SUB TOTAL**	**2.35**	**12.84**	**15.19**	
8	**AFUDC**	**0.09**	**0.49**	**0.58**	
GRAND TOTAL:		**2.44**	**13.33**	**15.77**	

During the hearing held on April 2, 2007, the Company requested to increase the capital costs for all options to reflect the impact of the unanticipated extent of the regulatory process and higher labour costs (T2: 93-94). In response to questions from the Commission Panel, FortisBC further explained that it was not until the week prior to commencement of the hearing that the Company received "some information from BC Hydro, who has filed market studies in B.C. on inquiries that they have had for information requests as to what escalators they are using" (T2:218-219).

On April 11, 2007 FortisBC filed the following table setting out the revised capital costs for the Ellison Project (Exhibit B-18, Undertaking 1).

Table 2
Revised Summary of Cost

	COMPONENT OF PROJECT	2006	2007	2008	TOTAL
		($million)			
1	Planning / Regulatory / etc	0.00	0.36	0.00	0.36
2	61 Line - Construction at 138 kV as double circuit overbuild	0.20	0.14	1.15	1.49
3	Modifications at Duck Lake Substation to allow proposed 61 Line	0.18	0.63	1.09	1.91
4	Ellison Substation	0.18	0.51	5.87	6.57
5	Land and Environmental Cost for Ellison Substation	0.34	1.02	0.00	1.36
6	Transmission ROW Cost	0.00	0.27	0.00	0.27
7	Building of Greenfield Distribution Lines / Re-conductor of existing distribution lines / Construction of double circuit distribution lines and substation egress	0.00	0.22	4.38	4.60
8	**SUB TOTAL**	**0.90**	**3.16**	**12.49**	**16.56**
9	**AFUDC**	**0.02**	**0.12**	**0.49**	**0.63**
TOTAL		**0.92**	**3.28**	**12.99**	**17.19**

The key assumption explaining the project cost increase from $ 15.77 million to $ 17.19 million is a General Construction Market Volatility escalator @ five per year over CPI of two percent until 2010 (Exhibit B-18, Undertaking 1, p. 1).

2.3 Engineering Design and Capacity

The engineering design and capacity of the proposed project is described in Section 3.2 of the Application. FortisBC states that the capacity of the transmission, substation, and distribution components of the project will accommodate the forecasted load growth for the next ten years. The major project components include:

Ellison Substation:

- one 138/13 kV, 32 MVA transformer with surge arrestors and oil OLTC with 10 percent regulation;
- one 2000 A, 138 kV dead-tank circuit breaker with associated line protection and control;

- outdoor-rated 13 kV switchgear containing one 2000 A main breaker and four 1200 A feeder breakers;
- an access bay for an emergency mobile transformer with isolation switches;
- protection and control, SCADA, and communications equipment;
- a fibre-optic link to Duck Lake Substation;
- provision for the egress of 138 kV lines to Duck Lake Substation in the north and Sexsmith Substation in the south, and for the egress of four 13 kV feeders; and
- space for a future second transformer.

Duck Lake Substation:

- one 2000 A, 138 kV dead tank circuit breaker with associated line protection and control; and
- provision for the egress of a 138 kV line to Ellison Substation

Distribution Upgrade:

- construction of four new 477 MCM distribution feeders from Ellison Substation and integration of the new and existing feeders into the distribution network;
- feeder egress from the substation; and
- voltage regulation equipment.

Transmission Connection between the Duck Lake and Ellison Substations:

- one 138 kV, 477 MCM ACSR transmission line from the Duck Lake Substation to the proposed Ellison Substation on an existing right-of-way (the line will be approximately 6 km in length and will be a standard single-pole design);
- right-of-way for the future construction of a 138 kV transmission line from the proposed Ellison Substation to 50 Line, connecting approximately 100 m east of the Sexsmith Substation. This will use approximately 2.6 km of an existing transmission line that was used to serve the area prior to 46 Line being constructed.

2.4 Other Aspects

Sections 3.3 through 3.9 of the Application describe several other aspects of the proposed project.

Project Management

FortisBC indicates that a senior project manager will be responsible for the quality, scope, and cost control for the project (Exhibit B-1, p. 18). Work that impacts the operational control points, including engineering, management and review, construction supervision, and final commissioning will be done, where appropriate, by FortisBC staff. Each project component will be actively managed by a FortisBC employee or representative, and the necessary quality, environment, and safety inspections will be carried out throughout the project.

Health and Safety

FortisBC states that the health and safety interests of the public, employees and contractors are well integrated into the planning, tendering and audit protocols for the project. FortisBC also states that construction safety and risk mitigation standards will be followed and the requirements will be detailed in final construction and environmental management plans (Exhibit B-1, p. 18).

Environmental and Social Impact

FortisBC indicates that design and construction work will proceed according to the terms of detailed construction, traffic, fire safety, and environmental management plans to ensure compliance with regulations and stakeholder expectations (Exhibit B-1, p. 19).

The Company states that its transmission line route and corridor planning included an environmental assessment to identify environmental sensitivities, landowner impacts, and potential stakeholder issues. Route selection priorities included cost, environmental impacts, residential impacts and suitability for construction. Corridor refinement was guided by efforts to minimize impacts to wildlife, watersheds and public use areas. An environmental impact assessment for the distribution tie between the Duck Lake and Sexsmith substations identified sensitive issues and facilitated development of an Environmental Management Plan ("EMP"). Guided by a general archaeological overview assessment, the detailed impact assessment found that there is a low risk of encountering items or sites of archaeological significance (Exhibit B-1, p. 19).

Electromagnetic Fields ("EMF")

FortisBC states that its position on EMF is consistent with that of Health Canada as set out in the document entitled "Electric and Magnetic Fields at Extremely Low Frequencies". That document states that "the scientific evidence is not strong enough to conclude that typical exposures cause health problems." The company also notes that the EMF levels associated with this project will be significantly lower than the public exposure guidelines supported by the World Health Organization ("WHO") (Exhibit B-1, p. 20). This matter is discussed further in Section 7.1.

Project Schedule

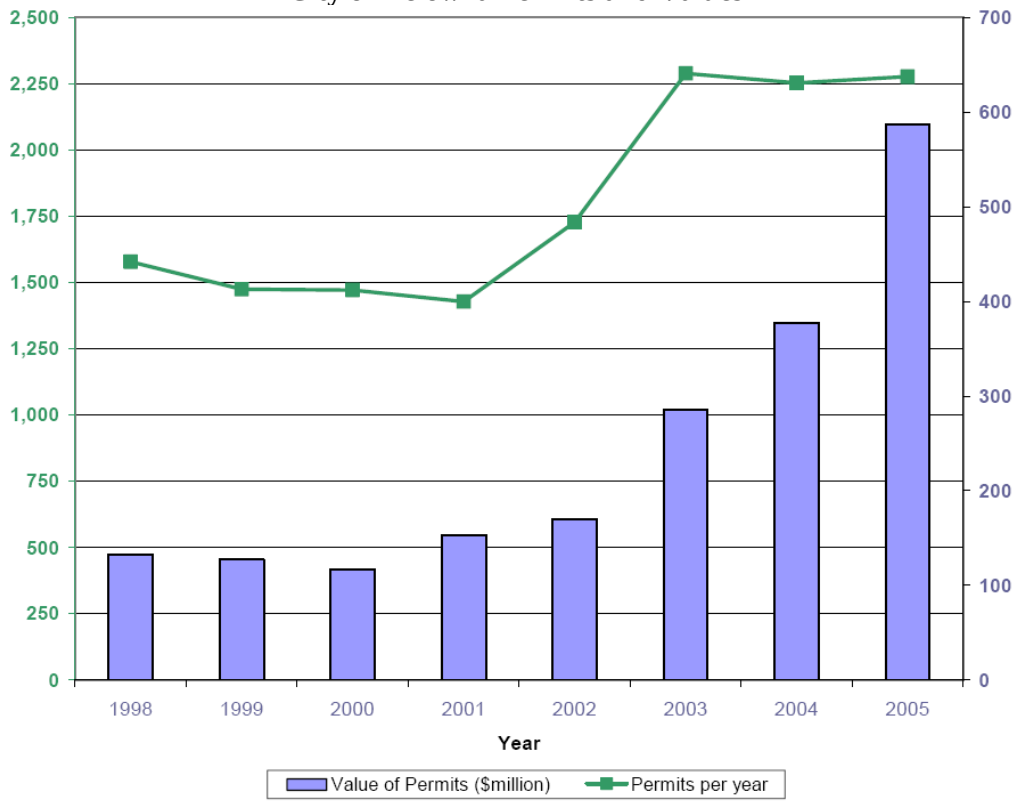
Energization of the 138 kV line and substation was originally scheduled to take place in the fourth quarter of 2007 (Exhibit B-1, p. 20). However, during the hearing, FortisBC indicated that it now expects the project to be energized in November 2008 (T2:155).

3.0 PROJECT JUSTIFICATION

3.1 Load Forecast

FortisBC submits that part of the justification for the Ellison project is that Kelowna has experienced rapid growth in the past few years and indications are that the growth will continue over the planning horizon. More than 9,000 residential units are currently under construction or planned in the Clifton/Glenmore Highlands and South and North University areas. Construction activity is also occurring in the McKinley Landing and north Kelowna areas. Commercial growth in the area is also significant, with hotels, industrial sites, the UBC campus, and supporting small businesses in the planning or construction stages. FortisBC submitted the following chart, highlighting the significant increase in the number and value of City of Kelowna building permits (Exhibit B-5, Slide 4).

Chart 1
City of Kelowna Permits and Values



FortisBC has forecast an average load growth of approximately 4 to 5 MVA per year for the next ten years in the north Kelowna area (Exhibit B-1, p. 28; Exhibit B-8, CCQRLR 1.20.5). The capacity of the Sexsmith and Duck Lake substations are expected to be exceeded by the winter of 2008/09, as shown in the following charts (Exhibit B-5, Slides 7, 8).

Chart 2
Load Growth - Sexsmith

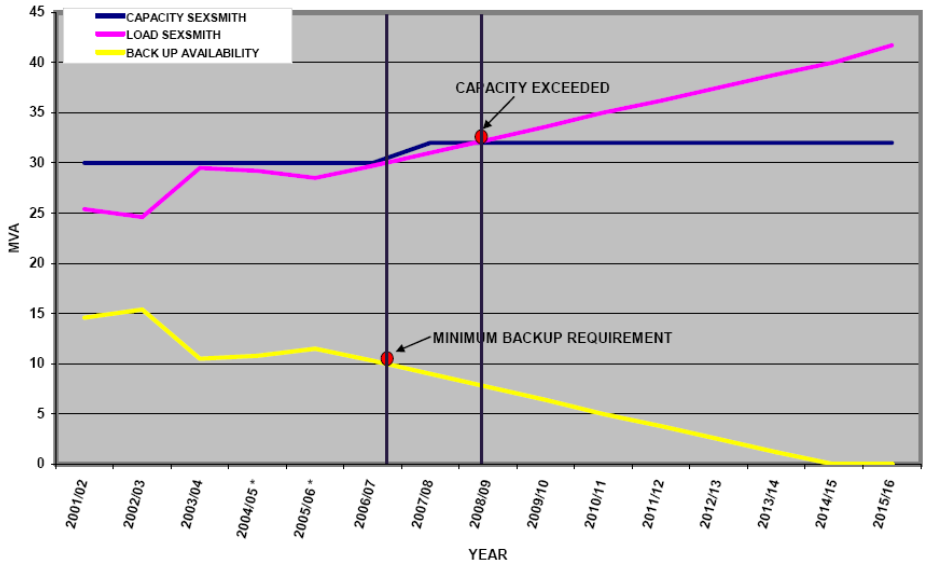
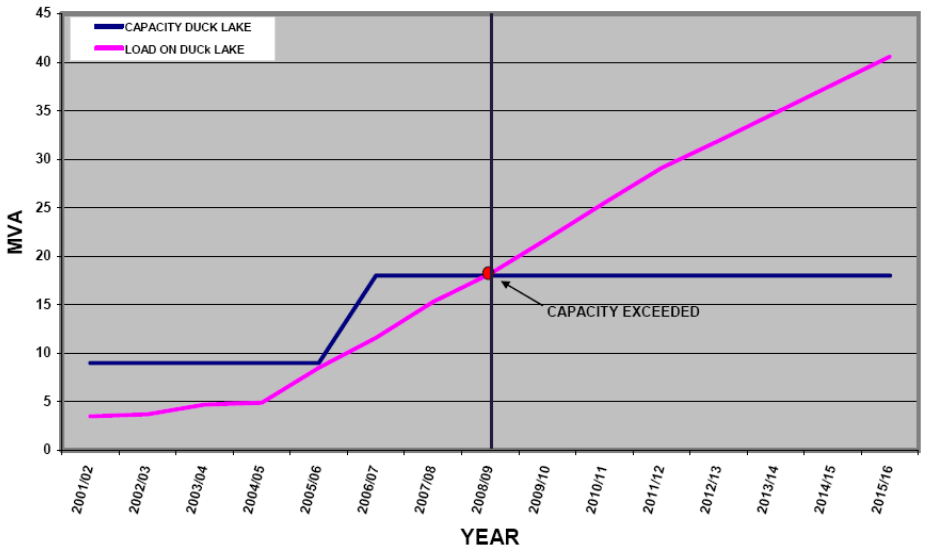


Chart 3
Load Growth – Duck Lake



FortisBC submits that there are approximately 7100 customers who are presently served by the Sexsmith, Duck Lake, and Glenmore substations in north Kelowna, and that this figure is expected to exceed 11,500 by 2015 (Exhibit B-1, p. 29).

3.2 Reliability

FortisBC notes that, while restoration times for transmission and distribution outages in the north Kelowna area are generally minimal due to the proximity of the area to the FortisBC Operations Centre, a transformer failure or a contingency on the radial 46L serving the Duck Lake Substation may require higher restoration times depending on the availability of a mobile substation and considering the fact that full N-1 back-up for transformers may not be available (Exhibit B-1, p. 27, Tables G2 and G3). Failure of the single transformer at Sexsmith would result in unacceptably long outages for over 3500 customers currently fed by this substation, while failure of the single transformer at Duck Lake would result in unacceptably long outages for 1000 customers.

FortisBC also notes that the area served by Duck Lake Feeder 1 has some voltage-related problems that are expected to be resolved once the Ellison project is completed (Exhibit B-1, p. 29).

3.3 Commission Panel Determinations

The Commission Panel notes that no party in this proceeding disputed the need for additional electrical capacity in the north Kelowna area. Indeed, the QRRA acknowledges that there is a need for additional electrical infrastructure to meet future demand in north Kelowna, and recognizes that there will likely be a need for a new substation between the existing Duck Lake and Sexsmith substations (QRRA Final Argument, p. 2). **The Commission Panel accepts FortisBC's evidence that additional capacity is required to meet area load growth.**

The Commission Panel also accepts FortisBC's evidence that the reliability of supply to customers in the north Kelowna area could become unacceptable in the absence of system upgrades.

4.0 ALTERNATIVE SOLUTIONS

FortisBC considered three options to address the load growth and reliability concerns in the north Kelowna area. These included the new Ellison Substation near Highway 97 in the general vicinity of the Kelowna Airport with a transmission link between the Duck Lake and Sexsmith Substations through the Ellison Substation, the upgrading of Duck Lake Substation along with the expansion of Sexsmith Substation, and the expansion of both Sexsmith and Duck Lake Substations.

4.1 Option 1: New Ellison Substation

Option 1 involves the construction of the new Ellison distribution Substation in the north end of Kelowna, together with a transmission line from Duck Lake Substation to Sexsmith Substation via Ellison Substation (Exhibit B-1, pp. 30-35). This option is the proposed Ellison Substation project described in the Application.

FortisBC submits (Exhibit B-1, p. 32) that Option 1 will:

- provide adequate capacity for load in the north Kelowna area through the planning horizon of 2015;
- accommodate the transfer of 10 MVA of load from Sexsmith Substation, thereby avoiding transformer overload;
- accommodate the transfer of load from Duck Lake Substation to avoid overloading station regulators and to defer construction of additional distribution feeders from that substation;
- provide adequate system capacity for the Sexsmith, Duck Lake and proposed Ellison substations through the planning horizon of 2015;
- meet the N-1 transformer backup capability and 80% backup criterion for the single-transformer Sexsmith, Duck Lake, and Ellison substations through the planning horizon of 2015;
- locate the 138/13 kV substation in the center of the emerging load in the north Kelowna area; and
- allow dual transformers to be located in the Duck Lake and Ellison substations, thereby strategically spacing the stations but not unnecessarily creating unused capacity.

Option 1 results in a system with two substations (Ellison and Duck Lake) served radially from 46 Line, in violation of the N-1 planning criterion. In FortisBC's submission, a transmission line between Ellison and Sexsmith will be required in the future, though this line can reasonably be deferred until 2010 based on the historical reliability of 46 Line. Right-of-way acquisition is included in the Application; however, the new line, which is expected to cost approximately $3.86 million (2010 dollars), does not form part of the Application and will be submitted as a separate project at a later date.

4.2 Option 2: Upgrade Duck Lake and Expand Sexsmith

Option 2 involves upgrading the distribution bus and constructing two more distribution feeders at Duck Lake Substation to utilize the full capacity of the Duck Lake transformer (Exhibit B-1, pp. 36-39). This is followed by the installation of an additional 138/13 kV, 32 MVA transformer at Sexsmith Substation to create additional station capacity, along with provision for four additional 13 kV feeders to supply the north Kelowna area. The Sexsmith upgrade would require the procurement and development of addition land, the installation and commissioning of feeder reactors for fault level control, voltage regulation upgrades, and protection and control upgrades.

FortisBC submits that Option 2 will allow full utilization of the Duck Lake transformer capacity, ensure adequate capacity for load served by Sexsmith Substation, permit load transfers between Duck Lake and Sexsmith, and enable reasonable backup capacity to meet the N-1 backup criterion for the Duck Lake transformer beyond 2015. However, the Company also cites some disadvantages of Option 2 relative to Option 1, including:

- the backup power available for the multi-transformer Sexsmith Substation falls below the required 100 percent backup power requirement during 2014/15;
- the backup power availability for the single-transformer Duck Lake Substation falls below the required 80 percent backup level during the 2006-2010 timeframe;
- the Duck Lake and Sexsmith Substations are approximately 6 km and 5.8 km, respectively, from the emerging load center, which would mean more double-circuit distribution lines and new rights of way to accommodate growth;
- the overall longer length of the distribution feeders will increase exposure to natural elements and accidents and result in greater line losses than Option 1;
- voltage regulators are required to maintain power quality since a substantial amount of load would have to be transferred from Duck Lake Substation to the Sexsmith area;

- it may be difficult to construct a substation in the area in the future if the proposed Ellison Substation is not commissioned now; and
- this option does not provide a transmission tie between Sexsmith and Duck Lake.

During cross-examination of the FortisBC witness panel, counsel for CCQRLR put forward a hypothetical transformer configuration as an amendment to Option 2 (T2:168-170). Instead of installing a 32 MVA second bank in Sexsmith, the modified option would see the installation of a larger one (for example, 40 MVA). Then, when the station exceeds 64 MVA, or twice the smaller 32 MVA unit, the old 32 MVA bank would be replaced with a second 40 MVA bank, providing a station capacity of 80 MVA. FortisBC provided comments on this alternative in Exhibit B-18 (p. 11).

4.3 Option 3: Expand Sexsmith and Duck Lake

Option 3 (Exhibit B-1, pp. 40-43) involves expanding Sexsmith Substation to accommodate one additional 138/13 kV, 32 MVA transformer to supply four more distribution feeders, followed by a similar expansion of Duck Lake Substation in 2010. Option 3 ensures N-1 transformer contingency at both substations by creating adequate load backup capability well beyond the planning horizon of 2015. The Sexsmith upgrade would require the procurement and development of additional land, the installation of feeder reactors for fault level control, protection and control upgrades, and extension of the distribution bus. In addition to the new transformer, the Duck Lake upgrade would require extension of the distribution bus to accommodate four additional feeders, new feeder reactors, protection and control upgrades, and voltage regulation equipment.

In FortisBC's submission, Option 3 would create adequate capacity for both Sexsmith and Duck Lake Substations to serve load and meet the N-1 criterion for transformers at both substations beyond 2015. However, while Option 3 provides capacity and reliability similar to that provided by Option 1, it has certain technical disadvantages, including:

- Sexsmith and Duck Lake Substations are approximately 6 km and 5.8 km, respectively, from the emerging load center, creating the need for a larger distribution network;
- the overall longer length of the distribution feeders will provide additional exposure to natural elements and accidents and will result in greater line losses than Option 1;
- voltage regulators will be required to maintain power quality;

- it may be difficult to construct a substation in this built-up area (Ellison) in the future if the proposed Ellison Substation is not commissioned now; and
- this option does not provide a transmission tie between Sexsmith and Duck Lake Substations.

4.4 Economic and Technical Comparison of the Options

In response to an undertaking FortisBC filed the following updated cost and rate impact summary and a comparison to the cost estimates in the CPCN Application for the three options (Exhibit B-18, Undertaking 1):

Table 3

PARAMETERS	YEARS					AFUDC	CAPITAL COST	NPV	RATE IMPACT
	2006	2007	2008	2009	2010				
	$ millions								%
OPTION 1: AS IN CPCN	2.35	12.84				0.58	15.77	17.72	0.61%
OPTION 1: REVISED	0.90	3.16	12.49			0.63	17.19	18.30	0.63%
OPTION 2: AS IN CPCN	0.00	1.43	5.85	8.56	9.99	1.61	27.44	18.84	0.65%
OPTION 2: REVISED	0.00	1.79	6.14	9.51	11.57	1.80	30.81	20.92	0.72%
OPTION 3: AS IN CPCN	2.74	14.86	0.00	2.15	18.00	2.01	39.76	29.94	1.04%
OPTION 3: REVISED	0.00	1.65	17.60	2.36	21.04	2.12	44.77	31.76	1.10%

FortisBC states that the table provided is based on the most recent version of the project schedules. It also notes that, while the capital cost of Option 1 does not include the Ellison-Sexsmith transmission line proposed for 2010, the NPV of that option does include the cost of the line. In addition, the costs include a land cost escalator of 10 percent per year and a general construction market volatility escalator of five percent per year over the CPI increase of two percent until 2010.

In its response to BCUC IR1 6.2, FortisBC submits that the option of having three regional substations with one transformer each is preferable to the option of having two substations with one or two transformers because it reduces the risk associated with the location of future load growth and it has a lower cost than the two-regional-

substation option over the next 20 years. FortisBC also provided the following table, in which the pros and cons of the scenarios are discussed (Exhibit B-3, BCUC 1.6.2).

Table 4

	Parameters Considered	3 Regional Single Transformer Substations (Option 1)	2 Regional Single / Multi Transformer Substations (Options 2 & 3)
	Reliability Perspective		
1	Satisfaction of back up power criterion during the Planning Horizon	Yes-Preferable	No-Not Preferable
2	Large Radial Load (Transmission Perspective)	No-Preferable	Yes-Not Preferable
3	Transmission Tie/Transmission Level Reliability	Yes-Preferable	No-Not Preferable
	Efficient Expansion Of Substation		
4	Substations in emerging load centre	Yes-Preferable	No-Not Preferable
5	Required to build new substation in future in built up area	No-Preferable	Yes-Not Preferable
6	Future stakeholder acceptability for building new substation in built-up areas	Not Applicable-Preferable	Difficult-Not Preferable
	Efficient Expansion Of Distribution		
7	Distance from emerging load centers	Low-Preferable	High-Not Preferable
8	Requirement of Single & Double Circuit Distribution Lines	Low-Preferable	High-Not Preferable
9	Requirement of new Rights of Way ("RoW") to accommodate growth	Low-Preferable	High-Not Preferable
10	Distribution feeder length / Exposure to elements (natural / accidental)	Low-Preferable	High-Not Preferable
11	Distribution feeder length / Line Loss (function of line length)	Low-Preferable	High-Not Preferable
12	Requirement of Voltage Regulators	Low-Preferable	High-Not Preferable
	Project Capital Cost/Financial Impact On Rate Payers		
13	Project Capital Cost/Customer Rate Impact	Low-Preferable	High-Not Preferable

4.5 Risks and Contingency Plan

FortisBC submits on page 47 of the Application that certain circumstances could delay the project or increase its costs, including (Exhibit B-1, p. 47):

- changes to the preferred transmission and/or distribution routes due to permitting or legal issues;
- unforeseen environmental or archaeological discoveries during the construction phase (though the risk of such an occurrence is considered low, based on the results of environmental and archaeological assessments);
- an unexpected increase in the delivery times of transformers, poles or conductors; and
- increases in the cost of labour and/or materials beyond typical inflationary levels.

FortisBC states that a project delay beyond the originally scheduled energization, which was to take place prior to the 2007/08 winter peak, would not have a significant impact on customer service since the Duck Lake and the Sexsmith substations will not exceed capacity until the winter of 2008/09 (though backup limits will be reached earlier, as indicated in Tables G2 and G3 of the Application).

FortisBC further states that, if it is apparent the project will be delayed for a significant period, then: (1) plans will be set in place to monitor the transformers on a frequent basis; (2) voluntary load curtailment may be arranged during peak load hours in discussion with customers; and (3) rotating load shedding may be arranged during peak load hours in discussions with customers.

4.6 FortisBC and Intervenor Submissions

In its Final Argument, FortisBC submits that there was no evidence of any substance or merit presented at the hearing establishing that any of the options detailed in the Application should be preferred over Option 1. In FortisBC's view, the evidence in the Application and its responses to information requests, as well as the evidence arising in cross-examination at the hearing, established that Option 1 provides a safe, cost-effective and reliable service with the greatest flexibility to meet increased demand in the future (FortisBC Final Argument, p. 3).

FortisBC goes on to state that Option 1 is the most cost-effective option and has the smallest environmental impact. Option 2, requiring an expansion to a substation in a more developed area and 36 km of new distribution lines, is an option presenting a potentially greater environmental and aesthetic impact, and higher cost, than Option 1. FortisBC also argues that Option 2 amounts to no more than a temporary deferral of the new substation proposed in Option 1, and it reiterates the disadvantages outlined in Sections 4.2 and 4.4 above. FortisBC further states that Options 2 and 3 are inferior to Option 1 because of cost, reduced future flexibility, and the simple fact that increasing capacity at the existing Sexsmith and Duck Lake substations would not be good planning—and indeed would be impractical—given the distance from the demand growth (FortisBC Final Argument, pp. 6-8).

With respect to the variation of Option 2 put to its witness panel, FortisBC submits that it is greatly inferior to Option 1 for a number of reasons, including cost, aesthetic impact, reliability, and planning criteria (FortisBC Final Argument, pp. 7-8; T2:168-170).

CCQRLR argues that Option 2 has the best overall attributes and should be found to be the preferred option (CCQRLR Final Argument, Section 2). CCQRLR submits FortisBC has stated that Option 2 is technically viable. It also submits that the cost difference between Options 1 and 2 is negligible because the NPV of the revenue requirements for Option 1 (prior to adding in the additional cost of acquiring the land under the option to purchase) was $17.7 million compared to $18.8 million for Option 2. The one-time rate impacts are 0.61 percent for Option 1 and 0.65 percent for Option 2, for a difference of 0.04 percent. In CCQRLR's view, the options are so close in economic ranking as to be indistinguishable. Furthermore, pushing out the Option 2 expenditures by one year reduces the NPV of Option 2 to $17.76 million, the same as Option 1.

CCQRLR also argues that site availability and certainty of tenure have become dominant factors in FortisBC's choice of Option 1 over Option 2 (CCQRLR Final Argument, pp. 2-4). In CCQRLR's view, FortisBC has overstated its ability to acquire the land and obtain the re-zoning approval needed for Option 1. In addition, CCQRLR submits that FortisBC understates the certainty of land tenure under Option 2, and goes on to argue that the Commission should find that rezoning remains a considerable risk to Option 1. CCQRLR argues that there is a second land tenure risk inherent in Option 1, which is that FortisBC's option to purchase will expire before a decision on re-zoning can be made.

In conclusion CCQRLR submits that, in contrast to Option 1, Option 2 has far more certainty of land tenure and that opposition to the acquisition of additional land at Sexsmith would be minimal.

In its Reply Argument, FortisBC disputes CCQRLR's contention that Options 1 and 2 are close in economic ranking, arguing that Undertaking 1 in Exhibit B-18 shows a difference in NPVs of over $2.5 million. FortisBC further submits that any reduction in the NPV of Option 2 by pushing out the associated expenditures also applies to the other options, and is therefore unhelpful in selecting from among the options. With respect to the contention that the option to purchase the land for Ellison Substation will expire before a decision is reached on the rezoning application, FortisBC states that it intends to exercise the option after CPCN approval but prior to making the rezoning application; accordingly, there is no basis for suggesting that the option will expire before being exercised (FortisBC Reply, pp. 2-3).

4.7 Commission Panel Determination

The Commission Panel finds that Option 1 is preferable to the original Option 2, the modified Option 2 proposed by CCQRLR, and Option 3. The Panel accepts FortisBC's evidence that Option 1, including the 138 kV line proposed for 2010, has the lowest NPV and rate impact. The Commission Panel also accepts the Company's submission that developing a new substation closer to the emerging load centre results in shorter distribution feeders with lower losses and less exposure to interruptions from natural causes and accidents, and in greater flexibility in responding to future developments in the rapidly growing north Kelowna area. Shorter distribution feeders also have higher load capacities and better voltage characteristics than longer feeders, all other things being equal, and will therefore require less voltage regulation capability. A distribution system having substations closer to loads is also likely to have lower right-of-way requirements given that the power transfer capability along a transmission corridor is much greater than that along a distribution corridor.

The Commission Panel accepts that, in terms of site selection, it may be more difficult to construct a substation in a more congested area in the future. The Commission Panel also notes that there are likely to be operational and reliability benefits associated with the future 138 kV transmission loop involving F.A. Lee Terminal and the Duck Lake, Ellison, and Sexsmith Substations. It also accepts FortisBC's assessment, given in Table 4 in Section 4.4 above, that there are other benefits to having three regional single-transformer substations rather than two regional substations having one or two transformers, including improved transformer backup capability. The Commission Panel also notes that Options 2 and 3 require more fault current and voltage control equipment than Option 1, which increases both cost and operational complexity.

In terms of the right-of-way for the future construction of a 138 kV transmission line from the proposed Ellison Substation to 50 Line, connecting approximately 100 m east of the Sexsmith Substation, the Commission Panel agrees that it would be prudent to acquire this right-of-way at this time as requested in the Application.

The Commission Panel does not accept CCQRLR's argument that the costs of Options 1 and 2 are similar; rather, it accepts FortisBC's evidence that there is a difference of $2.5 million in NPV. Even if CCQRLR's arguments about the similarity of costs or the benefits of deferring some expenses under Option 2 had been accepted, it is unlikely that a small economic benefit would have overcome the technical superiority of Option 1, and therefore would have been unlikely to affect the Commission Panel's finding.

The Commission Panel is, however, concerned about the escalation of project cost estimates since the filing of the Application. Due to the introduction of revised cost information at a very late stage of the regulatory proceeding and due to lack of any supporting references for the General Construction Market Volatility escalator, the Panel has no evidentiary record to exercise judgment on that information. Accordingly, while granting the CPCN to proceed with construction based on the revised summary of costs the Commission Panel reminds FortisBC that the eventual recovery of the project costs in customer rates may be subject to a prudency review.

The Commission Panel does not accept CCQRLR's submission that rezoning remains a considerable risk to Option 1, or that the risks associated with Option 2 are significantly lower. The latter point was not supported by evidence provided at the hearing. While the Commission Panel acknowledges that there is some rezoning risk for Option 1, the characteristics of that alternative and the Company's efforts to address issues such as site visibility and noise, along with its use of existing facilities (e.g., the 138 kV overbuild) and rights of way where possible, suggest that the risk is small. The Commission Panel expects, however, that FortisBC can actively manage the risk.

The Commission Panel approves the Ellison Substation project using the Option 1 system configuration and will consider the siting of the substation and the alignment of a certain section of Feeder 4 in subsequent sections of this Decision. The Commission Panel approves the acquisition of the right-of-way for the transmission line between Ellison and Sexsmith Substations, but FortisBC must seek the prior approval of the Commission prior to construction of this line.

5.0 SUBSTATION LOCATION

In Option 1, FortisBC's original plan for the location of the Ellison Substation identifies a site at the intersection of Highway 97 and Old Vernon Road as the preferred location. However, FortisBC reports that community feedback following a public information session encouraged FortisBC to identify other suitable locations. The siting proposed by FortisBC in the Application is across Highway 97 from the Kelowna Airport and near Lochrem Road and is commonly referred to in the proceedings as the Lochrem Road site (Exhibit B-1, p. 3).

The Application, in Option 1, does not offer any alternatives to the Lochrem Road site. However, the Application does contain two letters of support, one for "a new substation to be located at Kelowna Airport" and the second, "an additional substation, close to Highway 97 at the airport" (Exhibit B-1, Appendix A2). FortisBC states that the discussions it had with Kelowna Flightcraft and Holiday Park Resort that resulted in these letters of support occurred on May 30, 2006 and were in reference to the Dry Valley Road site (Exhibit B-8, QRRA 2.48.1, 2.48.2, 2.49.1). Reference was made to a possible site at the airport during the October 24, 2007 meeting with QRRA when FortisBC was asked "… is this the only area for the substation being considered?" The FortisBC response was "We did look, and evaluated a site sort of across a lot of developments, we looked at, although it proved to be not satisfactory, across the road on the airport side, and I'm trying to think if there's any other sites". In response to a further question "Has the airport site been dismissed" FortisBC replied "Yes it has. And that's for technical reasons, the slope of the land is close to airport operations. Nap [Nav] Canada has mandatories. The biggest thing is the slope down there. We need flat land to build a substation" (Exhibit B-3, BCUC 1.20.3, Appendix A20.3).

During the October 24, 2007 QRRA meeting, several alternate sites were suggested by attendees however they were dismissed by FortisBC on various grounds (Exhibit B-3, BCUC 1.20.3, Appendix A20.3). One alternative was near the landfill site, which was rejected based on its distance from existing transmission and distribution infrastructure. Another possible site was on Old Vernon Road east of Highway 97 and north of the Airport. This site was rejected because the owner was prepared to lease, but not sell the land and the site is in the flight path of the airport runway.

FortisBC provides a comparison of the Dry Valley Road, Lochrem Road and the Airport sites in response to BCUC IR1 14.4. FortisBC was also asked for a comparison of other site options referenced at the QRRA meeting, and FortisBC responded "The sites included in Table14.4 are acceptable with regard to their proximity to load center, the distribution infrastructure center, and the existing transmission line infrastructure. Because

the landfill area and the Wilden area are not acceptable in terms of those criteria, FortisBC did not undertake an evaluation of the remaining factors" (Exhibit B-8, BCUC 2.35.3). The Airport site is estimated to cost $1.5 to $2.0 million more than the Lochrem Road site (Exhibit B-8, BCUC 2.35.4). CCQRLR asked FortisBC how many other sites in addition to Dry Valley Road and Lochrem Road were evaluated and why they were not selected as the proposed site, FortisBC responded," Many alternate sites were initially reviewed. When a land owner indicated a willingness to sell a property, other investigations were stopped" (Exhibit B-8, CCQRLR 1.24.4).

5.1 Lochrem Road site

The Lochrem Road site is FortisBC's preferred site for the substation and is described in the Application as being near Highway 97 and Lochrem Road (Exhibit B-1, p.3). A further pictorial description of this site in relation to the Duck Lake and Sexsmith sub stations, existing and proposed transmission lines and the proposed Option 1 feeder lines is shown in Figure 6 (Exhibit B-1, p. 34). A more site specific and detailed illustration is shown in the CCQRLR IR-1, Diagram A9.1, page 17. The Lochrem Road site is on privately owned land and is not in the Agricultural Land Reserve; however, it is not currently zoned for the intended use and will require rezoning by the City of Kelowna. The site is in the location of a vacated gravel pit (Exhibit B-1, p. 49). FortisBC has negotiated an option to purchase with the owner. A copy of the Land Title Act, Form C, which was signed on February 2, 2007, was filed at the commencement of the Hearing on April 2, 2007 (Exhibit B-17).

There is a single residence approximately 200 meters from the proposed site which may be within view of the proposed substation depending on final siting and screening (Exhibit B-3, BCUC 1. 14.7).

5.1.1 Intervenor and FortisBC Comments on Lochrem Road site

Intervenor objection to the proposed Lochrem Road site focused on the visual effect from Lochrem Road, the Quail Ridge development and the property adjacent to the proposed site, the effect on property values, EMF, and transformer noise.

The characteristics of the proposed site are described by FortisBC in its Opening Statement (Exhibit B-16), as follows:

> "As evidenced by the topographical map of the site, the previous gravel operation has created an earth barrier of up to 30 feet on each of the three sides of concern to the area residents. This is equivalent of digging a hole 30 feet into the ground and placing the substation on the bottom of it. We could not ask for a better site to address stakeholder concerns." (T2:99)

FortisBC states that the closest Quail Ridge residence is some 800 meters from the proposed site and that the natural topography creates a very effective visual barrier (T2:101).

With respect to the visual impact of the adjoining residence, some 200 meters from the proposed site, FortisBC states "When compared to the ground elevation at the property line, the residence is at a lower elevation. From a line-of-sight perspective from the residence, this has the effect of increasing the current excavation depth to greater than 30 feet. For these reasons, it is unlikely that any of the equipment within the substation will be visible. However, in the event that the equipment is not sufficiently buffered, FortisBC has committed to work with the resident to provide additional screening if appropriate" (T2:100).

In terms of affect on property values, FortisBC states it "does not believe that electrical facilities materially affect property value. However, the Company does review each project on a case by case basis and if, in its opinion, there are any extraordinary circumstances to that project that would suggest that property values may be materially affected, the Company will undertake a more detailed review. For the works contemplated in this Application, given that most facilities are either on existing equipment or are located in areas that can be visually screened, the Company does not believe these extraordinary circumstances exist" (Exhibit B-8, CCQRLR 1.12.7).

FortisBC retained the firm Kent-MacPherson to provide a professional opinion regarding the impact on neighbouring properties arising from the proposed construction of the Ellison sub station. It was the opinion of the Accredited Appraiser that while the proposed substation is not a favourable use and will not enhance the value of adjoining lands, "there is no quantifiable impact or injurious affection to the adjoining lands" (Exhibit B-8, CCQRLR 1.12.13).

The Kent-MacPherson Appraisal document identifies the following assumptions on which their opinion was based. They are:

- the proposed substation will be sited behind the natural berm as depicted in the artist's renderings,

- the power pole lines will be installed in close proximity to the natural berm to minimize their visual impact on the landscape,
- all reasonable measures will be undertaken to reduce noise and light levels emanating from the proposed substation,
- the use of the proposed easement area will be limited to a dual circuit 138 kv over-head line construction, and
- the proposed substation will not be expanded in the foreseeable future.

CCQRLR submitted an opinion from a licensed realtor who resides in the Quail Ridge development and is a registered Intervenor, where in the realtor expressed the view, based on "listening to many, many peoples' thoughts and concerns which they express to me in the course of looking for a new home" that the proposed placement of the sub station "would definitely have an impact on property values" (Exhibit C119-9). Neither of the two opinions could be tested in cross examination.

Health issues related to EMF was cited by many Intervenors from the Quail Ridge development as a major concern. FortisBC provided evidence of the EMF readings emanating from the sub station and related power lines and summarized their findings in the FortisBC opening comments at the hearing as follows:

> "Scientific literature has debated thoroughly the impact of magnetic fields on health and the World Health Organization has adopted a set of guidelines, the ICNIRP guidelines, with regard to EMF exposure. In turn, the BCUC has determined that compliance with those guidelines is an issue for this hearing. In the case of both the substation and associated power lines for this project, magnetic fields are well within the guidelines suggested by ICNIRP. In fact, nowhere adjacent to any of the facilities involved in this application are the levels expected to reach even two and a half percent of the accepted guidelines. At the property line of the substation, levels are projected to be more than 1,000 times lower than the current guideline. At the closest house in the Quail Ridge community, magnetic fields from this substation source would be so low that they would not be distinguishable from the ambient household and community levels." (T2:102)

This matter is discussed further in Section 7.

Transformer noise was of concern to many Intervenors but particularly to both the adjacent resident and to the principals of the adjacent ranching operation.

In response to QRRA concern, FortisBC stated, "Any noise emanating from a substation will be undetectable from the Quail Ridge community" (T2:100).

FortisBC estimates the distance to the cattle corral to be 150 meters from the proposed site and estimates the noise level at that distance to be 40bBA, or equivalent to the noise in a typical living room. Based on this comparison, FortisBC does not believe the transformer noise level should be a concern for cattle on the property (Exhibit B-3, Mushta 1.2).

In terms of the closest residence to the site, FortisBC states "even in the absence of any noise mitigation, the sound would likely not be detected from that distance. If it could be detected, the impact will be further reduced, if not entirely eliminated, by the fact that the transformer is only 12 to 15 feet in height and the site has a 30-foot high earth barrier as an immediate barrier" (T2:99).

5.2 Airport site

The Airport site is shown in Diagram B-9, CCQRLR IR-1, Diagram A24.1. Using this diagram as a reference, it would appear to be directly east of Highway 97 and west of the railway right-of-way, approximately equidistant between the access road to the airport and Old Vernon Road. The Airport site is located on land reported to be owned by the City of Kelowna and is not in the ALR. It is zoned for industrial use (T2:180) and in the vicinity of commercial and industrial activity and airport operations. It does not appear that the Airport site is in close proximity to any residences. Certainly none were identified in the proceedings. At the QRRA meeting of October 24, 2007 FortisBC identified the slope of the land in terms of proximity to airport operations, Nap [Nav] Canada mandatories and the need for flat land to build a substation as reasons to reject this site as a viable alternative. These issues were addressed in Exhibit B-9, CCQRLR1.24.5 to 1.25.1 as follows:

> **Q24.5. During the workshop the Applicant indicated that it had examined a site on the east side of Highway 97 between the highway and the railway track south of Old Vernon Road but that Nav Canada height restrictions were a contributing factor to not selecting that site.**
>
> A24.5 No response is required.
>
> **Q24.6. Did the Applicant make enquiries of Nav Canada to determine what those height restrictions might be and where they might apply?**

A24.6 No, the other contributing factors were sufficient to stop pursuing the east side of Highway 97.

Q24.7. If so, please provide the name and contact details for that person and the regulations, rules or other restrictions that were cited as being a deterrent to locating the proposed substation at that site.

A24.7 No response is required.

Q24.8. Please show in a diagram with an accurate scale the comparative altitude and heights of:

A24.8 The diagrams requested are not available. Estimated heights are provided below.

Q24.8.1 The transmission towers that currently exist along Highway 97 along the Kelowna International Airport,

A24.8.1 The transmission towers are approximately 55 - 50 feet.

Q24.8.2 The transmission towers that will connect the Duck Lake and proposed Ellison substations and that would occupy the railway line right-of-way that parallels the Kelowna International Airport,

A24.8.2 The transmission towers are approximately 55 - 50 feet.

Q24.8.3 The highest ponderosa pine trees that currently stand between Highway 97 and the Kelowna International Airport,

A24.8.3 The highest ponderosa pine tree is estimated to be 35 - 40 feet.

Q24.8.4 The highest buildings that are to be found on the grounds of Kelowna International Airport (such as, but not restricted to, the tallest Kelowna Flightcraft building), and

A24.8.4 The tallest Flightcraft building is estimated to be 45 - 50 feet.

Q24.8.5 the proposed substation if it were to be located in the vacant land between the railway and Highway 97 south of Old Vernon Road.

A24.8.5 A structure in the proposed substation is estimated to be 30 feet.

25. Reference: Exhibit B-3, Appendix 20.3, page 9

Q25.1. The Applicant also stated that this same site at which Nav Canada restrictions were a consideration, also had too much slope to be suitable for a substation. To the naked eye, much of this location (the land south from the corner of Hwy 97 and Old Vernon Road) appears to be very flat. Please provide a slope profile of the entire site between the railway on the east and Highway 97 on the west, from the corner of Hwy 97 and Old Vernon Road at its northern point all the way south to the road entrance from Hwy 97 to the airport.

> A25.1 FortisBC does not have any issues with the slope of the terrain on the east side of Highway 97 where a substation could be situated. The approach to the site however, is sloped enough to require additional structures to allow the transmission line to drop in to the station, adding additional expense and visual impact."

QRRA inquired about the technical inadequacy of the Airport site, and specifically why the site could not be leveled. FortisBC replied "Site leveling is only one factor that excludes this location from consideration. Other considerations are the requirement for larger transmission structures approaching the site, increased grounding costs, and a railway crossing" (Exhibit B-8, QRRA 2.17.1).

During cross examination of the FortisBC Panel, CCQRLR identified on an aerial photograph what appeared to be road access from the airport road to the Airport site on the west side of the railroad tracks which would preclude the need for a rail crossing to access the Airport site. FortisBC stated that it was "not aware of that road, no" (T2: 181). On further cross examination, when presented with the proposition that no railway crossing would be required, FortisBC replied "that is correct" (T2:183).

On the issue of the elevation change, FortisBC further acknowledged that there is less elevation change at the northern end of the site (T2:183). FortisBC stated that it had not discussed the Airport site with the City of Kelowna (T2:184).

A breakdown of the incremental cost for the "East of Highway 97 (Airport)" site when compared to the "Lochrem Road" site is provided below.

PARAMETERS	**COST ($000s)**
Construction of Access Road	204
Incremental Ground Grid Cost	127
Transmission Structures	13
Distribution Feeders Under Highway 97	127
Site Leveling	166
Controlled Access (Railway Crossing)	64
Tax on Material	13
Purchase of Access Road ROW	414
Incremental Engineering / Design	178
Project Management	226
AFUDC	92
TOTAL	**1,624**

Note: The Access Road ROW costs reflect the limited access to the proposed site. Having considered this request and reviewed the existing roads, FortisBC continues to be of the view that this expenditure would be required in order to either acquire access to existing private roadways or construct a new one.

(Exhibit B-18, p. 6)

Commission Determination

With respect to the two opinions on the possible effect of the proposed project on property values, neither of the two opinions could be tested in cross examination. Consequently, the Commission Panel placed little weight on the opinion of the Accredited Appraiser from Kent-MacPherson and very limited weight on the opinion of the resident licensed realtor.

The site photographs and line of sight diagram (Exhibit B-5, pp. 11-15) effectively illustrate the visual impact of the sub station on the proposed Lochrem Road site. The Commission Panel notes that with the exception of the tops of the power poles, the installation does not appear to be visible from the adjacent roadway.

The Commission Panel accepts the elimination from further consideration of all site alternatives identified in the proceeding, except for the Lochrem Road and Airport sites.

The Airport site was suggested by Intervenors as a possible alternative substation site. The Commission Panel is concerned about the contradictory comments and unsubstantiated information provided by FortisBC with respect to the Airport site and is of the view that a full and proper comparison of the Airport site with the Lochrem Road site was not made by FortisBC. Consequently, a determination on substation siting by the Commission Panel is not possible with the information available to it. **Commission Order No. C-4-07 directed FortisBC to submit a written report by June 6, 2007, which addresses the issues listed in Attachment A to that Order. Intervenors are to file comments on the report by June 13, 2007, followed by FortisBC's reply on June 20, 2007. Subsequent to receiving and considering this information, the Commission Panel will make a decision on the location of the site for the substation.**

6.0 ELLISON FEEDER 4

6.1 Overview

The Ellison Feeder 4 is an entirely new feeder, 3.5 kilometres in length and conductored with 477 MCM ACSR. The plan outlined in the Application by FortisBC indicates that construction will be scheduled in conjunction with the future City of Kelowna plans to ultimately extend Old Vernon Road to the Glenmore area (Exhibit B-1, p. 12) in the next few years (Exhibit B-1, p. 50). The new road is referred to as McKinley Road.

6.2 Consultation and Regulatory Review Process

Because the issues of main concern to QRRA are related to routing, alignment and timing of construction for the specific location of a 300 metre component of Ellison distribution Feeder 4, and became increasingly contentious during the proceeding, this section addresses those matters in further detail.

November 2006 – January 2007

As a part of its on-going consultation, at the request of the QRRA Executive, FortisBC held a further meeting with this resident group on November 10, 2006. In order to ensure that information was correctly interpreted, the QRRA Executive prepared a summary of the meeting in the form of a Question and Answer sheet (Exhibit C1-13) and subsequently obtained acceptance of the document from FortisBC (QRRA Argument para. 14-15). Question #3 addressed the corridor along the future McKinley Road with the following statements having been summarized:

> "FortisBC indicated that the utilization of the east-west corridor afforded by the future McKinley Road that will run north of Quail Cres. would coincide with and not precede the construction of this roadway. Members present indicated a preference for pole structures, if used, to be placed on the north side of the McKinley road" (Exhibit C1-13, p. 2).

The QRRA argues that this information is very significant to Quail Ridge residents for three reasons. First, they take comfort in the knowledge that McKinley Road will not likely be constructed in the near future. Second, their understanding is that the future McKinley Road will not be immediately adjacent to their properties and that there would be subdivided lots on each side of McKinley Road, which would ensure some distance between the north end of the Quail Ridge properties and any power line on McKinley Road. Third, they expect that the

ultimate alignment of the McKinley Road would not be determined without a public hearing to consider the impact of the road and any associated power line on their properties (QRRA Argument, para. 20-23).

At the Commission-sponsored public workshop on January 9, 2007, when comparing Options 1, 2 and 3, FortisBC identified the right-of-way pertaining to Option 1 as "Existing" (Exhibit B-5, Slide #14).

On January 31, 2007 FortisBC, in response to QRRA IR No. 2, FortisBC provided Map 12.1 of the Kelowna 2020 Official Community Plan entitled "20 Year Major Road Network & Road Classification Plan" (Exhibit B-8, QRRA A2.21.1). FortisBC also submitted its own diagram for the area at the north end of the Quail Ridge development with an "Approximate Proposed McKinley Road" identified, which in addition shows the new poles installed in 2006 (Exhibit B-8, QRRA A2.21.2).

Oral Public Hearing – April 2, 2007

Under cross-examination by the counsel for the QQRA, FortisBC outlined a new development in the Applicant's plans regarding the construction schedule. The Company indicated that accelerated land development in the North Kelowna area, with load demand increasing faster than was anticipated in October 2006, when the Application was filed, has resulted in a necessity to construct Ellison Feeder 4 along the same route as planned without necessarily waiting for the development of a new McKinley Road by the City of Kelowna (T2:133).

FortisBC further explained that as a BCUC regulated utility, it is obligated to construct overhead facilities unless there are technical, safety or environmental reasons not to do so. The Company reminded Intervenors that Quail Ridge residents have the opportunity to pay the incremental cost of under-grounding distribution lines and to apply to the Company's Aesthetic and Environmental Upgrade Program for cost participation assistance (T2:203).

As an undertaking, FortisBC provided a map for Ellison Feeder 4 along the proposed 300 metres of right-of-way that FortisBC may have to purchase in the event McKinley Road is not constructed before 2008 (Exhibit B-18, Undertaking 3).

Arguments and Replies

FortisBC states that Ellison Feeder 4 is contemplated in the Application and has always been a component of the Company's preferred Option 1. FortisBC further argues that this distribution line is required to service the area west of the proposed Ellison Substation whether it is built along a road alignment or an easement obtained over the property north of Quail Ridge (FortisBC Argument, para. 21). In other words, Ellison Feeder 4 will be built with or without the construction of McKinley Road.

The QRRA submits that the Commission Panel can and should exclude from the Application FortisBC's proposal to construct without delay an Ellison Feeder 4 extension westward immediately to the north of the Quail Ridge community for the following reasons:

- It would not be in the interests of the ratepayers of FortisBC to incur the cost of an immediate Ellison Feeder 4 extension in the absence of a proper evidentiary record for the Commission's consideration.
- The Commission should not allow a public utility to benefit from failing to provide timely, voluntary disclosure within the CPCN proceeding of substantial changes to the project for which approval is sought.
- The immediate Feeder 4 extension proposal arose too late in the proceeding for participants to have adequate opportunity to question it (QRRA Argument, para. 60-61).

The QRRA acknowledges that while the route of the Ellison Feeder 4 has been identified in the Application as following the future McKinley Road (east-west some undefined distance to the north of the Quail Ridge community) the alignment of the line (its precise location within that route) has not been identified, because the alignment of the future McKinley Road has been neither identified nor approved (QRRA Argument, para. 52).

FortisBC argues that the Commission does have an adequate evidentiary record before it to approve Ellison Feeder 4 as a part of the Application; therefore, a determination as to the location of 300 metres of distribution line should not impede or delay the disposition of this Application (FortisBC Reply, para. 33). To substantiate its position FortisBC highlights the following:

- At every instance where the route for Ellison Feeder 4 was presented in the Application, responses to IR's or at community presentations, the route has always been at the north end of the Quail Ridge development. Further, the related costs have been included and identified (FortisBC Reply, para. 36).

- Accelerated land development in North Kelowna has resulted in a requirement to construct Ellison Feeder 4 along the planned route without necessarily waiting for the development of a new McKinley Road by the City of Kelowna (FortisBC Reply, para. 37).

- The Kelowna Official Community Plan submitted as evidence indicates the location of the proposed McKinley Road along the north extremity of the Quail Ridge development but was not referred to by the QRRA (FortisBC Reply, para. 47).

The QRRA explains that it did not refer specifically to the Community Plan map in the Argument because such maps show routes of future roads, not alignments. Further, there is considerable evidence on the record to the effect that the alignment of the future McKinley Road has not been determined and FortisBC has not, until its Reply, asserted that the alignment of the road has been finally determined (QRRA Reply, para. 15). In summary, the QRRA reiterates that its main concern is the alignment of Ellison Feeder 4, in particular the newly proposed 300 metre section immediately adjacent to the north side of Quail Ridge properties (QRRA Reply, para. 5).

Commission Determination

The Commission Panel acknowledges that the timing of construction for Ellison Feeder 4 is driven by need and accepts the argument by FortisBC that the accelerated land development in North Kelowna has resulted in a requirement to construct Ellison Feeder 4 without necessarily waiting for the construction of the new McKinley Road by the City of Kelowna.

The Panel notes, however, that the accelerated load growth has not been instantaneous and that FortisBC was unresponsive and remiss in not informing the affected Intervenors or the Commission of the changed plan earlier. The January 9, 2007 workshop, responses to the second round of IR's and the Opening Statement made by the FortisBC policy witness in the beginning of the April 2, 2007 Oral Hearing are examples of those missed opportunities. Moreover, in view of the apparent urgency to construct the Ellison Feeder 4, the Panel is surprised at the lack of dialogue with residents of Quail Ridge regarding potential mitigation measures. Finally, the Panel is unsure about the official status of the proposed McKinley Road and its proximity to the north boundary of the Quail Ridge development.

The Commission Panel agrees with FortisBC that a determination as to the specific alignment of 300 metres of distribution line should not impede or delay the disposition of the Application. **Accordingly, the Panel approves Ellison Feeder 4 as an essential component of the Ellison Project – Option 1 on the following terms:**

1. **FortisBC is to collaborate with the City of Kelowna and affected QRRA members and Quail Ridge residents to determine, considering the current and/or future plans for the development of McKinley Road, the alignment for Ellison Feeder 4 with the least impact as it passes the northern section of the Quail Ridge development and to make available to the QRRA members and residents full details of an under-grounding option for this section of Feeder 4 and the arrangements by which these members and residents could access this option.**

2. **FortisBC is directed to file a report on progress on the collaboration on and/or resolution of this matter by September 28, 2007.**

3. **Intervenor comments are to be submitted by October 10, 2007 and FortisBC reply by October 18, 2007.**

4. **Pursuant to item 3 above, FortisBC is to confirm in its report that the alignment of any Ellison Feeder 4 under consideration and/or proposed to the Commission is in compliance with the WHO and ICNIRP EMF standards.**

A decision by the Commission Panel on the alignment of Feeder 4 will be made after it reviews the report from the Applicant and the submissions of the Parties.

7.0 SOCIAL AND ENVIRONMENTAL ISSUES

7.1 Project Compliance with WHO and the International Commission on Non- Ionizing Radiation Protection "ICNIRP" Electromagnetic Field "EMF" Standards

In the Application, FortisBC states that "In all locations along the transmission and distribution line right-of-way, the EMF levels associated with this specific project will be significantly lower than the public exposure guidelines supported by the [WHO]" (Exhibit B-1, p. 20) and in Appendix F (Exhibit B-1, pp. 73-75) provides some typical values for both the Magnetic and the Electric Fields and their comparison to recommended values by ICNIRP.

Many local residents, in their letters of registration for Intervenor status, expressed concern about EMF related health issues associated the proposed Project. Intervenor Mr. Hans Karow provided numerous submissions on EMF issues. During the Public Submissions and Pre-hearing Conference, Intervenors made submissions on EMF and related health issues and requested that EMF issues be included as an issue for the Hearing.

At the Pre-hearing Conference FortisBC addressed the issue of EMF with the following statement.

> "The evidence to date in this application is that there are very low levels of EMF that will arise from the transmission distribution lines and the substation and those EMF levels that are shown in the application were the subject of further responses, I believe, in the IRs. They are very low. We are talking about two or three milligauss at the most. EMF issues have been very thoroughly reviewed by this Commission on a number of occasions. In regard to FortisBC's appearance before this Commission the EMF issues were thoroughly reviewed at the Nk'Mip hearing. However, after the Nk'Mip hearing, I believe it was in July of last year, the Commission rendered its decision in what I'll refer to as the VITR application. The VITR decision expressly approves the standards put forth by the ICNERP, the World Health Organization and Health Guidelines. In that decision the Commission also directed BCTC to monitor science related to the ICNERP, WHO and Health Canada Guidelines, and to report on a biannual basis as to the science, the developing science, if any, and if there are any changes in the applicable guidelines for transmission lines and electrical facilities. The VITR decision expressly refers to that science as it's dealt with by the Commission in the decision as setting a guidepost or a post of application throughout the province. The reference and the applicability of the VITR decision to the balance of the province of British Columbia, which would include the matters in this application, stated to expressly be the guiding light. And given that the EMF levels in evidence at this hearing -- and there's no suggestion anywhere that the readings of FortisBC are wrong -- given that those levels are so low, in my submission there is no serious issue relating to EMF health issues arising on this application" (T1:64, 65).

By letter dated January 8, 2007, Mr. Hans Karow requested that EMF related issues be included on the hearing list and that both the Commission and FortisBC retain separate EMF experts for cross examination (Exhibit C152-16).

The Commission Panel considered the submissions for Hearing Issues, including, among other things, an expansive review of EMF issues and determined a Hearing Issues List which was included as part of Commission Order No. G-1-07. The Hearing Issues List included "Project compliance with the WHO and ICNIRP EMF standards".

By Letter dated January 19, 2007, (Exhibit C152-23) Mr. Karow made application for Reconsideration of Order No. G-1-07 and Request to the Commission and FortisBC to have a EMF legal issue panel provided. In considering this request the Commission Panel followed the established practice for reconsideration and determined that there was not a reasonable basis for reconsideration and denied the request without further process. In the response to Mr. Karow, reference was made to the January 9, 2007 Pre Hearing Conference where in the BCUC Decision on the Vancouver Island Transmission Reinforcement Project ("VITR") was referenced. That Decision states on page 72 as follows:

> "… the Commission Panel directs British Columbia Transmission Corporation ("BCTC") to file a public report with the Commission every two years, or sooner if there are major developments in the EMF field, that summarizes the latest results of EMF risk assessments and any changes in the guidelines developed by the WHO, ICNIRP, Health Canada and others where relevant. This directive is intended to help the Commission to fulfill its commitment to monitor science and will allow residents to keep abreast of major developments in the field. The Commission Panel also expects the reports will provide a common foundation for evaluating any EMF issues associated with future transmission projects in the province."

The response to Mr. Karow also stated "Item six on the Hearing Issues List that was established by Order No. G-1-07 provides an opportunity to lead evidence as to how the perception of EMF may impact property values." Mr. Karow did not appear at the hearing nor did he provide an expert witness for cross examination on any of the submissions.

EMF was not raised in cross examination of the FortisBC Panel.

Commission Determination

The Commission Panel has reviewed the evidence in the Application at Appendix F (Exhibit B-1, pp. 73-75) and has determined that the EMF levels associated with this project will be significantly lower than the public exposure guidelines developed by the WHO and ICNIRP. **However, the Commission Panel is conscious of public concern for this issue and in granting the Conditional CPCN for the project (Order No. C-4-07) requires FortisBC, to confirm in its report which it must file with the Commission by September 28, 2007, that the alignment of Ellison Feeder 4 recommended to the Commission, in terms of its impact on adjacent residents, is in compliance with the WHO and ICNIRP EMF standards.**