1.0 Reference: Exhibit B-1, B. BACKGROUND TO THE PROJECT, p. 1, paragraph 5

The Project is also required to address and improve equipment condition. The 2006/07 winter peak load was 125% of the emergency nameplate rating of the existing transformer. In addition, the transformer tapchanger has failed FortisBC Submission regarding the Naramata Substation Project frequently, causing voltage fluctuations beyond the normal range. The general condition of all of the substation equipment has deteriorated due to age.

Q1.1 Please provide an explanation of FortisBC's operating guidelines for transformer loading in per unit of continuous or nameplate rating and include Summer Emergency and Winter Emergency ratings.

A1.1 The determination of the precise overload capability of a specific transformer is very complex and requires knowledge of pre-loading levels, the expected ambient temperature, and a detailed assessment of the current condition of the transformer. A precise determination for the Naramata transformer has not been completed.

Q1.2 Please clarify if the 125% is of the Winter Emergency rating or the continuous or nameplate rating.

A1.2 The transformer loading is in reference to the "Maximum Cooled Capacity" rating of the transformer which is 5.6 MVA (4 hour timeframe). The continuous nameplate rating of the transformer is 4.2 MVA.

2.0 Reference: Exhibit B-1, C. A TOTAL PROJECT COST ESTIMATE, INCLUDING A SUMMARY OF EXPENDITURES TO DATE, p. 2, paragraph 7

Q2.1 Please confirm that the purchase price of the Fire Hall site is still $400,000.

A2.1 FortisBC confirms that this is the anticipated purchase price. No offer to purchase the land will be made unless the BCUC directs the Company to construct the substation at this site.

Q2.2 What will happen to the existing Naramata substation site today and in the future? What is the appraised or assessed land value of the existing Naramata substation site?

A2.2 As stated in the August 11, 2006 response to BCUC IR1 Q3.6 (Exhibit B-2, Appendix C, page 10), FortisBC expects to sell the existing property.

Q2.3 In 2005 Revenue Requirements 2005 Capital Plan Appendices - Tab 9, Appendix 3, Project Name: Naramata Rehabilitation Costs were $2.0 million in 2005 (project total $3.25 million) for a 63/13 kV, 20 MVA station. Now, for a 63/13 kV, 10 MVA station, the Arawana Road Station is $6.3M and the Fire Hall site is $7.4M. Please explain the cost differences from the pervious $3.25M. Please explain how these additional new costs will impact future revenue requirements by FortisBC.

A2.3 The estimate included in the 2005 Revenue Requirements application was based on planning level engineering work and estimated in 2004 construction dollars. The current estimate is based on detailed engineering and current (2007) construction dollars and reflects market rates for construction labour and material that are increasing at a rapid rate. The major variables that have driven the cost increase from the 2005 Revenue Requirements submission ($3.25 million) to the current project estimate ($6.3 million for the Arawana Road site) are as follows:

- Increase in Material prices (based on actual cost of power transformer for this project and purchases of major equipment for other substation projects) $260,000
- Construction Labour Cost increase (based on actual costs of similar projects under construction) $140,000
- Increase in Transmission Line Costs (at the time of the 2004 estimate, the cost of Transmission work was assumed to be $50,000 as the site was not determined) $200,000
- Sunk Costs to date (including engineering, regulatory, and investigative costs) $1,100,000
- Cost of Land (actual cost of the Arawana Road site and projected cost of the transmission right of way) $800,000
- AFUDC (originally estimated on a 6 month project window) $339,000

- Additional costs associated with regulatory requirements $200,000.

In the cost comparison, an adjustment of <$140,000> has been made in respect to AFUDC for the Fire Hall site option. (Please see the response to NAFS Q1.4.8).

Table 7 – Exhibit B-1, Page 2, C.7 (Updated Project Costs) as adjusted, is provided below

	Arawana Road	**Fire Hall**	**Difference**	**Comments**
		($000s)		
Costs incurred to date				
Project Management and Planning	500	500		
Transformer and materials	900	900		
Design and Engineering	525	525		
Acquisition of Arawana Road Site	525	525		
Costs Incurred to Date – Total	**2,450**	**2,450**	-	
Costs Going Forward				
Substation				Does not include transformer cost
Line Work	18	18		Provides allowance for line work inside the station fence.
Civil and Site	936	1,911		
Buildings	169	169		
Structures and Buswork	267	276		
Station equipment and Apparatus.	250	250		Transformer and recloser already paid for.
Communications	90	75		
P&C	128	128		
Engineering, Commissioning and Project Management	792	1,023		Includes Project Management, Engineering, Commissioning, PST, travel, rentals, LOA costs.
Substation Total	**2,650**	**3,850**	**1,200**	
Transmission Line	**250**	**50**	**(200)**	Assumes direct route for transmission line to 45 Line
Distribution Line	**100**	**50**	**(50)**	Rebuild existing along Arawana Road
Acquisition of Fire Hall Site	**0**	**400**	**400**	
Disposal of Arawana Road Site	**0**	**(500)**	**(500)**	
Lines Rights of way	**300**	**-**	**(300)**	
Regulatory Costs	**200**	**200**		
AFUDC	**339**	**772**	**433**	AFUDC adjusted per NAFS Q1.4.8
Forecast Total	**6,289**	**7,272**	**983**	

Please see the response to NAFS IR1 Q1.4.5 for the respective rate impacts for the two options.

Q2.4 In the project cost estimates, please show all costs in net present value 2007$. What is the level of accuracy for the estimates provided? What contingency and escalation amounts have been allowed for in the project cost estimate?

A2.4 Please see the response to NAFS IR1 Q1.4.1. The estimates are considered to be accurate to +/-10% for the construction of the substation and associated line work. The Fire Hall site has a contingency of 8.5% and the Arawana Road site has a contingency of 6.5%. Market escalation of 5% per year in addition to inflation of 2% per year is expected consistent with FortisBC's projections for the Ellison and Black Mountain substation projects, but is not included in the Naramata Project estimates.

2.5 In Exhibit B-2, Appendix A, A 5.1.

2.5.1 FortisBC states that the transmission line costs for the Arawana Road. site of $250,000 is for the Option 2 and is a more direct cross country new transmission line from Naramata Road (Greenfield) to the new substation with one distribution feeder under built on the transmission structures and does not include land costs (either for anchoring easements or expropriation).

Q2.5.1.1 What is the estimated land costs associated with this option? Please show these costs in the updated project cost estimate.

A2.5.1.1 Please refer to Table 7 in Question 2.3 above. The estimated cost to acquire the land for this option is $300,000.

Q2.5.2 The transmission line cost for the Fire Hall site is $50,000. Previously, these costs were $80,000 to $100,000. Please confirm this cost as well.

A2.5.2 Previously, FortisBC has stated that the cost related to the distribution and transmission line work at the Fire Hall site would be approximately $80,000 - $100,000. The $50,000 estimate provided most recently is related to the transmission work only at the Fire Hall site.

Q2.5.3 Was there a reduction in cost due the reduction in the size of the transformer?

A2.5.3 Yes, a reduction of approximately $200,000 was realized as a result of reducing the transformer size from the original design.

Q2.5.4 Are the transmission lines sized for future 20MVA transformer or the current 10MVA transformer?

A2.5.4 FortisBC standard transmission conductor is satisfactory for a 20 MVA transformer.

Q2.5.5 Please provide an updated estimate showing any additional cost or credit not already shown. Include any costs or credits that may be incurred and expected during the project or shortly thereafter.

A2.5.5 All costs or credits that are anticipated at this time are included in the project cost estimates with the exception of proceeds from the sale of the existing substation property (net of decommissioning costs estimated at $150,000).

Q2.5.6 Please provide additional columns in the project cost estimate to cover the various options for substations and transmission lines under review such as wood pole construction, self supporting steel, etc.

A2.5.6 The various options reviewed for the substation and transmission and distribution lines are summarized in the table below.

	i.	ii.	iii.	iv.	v.	vi.	vii.	viii.	ix.
Appendix A6.1 Reference			Option C			Option A	Option B	Option D	Option E
Substation Site	**Fire Hall**	**Fire Hall**	**Arawana**	**Arawana**	**Arawana**	**Arawana**	**Arawana**	**Arawana**	**Arawana**
Substation Screening		Aesthetic wall		Vegetation	Aesthetic wall				
Transmission Line			Direct O/H	Direct O/H	Direct O/H	Direct U/G	Arawana Rd U/G	Arawana Rd O/H	Arawana Rd Self Supporting
Distribution Line 1			Underbuild	Underbuild	Underbuild	Direct U/G	Arawana Rd. U/G	Arawana Rd Underbuild	Arawana Rd Underbuild
Distribution Line 2			Arawana Rd O/H	Arawana Rd O/H	Arawana Rd O/H	Arawana Rd O/H	Arawana Rd O/H	Arawana Rd U/G	Arawana Rd U/G
Total Costs Incurred to Date	2,450	2,450	2,450	2,450	2,450	2,450	2,450	2,450	2,450
Substation Total	3,850	3,990	2,650	2,800	2,730	2,650	2,650	2,650	2,650
Transmission Line	50	50	250	250	250	800**	1,100	300	730
Distribution Line	50	50	100	100	100	100***	100***	150+	150+
Acquisition of Fire Hall Site	400	400	0	0	0	0	0	0	0
Disposal of Arawana Road Site	(500)	(500)	0	0	0	0	0	0	0
Lines rights of way	-	-	300	300	300	300	100++	100++	0
Regulatory Costs	200	200	200	200	200	200	200	200	200
AFUDC	772	772	339	339*	339*	339*	339*	339	339
Forecast Total	7,272	7,362	6,289	6,439	6,369	6,839	6,939	6,189	6,519

* AFUDC is assumed to be equal for the purposes of comparison.
** Transmission route includes one distribution feeder
*** Includes the cost to upgrade the existing distribution on Arawana Road.
\+ Allows for underground distribution feeder
++ Costs estimated are to allow for acquiring anchoring easements where required.

i. Fire Hall Site – Base Case

ii. Fire Hall – Aesthetic concrete wall. Construct a solid visual screen along all four sides of the substation at the Fire Hall site.

iii. Arawana – Base Case - Wood pole construction – "Direct Cross Country Route". The transmission line with one underbuilt distribution line would be constructed directly from Naramata Road to the Arawana Road site. The existing distribution line on Arawana Road would be upgraded to current day standards.

iv. Arawana - Vegetative screening along north and west side of substation. Provide a vegetative screen of a suitable species to provide a visual obstruction to the substation. To accomplish this on this site, a retaining wall would need to be constructed on the east side to move the footprint of the substation further east and therefore provide a level area to plant vegetation along the fence line. This would provide better screening than if the vegetation was planted along the toe of the cut slope (along the road)

v. Arawana - Aesthetic concrete wall. Construct a solid concrete barrier along the west and north sides of the substation to provide visual screening.

vi. Arawana - Underground – "Direct Cross Country Route". The transmission and one of the distribution lines would be constructed underground from Naramata Road to the substation site. The existing distribution line on Arawana Road would be upgraded to current day standards.

vii. Arawana - Underground – Arawana Road. The transmission and one distribution line would be constructed along Arawana Road from Naramata Road to the Arawana Road site. The existing distribution line on Arawana Road would be upgraded to current day standards. This option would require more splice boxes due to the nature of the Arawana Road alignment, and would have potentially more underground interferences.

viii. Arawana - Wood pole construction – Arawana Road. The transmission line with one underbuilt distribution line would be constructed along Arawana Road. A second distribution feeder would be constructed underground along Arawana Road from the Arawana Road site to Naramata Road. This option presents anchoring challenges due to the large line angles and limited space, and potential underground

interferences with existing utilities.

ix. Arawana - Steel self supporting. The transmission line with one underbuilt distribution circuit would be constructed along Arawana Road. The lines would be constructed on self supporting steel poles that would negate the need for anchoring. A second distribution feeder would be constructed underground from the Arawana Road site to Naramata Road.

3.0 Reference: Exhibit B-1, D. A SUMMARY OF AGREEMENTS, PERMITS AND APPROVALS THAT REMAIN OUTSTANDING FOR THE PROJECT

Q3.1 Paragraph 13. What is the incremental cost amount for the lines to be placed underground to the Arawana Road site? Explain why overhead would be considered as "in accordance with FortisBC Electric Tariff"? Is there any portion of the 69kV line currently supplying Naramata located underground?

A3.1 Section 4.2 of the Terms and Conditions of FortisBC's Electric Tariff, states the following:

"The Company's Tariff is designed to recover the cost of providing electrical service from overhead poles and conductors. The Customer applying for underground service under any Rate Schedule shall be responsible for any added cost…"

FortisBC provides underground service at the Company's cost when warranted for technical, safety, or cost reasons.

As noted in Question 2.5.6, the cost to underground the 63 kV is more expensive. The incremental cost difference to underground the 63 kV over the Greenfield route would be $550,000, and to underground the 63 kV along Arawana Road would be $650,000. No portion of the existing transmission line is underground.

Q3.2 Paragraph 18. What is the planned height of the substation? What is the height restriction in the zoning by-law for both sites? If a variance is required, will there be delays in obtaining a variance? Has the variance been applied for?

A3.2 The planned height of the 63 kV line termination structures is 9.8 meters not including

the lightning mast. No height variance would be required for either site.

Q3.3 Paragraph 25. When either site is under construction, would the existing Naramata substation be able to handle the electrical load?

A3.3 The existing Naramata substation transformer is at risk of failure during winter peak 2007/08. The transformer has already exceeded its emergency winter rating in 2006/07. Project load growth will increase the risk further if the existing transformer, due to the extended construction schedule associated with the Fire Hall site, is required for the 2008/09 winter peak.

Q3.4 Paragraph 31. Is the cost of the 10ft high wall included in the project cost of the Fire Hall site? Has FortisBC considered a green living wall instead of a plain concrete wall for aesthetic purposes? What other visual screening options has FortisBC considered for either substation site?

A3.4 The cost of the screening wall has not been included in the project cost estimate. As noted in the response to Q2.5.6, FortisBC did evaluate the cost of installing vegetative screening and a concrete aesthetic wall at the Arawana site, and a concrete aesthetic wall at the Fire Hall site. A vegetative option is not available at the Fire Hall site due to space constraints. In addition, FortisBC makes every effort to maintain existing vegetation during construction, and where possible will use excess materials to construct natural berms on the site where space will allow. FortisBC has also considered privacy slats within the chain link fence at both sites for additional screening benefits.

Q3.5 Paragraph 31. Are there any additional costs not included in the project costs for landscaping the Arawana Road site to reduce the aesthetic concerns? Please explain the nature, height and type of vegetation used to provide screening of the Arawana Road site. Has a wildland/urban wildfire interface been created, reviewed and approved by the local and provincial authorities, namely the Ministry of Forest and Range Protection Branch? How will FortisBC deal with the outside lighting of the substations to reduce the aesthetic concerns?

A3.5 The project cost estimate does not include costs for additional landscaping to reduce

aesthetic concerns. Only the costs of facilities necessary to provide service (in this case, chain link fencing) is included in the current cost estimate.

As required by BC Wildfire Regulations pursuant to the Wildfire Act, FortisBC maintains its equipment and materials in a manner that reduces the likelihood of producing an ignition source. As well, increasing the amount of space used to situate a substation creates a greater buffer around the equipment which aids in the prevention of fire entering into or from the site.

FortisBC provides lighting at the substation to minimum levels required for safe operations only. The actual lighting in the station is equivalent to a porch light on at all times above the control building doors, with the remainder of the lights controlled by motion sensors.

3.6 In FortisBC's response to BCUC Information Request No. 1, Appendix D, Page 1

Q3.6.1 Is the Ministry of Transport still interested in disposing of or leasing the Fire Hall site?

A3.6.1 As far as FortisBC is aware, the Ministry of Transportation is still interested in disposing of this site.

Q3.6.2 Was the cost of relocating the natural gas line, originally stated as $25,000, included in the project costs?

A3.6.2 This cost was included in the project cost estimate.

Q3.6.3 What would be the maximum area available from the Ministry of Transport?

A3.6.3 Approximately 0.47 acres.

Q3.6.4 Would this area be sufficient to build the substation?

A3.6.4 The area available from the Ministry of Transportation is not sufficient in size to construct the substation.

4.0 Reference: Exhibit B-1, F. COMPARISON OF THE ALTERNATE SITES ON A NON-FINANCIAL BASIS

4.1 Paragraph 27. Table 1, Definitions, 2. Operations and Safety.

The Fire Hall site scored significantly lower than the Arawana Road site by 45 points. In the response to the Commission Information Request No.1 to FortisBC, Appendix C, pages 5, 6, 7 and 8, the existing Fire Hall site is 13.4m x 25.9m and the Fire Hall site including the RDOS from Ministry of Transport is 35m x 45m or 1575m2. The Arawana Road site is 80m x 155m or 12,400m2. The area required for the substation including the required perimeter safety zone is 40m x 50m or 2000m^2.

Q4.1.1 Please explain the substation utilization of the existing Fire Hall site and the Fire Hall site including the RDOS from the Ministry of Transport in per Figure 1 below.

A4.1.1 Currently, the land noted in triangle 1 in Figure 1 is utilized as a location to connect the mobile transformer in the event of maintenance or an unplanned outage at the existing Naramata Substation. The fenced area provides adequate space to park the mobile, and there are connection points to the existing transmission and distribution systems.

The area noted in yellow on the attached map is currently in use by the regional fire department. The southernmost area bounded in yellow is available to FortisBC to the best of our knowledge, but will require RDOS to break their lease on the land with MoT. The area outlined in triangle 2 is the entrance to the Fire Hall and is not useable for this project. Similarly, the area outlined in triangle 3 is unusable space for the purposes of constructing a substation.

Q4.1.2 In reference to Exhibit B-2, Alternate Sites, Appendix A.

Q4.1.2.1 Please advise if the Fire Hall site (outlined in yellow), that is transected by both Naramata Road and Debeck Road, can have the transection of the property altered or removed to improve the usable area for substation development and access.

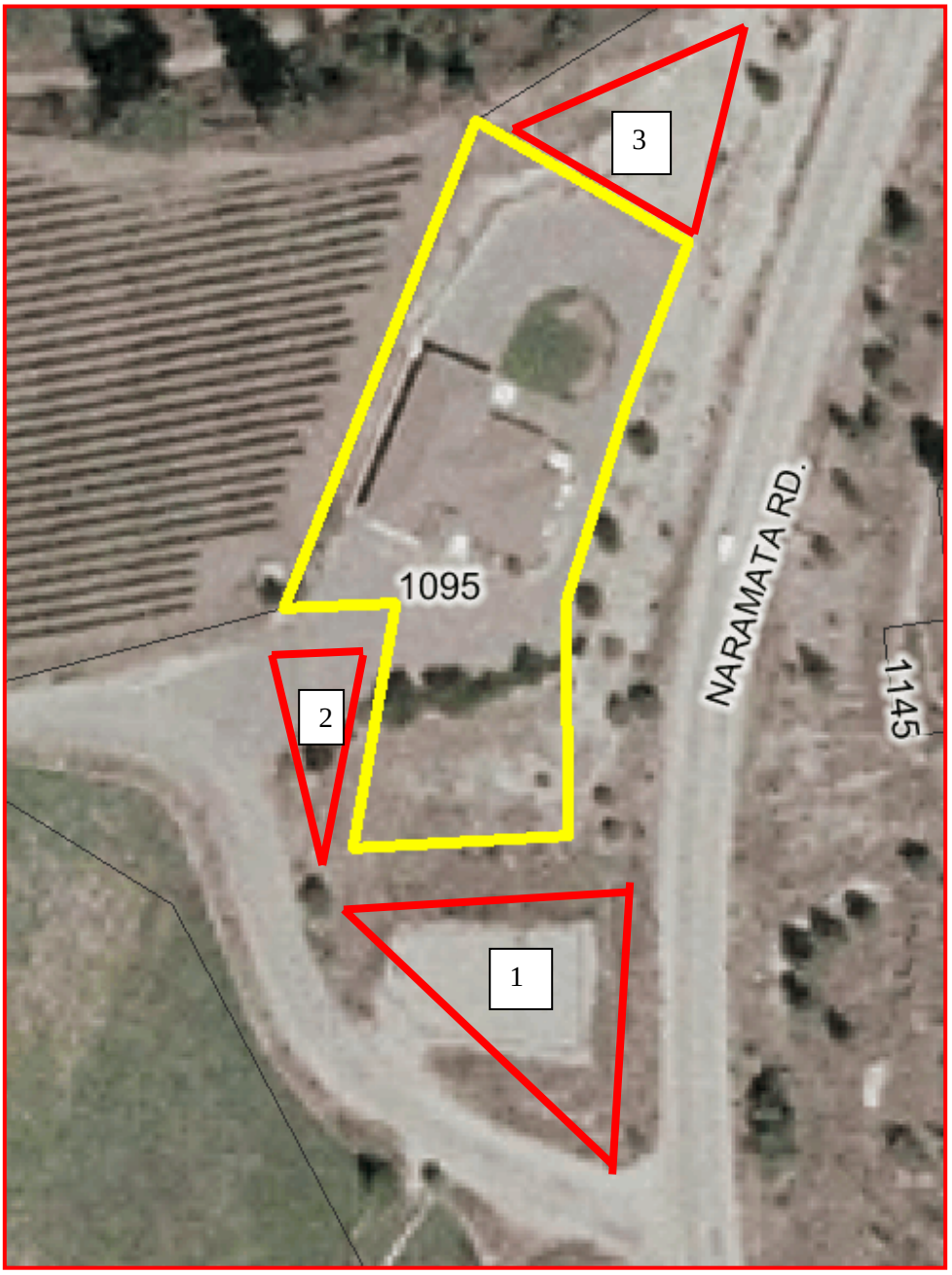
A4.1.2.1 Yes, this division will be required to satisfy the plans proposed for a substation at this site.

Q4.1.2.2 Are the triangular areas adjacent to the Fire Hall site (outlined in red) available to FortisBC for substation development? Can they be purchased? If not, why not?

A4.1.2.2 Both areas 1 and 2 may be purchased from the Ministry of Transportation. Site 3 also may be available but would not be of use to FortisBC.

Figure 1 - Fire Hall Site 1095 Lower Debeck Rd

LICENSE NO 336560 FOR FIREHALL SITE PURPOSES



Q4.1.3 Please provide a dimensioned rendition or sketch plan layout of the substation using the minimum site areas that are feasible without compromise of the safety standards and clearances required for both sites. Also, please provide on these renderings the existing power lines and any new power lines required for the current substation connections as well as any future transmission requirements.

A4.1.3 Fire Hall site

A sketch plan of the Fire Hall site is attached as Appendix A4.1.3 Fire Hall site. The general arrangement of the substation has been modified to fit the reduced land area available and meets minimum safety standards and clearances for operation. It should be noted that this general arrangement, although in compliance with minimum safety standards does not conform to FortisBC standard construction, and as such, all operational and future expandability concerns identified in Appendix H of Exhibit B-2 are still valid and are shown below for reference.

Construction

a) The available footprint for the substation is much smaller than the Arawana Road site, resulting in higher costs for:

- *re-engineering to design non-standard layout;*
- *site preparation, due to limited work space, additional trucking and storage costs due to lack of room to store earth spoil, mitigation of traffic impacts during construction; and*
- *equipment grounding in limited space, including the requirement for a geotechnical study.*

b) There is a possible requirement to pave the substation site to mitigate grounding issues.

c) The natural gas main located in the center of site will have to be relocated.

d) The contour of the property combined with limited area will require the construction of retaining walls on the Fire Hall and Debeck Road sides and distribution egress through the retaining wall and natural grade.

Operations

The restricted size of the Fire Hall site gives rise to a number of operational and

safety issues during substation maintenance or emergency response when a mobile substation is required to be installed. These include:

- *the oil processing unit and tanker would need to be parked outside of the station, restricting traffic flow;*
- *the maintenance trailer may fit on site, however other Company vehicles will have to be parked roadside.*
- *restricted operation of manlifts and hiabs (truck mounted crane);*
- *transformer replacement will require road closures to position cranes; and*
- *one entrance to site restricts general operations such as snow clearing.*

Proposed line access into and out of the substation is shown in the response to BCUC IR1 Q6.1.

Arawana Road site

A sketch plan of the Arawana site showing the proposed general arrangement is attached as Appendix A4.1.3 Arawana Road site. It should be noted that proposed layout is slightly larger than the 40 x 50 meters previously mentioned. The additional length shown on the sketch plan is due primarily to the repositioning of the control building to improve vehicle access within the site.

Proposed line access into and out of the substation is shown in the response to BCUC IR1 Q6.1.

Q4.1.4 The larger transformer (12/16/20 MVA) would have no impact on the substation site area as sufficient space must be initially established to ensure future station / transmission system requirements. Please explain what future station/transmission system requirements are being considered and show these future system requirements on a second layout which incorporates the current requirements. Please provide an estimated in-service date for these future system requirements.

A4.1.4 FortisBC's standard practice is to consider the need for the installation of a second

transformer at an existing site, along with associated equipment (i.e. breakers). In addition, the site should be of sufficient size to accommodate capacitors, reactors, and voltage transformers. The FortisBC standard substation general arrangement for two transformers and one transmission source is attached as Appendix A4.1.4. The fenced dimensions will differ from site to site, but the general arrangement will be the same. There is no plan to expand beyond a single transmission line or transformer within the next 25 years.

Q4.1.5 Please provide the site size of the existing Naramata substation. How does the size of the Naramata substation compare to other similar sized (10-20 MVA) substations currently being operated by FortisBC?

A4.1.5 The existing Naramata Substation site is 44 feet by 85 feet. FortisBC 6/8/10 MVA or 12/16/20 MVA substations vary in size depending on location, application, year of construction and site conditions. FortisBC stations are designed to meet current standards and guidelines (such as Canadian Standards Association - CSA, Workers' Compensation Board - WCB, Environment Health and Safety - EH&S, corporate work procedures, lockout procedures, and operational requirements) which are factored in to determine the layout and configuration.

Q4.1.6 Please provide a layout of the 40mx 50m substation requirements and an explanation of clearance requirements and set-backs required. Please show the size and space requirements for the mobile substation to be located at the substations. Please provide the number of times that the mobile substation has been used and the duration that the mobile substation was in place for each event at the existing Naramata substation.

A4.1.6 Please refer to the response to Q4.1.3 for a proposed general arrangement for the Arawana Road site. The location of the mobile substation is indicated on these drawings. The mobile substation was used in 1996 for approximately 4-6 weeks. Please also see the response to NAFS IR1 Q1.1.4.

Q4.1.7 As the Arawana Road site is 6.2 times larger than the base substation requirements, please provide an explanation as to why this much space is required and what will be the intended use of the space now and in the future.

A4.1.7 The additional space at the Arawana Road site will be used during construction for staging activities and for excess material disposal (berming) where practical.

The larger area will also provide a larger buffer between the public and the substation once operational. There are no plans for other use of this space in the future.

4.1.8 In Reference Exhibit B-2, Appendix H, Flexibility for Future Growth

4.1.8.1 FortisBC states that "In its 2006 System Development Plan ("SDP") Update, the Company forecast growth for Naramata at 3.3% annually over the distribution planning horizon (5 years) and 1.5% annually over the transmission planning horizon (20 years), and had recommended a standard 20 MVA station with mobile backup to accommodate unforeseen load increases. A 10 MVA transformer was purchased for the new substation. With Okanagan development showing continued strong growth (an example is the recent upgrade of the Naramata water supply system which added an additional 800 kW in area demand), the load forecast for Naramata in the next SDP Update will extend the distribution growth for a further five years at rates somewhere between 3.0 - 5.0% for residential and commercial development before declining again to a more moderate longer term growth rate. Although the capacity of the proposed 10 MVA transformer is expected to meet demand for the next 15 years under the revised forecast, FortisBC considers it prudent to ensure that the Naramata Substation Project substation site is of sufficient size to allow for future growth. The Arawana Road site is large enough to accommodate, if necessary, a second transformer in future, allowing full operational access to equipment and additional feeders without expanding the footprint of the substation. It is the Company's opinion that either the advancement of

load growth, or a shift in the location of growth, may result in a future need to relocate or even add a second substation to meet Naramata's requirements. This concern, in addition to the cost, operations and safety and aesthetic issues will be better addressed by locating the new substation at the Arawana Road site." Also in Exhibit B-2, Appendix C, A 2.4 Fortis states that "A 12/16/20 transformer is oversized and would exceed the projected load growth for the distribution planning horizon. The larger transformer would have no impact on the substation site area as sufficient space must be initially established to ensure future station / transmission system requirements."

Q4.1.8.1.1 **The prior statement appears to confirm that if a 20MVA transformer was installed at some time in the future that there would be no impact on the substation area. Hence either the Fire Hall site or the Arawana Rd. site could easily accommodate the 20MVA transformer in the future. Please explain and confirm these statements. When would the capacity of a single 20MVA transformer be exceeded in 2026 or is this too far in the future to even be considered at this time?**

A4.1.8.1.1 A 12/16/20 MVA transformer could be installed within the footprint of the proposed general arrangement for the Arawana Road or Fire Hall site. The main consideration of upgrading from a 6/8/10 MVA to 12/16/20 MVA transformer is the volume of oil containment provided. The physical space to install the larger transformer is provided within the general arrangement. The capacity of a single 12/16/20 MVA transformer is not expected to be exceeded within the next 25 year.

Q4.1.8.1.2 **Could 2-10MVA or 2-20MVA transformers be installed in either substation in the future as the mobile station would not be required?**

A4.1.8.1.2 Two 6/8/10 MVA transformers could be installed in either the Arawana Road or Fire Hall site. Two 12/16/20 MVA transformers could be installed at the Arawana Road site but a second 12/16/20 MVA transformer could not be added at the Fire Hall site. The requirement for

oil containment, breakers, switches and additional structures would leave insufficient space for vehicle access within the substation.

4.2 Paragraph 27. Table 1, Definitions, 2. Risk of Delay

"There is a high risk of the existing Naramata Substation transformer emergency capacity being exceeded within the next peak load cycle."

Q4.2.1 In the 2005 Revenue Requirements, the forecasted electrical load growth is stated as nearly 4%. What is the current forecasted electrical load growth taking into account the predicted future and prior population growth (-0.2% between 2001 and 2006 from Statistics Canada) in the area that this substation will provide electrical service to?

A4.2.1 Current forecast load growth is 3.4% based on a historical rate of 4.7%

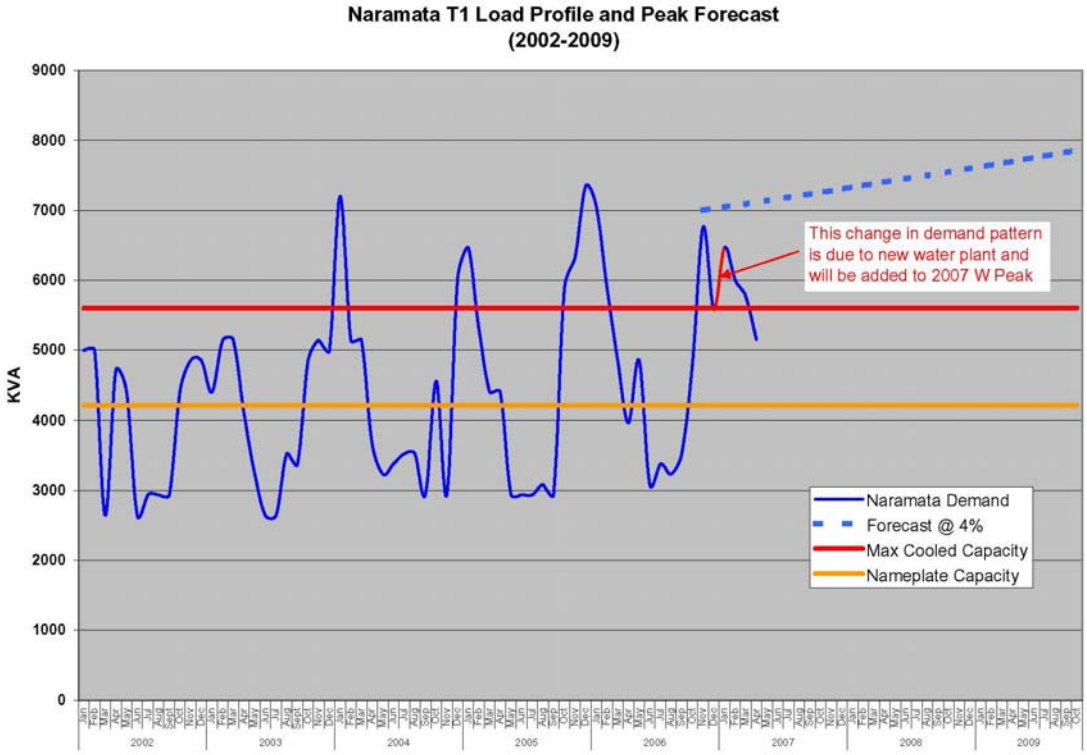
The population growth rate cited in this question is based on population taken from the 2006 and 2001 Census of Canada for Naramata. FortisBC is not aware of any Statistics Canada population forecasts.

The change in Naramata's population between 2001 and 2006 does not show the same trend as electrical load over the same period. There are many reasons that population growth does not correlate well with load growth, including changes in patterns of use, such as an increase in the average size of homes, increased cooling load or increase in the number of electrical appliances, or increases in the number of commercial or irrigation accounts. For example, the addition of a new water pumping station alone increased load on the existing Naramata substation by approximately 15%.

In forecasting load growth at the substation or feeder level, FortisBC does not employ population forecasts. Extrapolation of recent load trends is supplemented with other available information including input from local government, developers, and others.

Q4.2.2 Please provide a graph showing the actual ultimate load and average load growth over the period January 2002 to January 2007 of the Naramata, T1 Load Profile (to the 2005 Capital Plan Appendices – Tab 9) and showing the nameplate capacity, and Summer Emergency and Winter Emergency ratings. Project the forecasted ultimate load and actual load growth on this graph out until the end of construction or October 2009.

A4.2.2 This chart below shows the transformer nameplate capacity along with the "maximum cooled capacity". For old transformers, emergency ratings can only be determined by a condition assessment and design review of the integral components of the transformer. For new transformers, emergency ratings are generally 125% (summer) and 135% (winter) of nameplate rating.



Q4.2.3 What is the normal and emergency rating of the existing "locked-out" load tap changer? Is the existing load tap changer currently at risk in the locked out position (non-automatic operating mode)? If so, why?

A4.2.3 Rating of the Load Tap Changer (LTC) is 260 Amperes (approximately 5.6 MVA) for normal operation and 385 Amperes (approximately 8.3 MVA) for emergency rating.

The LTC could develop the same contact resistance problems that De Energized Tap Changers (DETC) are subject to, due to the contacts being placed in the static position.

Q4.2.4 What is the identified risk with the existing station transformer? Are there any identifiable risks associated with the main power transformer other than the load tap changer? Please explain these other risks.

A4.2.4 The main transformer suffered an internal fault circa 1980. The fault was due to dielectric breakdown of one of the voltage leads which flashed over to the main transformer tank wall. This dielectric breakdown will continue with time. The end of a transformer life is due to insulation failure. Insulation failure is promoted by transformer overload, water content of the paper and oxygen.

A4.2.5 Please provide a listing of the number of outages that occurred on the existing Naramata substation and the duration of each outage.

A4.2.5 The system failures that would cause outage to the Naramata Substation during January 2001 to April 2007 are listed as follows:

Description of Cause	Element	Fault Down Timestamp	Fault Up Timestamp	Duration
PROTECTIVE RELAY	45 Line	1/17/2001 4:20:32 PM	1/17/2001 5:45:12 PM	01:24:40
DISCONNECT	RG Anderson terminal	4/26/2001 2:07:23 AM	4/26/2001 2:18:11 AM	00:10:48
INSULATOR	45 Line	8/2/2001 3:17:03 PM	8/2/2001 7:43:09 PM	04:26:06
OPERATING ERROR	RG Anderson terminal	1/4/2004 5:04:49 PM	1/4/2004 5:17:07 PM	00:12:18
LIGHTNING	RG Anderson terminal	6/21/2005 7:01:18 PM	6/21/2005 7:08:02 PM	00:06:44
PROTECTIVE RELAY	RG Anderson terminal	10/8/2005 1:35:49 PM	10/8/2005 1:38:47 PM	00:02:58
VEHICLE	45 Line	12/4/2005 10:59:00 AM	12/4/2005 12:59:00 PM	02:00:00

Q4.2.6 What is the age of the existing Naramata Substation?

A4.2.6 The Naramata Substation was constructed in 1978. The transformer itself is circa 1962.

4.3 Paragraph 27. Table 1, Definitions, 6. Terrestrial Habitat

Q4.3.1 Explain why Arawana Road site ranks lower in criterion 6 - Terrestrial Habitat.

A4.3.1 The Fire Hall site is viewed as superior in this category as the opportunity for environmental impact is lower than at the Arawana Road site. This is primarily due to the extent that the site has already been disturbed and is bordered by roads on two sides. The Arawana Road site is less developed.

4.4 Paragraph 27. Table 1, Definitions, 9. Property Values

Q4.4.1 Explain why the property values are ranked the same for both sites.

A4.4.1 This criterion is concerned with the potential impact on the value of properties in the vicinity, other than those which will contain the facilities included in this Project, whose owners will be compensated during acquisition of the substation site or rights of way. For either site, there will be no impairment of land use as a result of the Project. Many view planes are in the opposite direction. The Company has not seen any credible evidence that facilities such as these will materially affect values of property near or adjacent to the site.

Q4.4.2 Explain why the property values on Arawana Road would not be affected to a greater degree.

A4.4.2 Please see the response to Q4.4.1 above.

Q4.4.3 Are any property values affected at the Fire Hall site?

A4.4.3 No. Property values in the vicinity of the Fire Hall site will not be impacted by this Project, for the reasons stated in the response to Q4.4.1 above.

Q4.4.4 How were these property appraisals obtained for these property value rankings?

A4.4.4 Based on FortisBC's experience and the facilities proposed in this Project, and as stated in the responses above, there will be no quantifiable negative impact on

property values in the vicinity. FortisBC did not commission property appraisals.

Q4.4.5 Was the impact of these transmission line routes included in these property value rankings?

A4.4.5 As stated in the response to Q4.4.1, this criterion does not include consideration of the properties to be acquired for either the substation itself or for the transmission or distribution lines. Rights of way do impose limitations on land usage, whose owners will be compensated when such rights of way are acquired.

Q4.4.6 Is any of the land being crossed by these transmission lines within the ALC?

A4.4.6 Yes, all of the proposed greenway corridor is within the Agricultural Land Reserve.

Q4.4.7 What is the corridor width required for these transmission lines and what is the estimated EMF profile radiating from these lines? Submit profiles similar to those profiles submitted for the Black Mountain substation project?

A4.4.7 FortisBC is proposing a 10 meter wide right of way for the transmission line. The estimated maximum load profiles in both the Nk'Mip and the Naramata project are expected to be similar. Since the magnetic fields are a function of the current, and the electric field is a function of the line voltages, it is expected that the EMF profile in both these cases would be similar.

Nk'Mip Transmission and Substation Project, Exhibit B-3, BCUC IR1, Q10.4, page 26 - 28 are attached as Appendix A4.4.7.

5.0 Reference: Exhibit B-1, G. ANALYSIS

Q5.1 Paragraph 29. Please describe the amount of time that the road access related to substation maintenance and emergency response issues at the Fire Hall site would create traffic problems on an annual basis.

A5.1 FortisBC conducts substation maintenance on a five year cycle. Emergency response issues cannot be predicted. However, in the event of an emergency or when maintenance is required the following apply:

- the oil processing unit and tanker would need to be parked outside of the station, restricting traffic flow;
- the maintenance trailer may fit on site, however other Company vehicles will have to be parked roadside.
- transformer replacement will require road closures to position cranes required to lift and remove/replace transformer.

Q5.2 Paragraph 34. Please describe the amount of space required to add voltage regulation, a capacitor bank, or other equipment to meet future growth. Please provide a sketch with the plan layout of the substations requested in this IR. Can this equipment be accommodated at the existing Naramata substation when it is taken out of service and still accomplish the same purpose or does it have to be located at the new substation site? If the future equipment must be located at the new substation site, then please explain why it must be located there and can not be located elsewhere.

A5.2 Some technical solutions for the area will require equipment to be installed at the station to be the most effective and economical. The existing site would not be an adequate location in the system to resolve system issues.

Approximate sizes of equipment typically in a substation are identified in the table below. Additional space is required for isolation switches and cabling in which the location can varies and is determined at time of detailed design. A sketch is provided as Appendix A5.2.

Space Available for Expandability				
	Fire Hall site		Arawana Road site	
Equipment	1 x 6/8/10 MVA Transformer	2 x 6/8/10 MVA Transformers	1 x Transformer (any standard size)	2 x Transformers (any standard size)
4 feeders	Yes	Yes	Yes	Yes
4+ feeders	No	No	Yes	Yes
4800 kVAr Capacitor Bank (approx. 5.7Lx2.2Wx4.4H in meters)	Yes	No	Yes	Yes
600 Amp Feeder Reactors (approx. 4.5Lx1.5Wx7.2H in meters)	No	No	Yes	Yes
Source Feeder Voltage Regulation	No	No	Yes	Yes

6.0 Reference: Exhibit B-1, H. PROPOSED REGULATORY TIMETABLE

Q6.1 Paragraph 36. Please provide maps (showing property address numbers and road names) and a rendering of the proposed substations at each of the Arawana Road and Fire Hall sites as well as existing transmission lines and Route Options for Transmission and Distribution Ties to the Arawana Road and Fire Hall Sites. These options will be those listed in Appendix C of FortisBC's Response dated August 11, 2006 to "Commission Information Request No. 1 to FortisBC."

A6.1 Attached as Appendix A6.1 are:

- Existing Transmission and Substation Options
- Transmission Line Routing Alternatives
- Option A - Underground "Direct Cross-Country"
- Option B - Underground - Arawana Road
- Option C- Wood Pole Cross-Country
- Option D - Wood Pole Construction & Option E - Steel Pole Self Supporting

Artist renderings of the Arawana Road site and Fire Hall site are shown below.

Artist rendering of substation at Arawana Road site

Artist rendering of substation at Fire Hall site

Q6.2 Please specify all land to be expropriated or otherwise obtained for rights of way on the maps. Please specify all right of way corridors and their nature and width on the maps. Will any of these corridors be joint-use corridors? What is FortisBC's share of the cost to relocate the Telus circuit if Telus elect to move their facilities off of the existing 63 kV structures in Arawana Road Option 1 new transmission tie and were these costs allowed for? Are there any other costs associated with either the Fire Hall site or the Arawana Road site that are not yet identified?

A6.2 Please see Appendix A6.1 for maps regarding proposed line routes. FortisBC does not expect to expropriate any property. It is anticipated that anchor easements will be required at all angle structures. Exact location of the anchor and poles will be determined during detailed design. Any non-road rights of way will be 10 meters wide and FortisBC is not aware of any requests from other utilities for joint use.

None of the possible line configurations under consideration would require Telus facilities to be relocated. Please see the response to BCUC IR1 Q2.5.5 above with regard to other costs.

Q6.3 Please provide schematic one-line diagrams of the Naramata proposed electrical transmission system and its modifications.

A6.3 The proposed electrical transmission system and its modifications are identified in the "bubble" provided in Appendix A6.3.