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September 11, 2008

Via Email
Original via Courier

Ms. Erica M. Hamilton
Commission Secretary
BC Utilities Commission
Sixth Floor, 900 Howe Street, Box 250
Vancouver, BC V6Z 2N3

Dear Ms. Hamilton:

Re: An Application for a CPCN for the Copper Conductor Replacment Project No. 3698518

Please find enclosed FortisBC Inc.'s responses to Information Request No.2 from the BC Utilities Commission, and Information Request No. 1 from the BCOAPO et al. Twenty copies will be couriered to the Commission.

Sincerely,

David Bennett
Vice President, Regulatory Affairs
and General Counsel

cc: Registered Intervenors

Q34.0 Reference: Exhibit B-2, BCUC IR 1.1, 1.2

Q34.1 Over the past five years approximately 200 of the 350 incidents of distribution conductor failure involved legacy copper. In 12 of the incidents involving copper, the downed copper conductor remained energized on the ground. Were any injuries sustained as a result of the downed copper conductors?

A34.1 No, there were no injuries sustained as a result of downed conductor.

Q34.2 In how many of the approximately 150 incidents that did not involve copper conductor did the downed conductor remain energized? Were any injuries sustained as a result?

A34.2 There have been no instances where non-copper downed conductor remained energized.

Q34.3 If there is a significant difference in the ratios for copper and other conductors that remain energized or caused injuries, please discuss the reasons why this occurred.

A34.3 The Company can offer no technical reason why this occurred. It is possible that non-copper conductors contacted a grounded neutral and tripped the circuit prior to hitting the ground, however the Company has no evidence to support this.

Q35.0 Reference: Application, Executive Summary, p. 4

FortisBC states that, over the past five years, there were approximately 350 incidents of distribution conductor failure of which approximately 200

or 57 percent involved legacy copper even though the legacy copper comprises only 10 percent of all conductor in service.

Q35.1 What is the approximate age distribution of the "legacy" wire versus the non-legacy wire?

A35.1 Table A35.1 below shows the approximate age of legacy versus non legacy conductors.

Table A35.1
Conductor Age Profile

Conductor Type		**Age Profile**
No. 90 MCM	Legacy	> 65 years
No. 8	Legacy	> 50 years
No. 6	Legacy	≥ 50 years
No. 4	Non-Legacy	Approx. 40 years
Remaining Copper	Non-Legacy	Approx. 40 years or less
Aluminum	Non-Legacy	Approx. 40 years or less

Q35.2 What was the failure rate for the oldest conductor that FortisBC does not include with the legacy copper conductor? In answering this question, please consider non-legacy-copper conductors in the oldest, ten-year-wide band (e.g., from 1940 to 1950).

A35.2 The Company has no records of any non-legacy copper conductors installed in the 1940-1950 timeframe. The No. 4 copper is the oldest non-legacy conductor in the system. No. 4 copper accounts for approximately 4.5 percent of total conductor failures.

Q36.0 Reference: Exhibit B-1, pp. 24, 27

Exhibit B-2, BCUC IR 14.4

Q36.1 FortisBC states that it has approximately 65,000 distribution poles that are older than 15 years, and that these poles are tested on an eight year cycle as part of the condition assessment process. Please explain how the poles to be tested each year are selected; for example, is it completely random, or are all the older poles on a specific distribution circuit tested at one time.

A36.1 As part of the capital expenditure planning process a list of feeders is selected for condition assessment based on an eight year cycle (Exhibit B-1, 2009/10 Capital Plan, page 87 - 88). All of the poles on the listed feeders that are older than 15 years are tested.

Q36.2 Please outline the method used to test the poles, and the time required between date of testing a pole and when a report on the condition of the pole is available to FortisBC engineering staff.

A36.2 The poles are visually inspected, sounded and drilled to inspect for interior rot, decay, infestation, or environmental damage.

The following is the criteria by which poles are classified as deteriorated.

<u>Poles</u>

- Surface rot:
  - circumference greater than 1200 mm and surface rot greater than 50 mm on 30 percent of the circumference; or

  - circumference between 775 mm and 1200 mm and surface rot greater than 25 mm on more than 30 percent of the circumference.
- Degree of split top, woodpecker damage, fire damage, vehicle contact damage.

If any action is required it is categorized by one of the following priority codes

- High — emergency corrective action required
- Medium — corrective action required within 2 to 6 months
- Low — corrective action required in 6 to 12 months (normal planned rehabilitation or rebuild).
- Monitor — condition to be checked on next patrol to see if condition has deteriorated or changed.

The results of the test are compiled and are generally available to engineering staff in the third or fourth quarter.

Q36.3 Please confirm that FortisBC records show when each individual pole was last tested and the results of that test.

A36.3 Confirmed.

Q36.4 On page 24 of the Application, FortisBC states "…it would be prudent to replace poles that are 50 years or older at the same time the legacy copper is replaced…" On page 27, FortisBC states "poles to be assessed for age and safety and replaced subject to assessment results." What is the basis that FortisBC will use to determine whether or not to replace a specific pole as part of the replacement of legacy copper?

A36.4 In general any pole older than 50 years will be replaced unless it is in good condition and the replacement involves significant effort (i.e. underground service attachments). Poles less than 50 years old will be replaced if they are deteriorated or if they become out of alignment as a result of a route change or if it is more cost effective to replace the pole to minimize the overall cost of that particular section of line.

Q36.5 Please discuss whether it would be reasonable to include, as part of any approval of the CCR Project, that any pole replacements will be based on the results of a condition assessment conducted in the previous two years.

A36.5 The Company believes it would be unreasonable to impose such restrictions. The condition assessment program is used to determine if a pole can be safely left in place, undisturbed, for another eight years. The condition assessment program does not consider any additional loading criteria or additional engineering criteria that would be required to allow for reconductoring the lines. The condition assessment does not consider the economics of rebuilding a structure and needing to replace it in a shorter time frame. The condition assessment criteria are set up to ensure the poles in existing lines continue to be capable of safely supporting the line until the next eight years assessment cycle. This would not be the same criteria used in a rebuilding situation like the Copper Conductor Replacement Program.

There is a need to further analyze the older poles to ensure the strength and safety factors can be maintained when changing the conductor to a large size and increasing the loadings on these poles. The proposed testing of the poles to be replaced in the first two years will allow the Company to refine the Project plan if necessary.

Q37.0 Reference: BCUC IR #1, A12.0 and A14.4

FortisBC notes that, as part of the conductor replacement initiative, it would be prudent to replace poles that are 50 years or older at the same time the legacy copper is replaced in order to avoid a duplication of the effort.

Q37.1 What is the failure rate of poles in this population?

A37.1 The failure rate of the poles in this population that were tested was 7 percent.

Q37.2 Given that failure rate, what is the expected number of years pole replacement would take in the absence of this project?

A37.2 It is unknown at this time how long it would take to replace the remaining poles. It is expected the failure rate will escalate as these poles reach the end of their useful life.

Q37.3 Please describe the synergies that make it beneficial to perform pole replacements along with the copper replacements, as proposed by FortisBC.

A37.3 As discussed below, there are some synergies that help to reduce the overall costs by completing the pole replacements along with the Copper Conductor Replacement Project. These benefits are not the driver for the pole replacements. The poles are being replaced due to either condition or the engineering requirements imposed when the lines are rebuild with larger conductors. All distribution system rehabilitation or rebuild jobs involve the following steps:

- Creation of a construction package;
- Site visit for staking and customer communication;
- Discussion between Planners, Designers, Schedulers and Construction Crews;
- Travel by construction crew to site;
- Development of safety plan and tailboard discussions;
- Provision and retrieval of line clearances by the person in charge (PIC); and
- Site clean up.

The CCR Project involves many of the same steps and synergies result primarily from the avoidance of duplication of efforts that would occur if the projects occurred at different times. In addition to the obvious cost advantages, the combined approach also reduces safety risks associated with returning to the same work location on two occasions. Weights and forces change drastically on the pole throughout the re-conductoring process. A holistic approach to the two projects allows for all aspects of the conductor/pole replacement to be considered together. Practically speaking, replacement of conductor will require adherence to current standards including the replacement of poles of insufficient height. The synergies between the execution of the Copper Conductor Replacement Project and any pole replacements deemed necessary at the time of conductor replacement would allow for a much safer work plan. Please also see the response to BCUC IR No. 2 Q36.5 above.

Q38.0 Reference: BCUC IR #1 A13.1 and A13.2

FortisBC did not calculate SAIDI and SAIFI values for the years 2006 through 2018, and it notes that the pre-arranged outages necessary to complete the project will negatively impact SAIDI and SAIFI values over the duration of the project.

Q38.1 For the last year for which SAIDI and SAIFI were calculated, what would have been the effect on those values had the failure rate of the legacy copper been the same as that of non-legacy conductors?

A38.1 Using a simplistic method of outages per kilometre of conductor to calculate the effect of conductor failure on SAIDI and SAIFI, the Company calculates that overall there were 150 outages for 8,340 kilometres of non-legacy conductor (9,300 kilometres minus 960 kilometres), or 0.02 outages per kilometre. For legacy conductor there were 200 outages for 960 kilometres of conductor, or 0.2 outages per kilometre. Based on the above, on average on a per kilometre basis, non-legacy conductor experienced only 10 percent as many outages as legacy conductor.

Figure 4 on page 40 of the CPCN Application (Exhibit B-1) shows that in 2006, the legacy copper conductor was responsible for a SAIDI of approximately 0.09 hours and a SAIFI of approximately 0.035 interruptions per customer.

Based on the above, it is reasonable to state that if legacy conductor had the same failure rate as non-legacy conductor, the SAIDI would have been 0.009 hours and the SAIFI would have been 0.0035 interruptions per customer.

Q38.2 What is the expected effect on both gross revenue and cost of energy given the decrease in expected reliability? Have these values been included in the project's financial impact assessment?

A38.2 The effect on gross revenue and cost of energy as a result of any decrease in reliability during the project duration will be minimal. It has not been included in the Project's financial impact.

Q39.0 Reference: Exhibit B-1, pp. 16, 23, 28-38
Exhibit B-2, BCUC IR 5.1, 15.5, 16.1

Q39.1 On pages 16 and 28 of the Application, FortisBC states that it intends to focus its efforts in the first three years of the program on more sensitive areas. The program as set out on pages 30-38 indicates many rather short circuit lengths will be upgraded. On page 23, FortisBC indicates that other cost factors associated with the replacement of existing conductor include preparation of construction packages, access to the site, set up time at the site, and project management. Please explain how FortisBC took into consideration such set up and other costs when it determined the distribution line segments that it proposes to upgrade in the years 2009, 2010 and 2011.

A39.1 FortisBC determined the line segments to be completed in 2009-2011 based on prioritizing the removal of legacy conductor from sensitive areas. Projects in similar geographical locations will be grouped together to minimize design cost, preparation of packages, mobilization / demobilization of construction crews and coordination of construction activities.

Q39.2 Please confirm that, considering the proposed expenditure on the CCR Project, FortisBC believes it is important to carry out the work as cost-effectively as possible.

A39.2 Confirmed. FortisBC also notes that the primary reason for the project is safety and has structured the schedule of the Project to reflect this.

Q39.3 Further to the response to BCUC IR 16.1 for the cost of replacing single phase #6 with #2 ACSR, please provide a reasonably detailed estimate of the cost of a shorter segment of line (e.g., 356 Avenue in Oliver, 0.1 km) and a longer segment of line (e.g., Adam Robertson School in Creston, 1.0 km), showing each of the project-specific set up and other costs for each project.

A39.3 Please see Tables A39.3a and A39.3b below. Table A39.3a provides an estimate for the 356 Avenue in Oliver project involving the replacement of 0.1 kilometre of line while Table A39.3b below provides an estimate for the Adam Robertson School in Creston project involving the replacement of 1.0 kilometre of line.

Table A39.3a
0.1 km Replacement Cost Estimate (356 Ave in Oliver)

	Total
Design and Engineering	$1,343.23
Project Management	$617.89
Line Staff setup time [(1)]	
Line Staff Project time	$6,154.28
Flagging	$535.95
Vehicles [(1)]	
Material	$1,701.75
Civil	$500.00
Subtotal	$10,853.10
Admin	$1,627.96
Subtotal	$12,481.07
Contingency	$1,872.16
Loading	$2,440.05
Total	**$16,793.27**

[(1)] “Line staff setup time” and “Vehicles” are included in “Line Staff Project Time”.

Table A39.3b
1 km Replacement Cost Estimate (Adam Robertson School in Creston)

Design and Engineering	$5,525.21
Project Management	$3,646.64
Line Staff setup time (1)	
Line Staff Project time	$29,832.38
Flagging	$4,287.60
Vehicles (1)	
Material	$16,205.89
Civil	$4,555.00
Land acquisition	$14,000.00
Outage cost	$9,700.00
Subtotal	**$87,752.72**
Admin (15%)	$13,162.91
Subtotal	$100,915.63
Contingency (15%)	$15,137.34
Loading (17%)	$19,729.01
Total	**$135,781.98**

(1) “Line staff setup time” and “Vehicles” are included in “Line Staff Project Time”.

Q39.4 Based on the response to the previous question, please discuss whether it would be more cost-effective to upgrade fewer, longer segments of line each year.

A39.4 Over the course of the Project all sections need to be replaced. This includes short sections as well as long sections. FortisBC plans to replace only the necessary sections of conductor. It does not intend to replace a 0.5 kilometre section of line with a 1.0 kilometre section of line just because it is less expensive on a cost per kilometre basis, but has a higher expected overall total cost.

Q39.5 The response to BCUC IR 5.1 indicates that in Kelowna, FortisBC intends to upgrade six segments of #6 line in 2009 and a further 10 segments in 2010. Please provide a map of the Kelowna area showing all of the #6 conductor, and indicating the segments to be upgraded in 2009, in 2010 and in the remainder of the CCR Project. Please discuss whether a reasonable alternative to the proposed program would be to replace all or most of the #6 conductor in the Kelowna area as one large project in 2009 or 2010. Please provide a cost comparison for the alternative approaches. In the response, please do assume that costs can be estimated accurately using a standard or average dollars per kilometer number.

A39.5 The map showing all of the No. 6 conductor in Kelowna is attached as Appendix A39.5. The Company agrees that the replacement of all No. 6 copper in Kelowna in 2009 or 2010 would be a reasonable alternative, however it would not allow the Company to meet its objective of replacing all conductors in sensitive areas in the 2009-11 timeframe. Please also see the response to BCUC IR No. 2 Q39.2 above. The Company is of the opinion that the approach has sufficient scope to take advantage of any economies of scale and that the approach suggested by the question is unlikely to reduce the cost of the Project.

Q40.0 Reference: Exhibit B-1, p. 51
Exhibit B-2, BCUC IR 4.1, 5.1, 12.2, 27.1

Q40.1 In the response to BCUC IR 4.1, FortisBC notes the cost estimate for the first two years has an accuracy of <u>+</u> 20 percent, and that it cannot determine the level of accuracy for future years. In response to BCUC IR 5.1, FortisBC repeats that the cost estimate is based on an average cost per kilometer.

The response to BCUC IR 12.1 states that experience in the first two years may result in changes to the cost estimates for future years. FortisBC requests CPCN approval for the CCR Project as a whole, with approval of future Project expenditures reviewed in future Capital Expenditure Plans.

Considering the size of the expenditure, the uncertainty in the cost estimate, the potential ability to learn and improve on the cost-effectiveness of the program and the duration of the program, please discuss whether FortisBC would be amenable to filing Annual Reports on the program and expenditures under it for Commission review.

A40.1 FortisBC would be amenable to submitting annual reports on the Copper Conductor Replacement Project.

Q40.2 Further to page 51 of the Application, for the work to be carried out in a year under the CCR Project, please provide a schedule of the annual cycle of activities, including the following, and when each is expected to start and be completed:

- **Identification of sections to be upgraded**

- **Public consultation**
- **Pole assessments**
- **Detailed design**
- **Approval of annual expenditure by FortisBC management**
- **Bidding for materials and outside services**
- **Construction**
- **Removal and disposal of old conductors**
- **Report on year's activity, both scope and actual cost**

A40.2 The following is a proposed plan for 2010:

- Confirmation of sections to be upgraded: By July 30th 2009
- Public consultation: August 1st 2009 - March 30th 2010
- Pole assessments: August 1st 2009 - June 30th 2010
- Detailed design: August 1st 2009 - June 30th 2010
- Approval of annual expenditure by FortisBC: By July 30th 2009
- Bidding for materials and contractor services: Nov 1st2009 - Nov 1st 2010
- Construction: Jan 1st 2010 - Dec 31st 2010
- Removal and disposal of old conductors: Jan 1st 2010 - Dec 31st 2010
- Report on years activity: March 31th 2011

Q40.3 Further to the previous question, when would be the most advantageous time for FortisBC to provide the Commission with an Annual Report that summarizes the construction, consultation and cost results for the most recent year that was completed, and provides a reliable forecast of construction scope and costs for the next year of the program?

A40.3 FortisBC believes that annual reports for the Copper Conductor Replacement Project should be filed on a calendar year basis, no later than March 31 of the following year.

Q40.4 Please discuss whether such an Annual Report would be an appropriate basis for the Commission's review and approval of work and expenditures for the next year of the program.

A40.4 FortisBC believes that the Annual Report is the appropriate means to review the previous years' activity and costs for comparison to the approved scope and budget. As stated in the response to BCUC IR No. 1 Q27.1, the Company believes that future years' proposed expenditures can be reviewed, and project plans examined, as part of future Capital Expenditure Plan submissions.

Q41.0 Reference: CCR Replacement Costs
Exhibit No. B-2, p. 1
BCUC IR 1.1

Q41.1 For the $850 per distribution conductor failure repair cost, provide the estimated hourly rate (loaded and unloaded) for the three power line technicians and each of the two trucks for three hours.

A41.1 The crew rate consisting of three power line technicians is $116.46 per hour unloaded or $200.31 per hour loaded. The cost for three hours is equal to

$600.93. The vehicle rate is $39.76 per hour. The cost for three hours is 2 x 3 x $39.76 = $238.56. The remainder is for the minimal material valued at approximately $10.00.

Q41.2 Provide a breakdown of the $850 per distribution conductor failure repair cost, by resource and activity.

A41.2 The breakdown is as follows:

Labour = $600.93

Vehicles = $238.56

Material = $10.00

Q41.3 Does the $850 per distribution conductor failure repair cost include ancillary costs (travel, setup time, removal of the old wire, site cleanup and overhead)? If yes, provide the ancillary costs. If not, please provide an estimate of ancillary costs.

A41.3 Yes. This average was for a relatively simple conductor repair and does not include a pole replacement and associated cleanup.

Q41.4 Provide an explanation of the 80 percent capital/20 percent O&M allocation for distribution conductor failure repair cost.

A41.4 The 80 percent capital / 20 percent O&M allocation for distribution conductor failure repair cost is based on past experience with similar types of repairs. While it is not possible to determine exactly what the ratio will be in future years, an examination of prior years' expenditures shows that this allocation is a good approximation. The determination of how the repairs are categorized depends primarily on the scope of the repair being performed

Q41.5 Explain how the estimated three hours per distribution conductor failure repair was determined.

A41.5 For this simple repair, a 1.5 hour round trip travel time and 1.5 hour repair time was assumed.

Q41.6 Provide the average response time for an emergency repair for 2004-2008 by year.

A41.6 Table A41.6 below shows the time duration from the receipt of a call until the power is restored. The Company began recording this information in 2006.

Table A41.6
Outage Restoration Time

	2006	**2007**	**2008 YTD**
	(Hrs:Mins)		
Response Time	2:39	1:57	2:01

Q41.7 Provide a breakdown flagging cost for three hours (including travel time) for an emergency repair (labour, benefits & concessions, overhead, transportation).

A41.7 One contract flagger average cost is $29 per hour resulting in a cost of $87 for a single flagger for a three hour repair assuming only one flagger is required.

Q42.0 Reference: CCR Replacement Costs
Exhibit No. B-2, p. 2
BCUC IR 1.3

Q42.1 Is flagging required when a downed copper conductor that remains energized is repaired? Please explain.

A42.1 The requirement for flagging is job and site specific. In certain downed conductor situations, flagging is required.

Q43.0 Reference: CCR Replacement Costs
Exhibit No. B-2, p. 2
BCUC IR 1.4

Q43.1 When was the infrared scanning process implemented?

A43.1 The infrared scanning process was implemented in 2005.

Q43.1.1 Have the incidences of distribution conductor failure repair decreased since the infrared scanning process was implemented? Discuss and include statistics regarding the incidences of distribution conductor failure.

A43.1.1 No, success of infrared is dependent on ambient temperature and conductor loading at the specific time of the scan and was therefore found to be only marginally effective in determining potential conductor problems.

Q43.2 For the 2005-2008F Distribution Line Rebuilds cost, provide the number of poles and the circuit length (km) replaced each year.

A43.2 Table A43.2 below provides the number of poles and kilometres of conductor replaced under the Distribution Line Rebuilds Project. The 2008 forecast is not currently available. Circuit kilometres are not tracked.

Table A43.2

Year	Poles replaced	Kilometres of Conductor replaced (Km)
2005	144	59.5
2006	234	28.6
2007	111	27.5

Q43.3 Explain why 2006 Distribution Line Rebuilds more than double 2005 costs?

A43.3 The Distribution Rebuild and Rehabilitation projects are somewhat similar and sometimes a project that was initially scoped as a rehabilitation project becomes a rebuild project. The 2006 Distribution Line Rebuild cost was more than the 2005 cost because during the detailed scoping and design for certain distribution rehabilitation projects it was determined that it was more appropriate to class the project as a rebuild project instead of a rehabilitation project. This would have decreased the expenditures in the Distribution Rehabilitation Project in 2006.

The combined budget in 2006 was approximately $4.77 million. The combined expenditures in 2006 were $5.8 million for a difference of approximately $1.04 million. The increase in expenditures is attributable to increase in project costs due to rebuilding a section of line versus rehabilitation, market conditions, and carryovers from previous years.

Q44.0 Reference: CCR Replacement Costs
Exhibit No. B-2, p. 4
BCUC IR 2.1

Q44.1 For 2010-2018, provide an estimate of the savings due to improved reliability and enhanced distribution network capacity.

A44.1 As per the response to BCUC IR No. 1, Q2.1 (Exhibit B-2), FortisBC has not tracked or calculated any previous savings or cost associated with changes in reliability and is unable to provide such an estimate. However, as noted in response to BCUC IR No. 1, Q1.1, the Company anticipates a reduction in the number of downed conductor incidents upon project completion. Based on this FortisBC anticipates a reduction in its urgent repairs capital project of approximately $47,600 per year and a reduction in operating cost of approximately $11,900 per year.

With respect to enhanced distribution network capacity, it is anticipated that over the course of the ten year Copper Conductor Replacement Project, several projects that would have been necessary to rectify voltage problems will no longer be required. The reduction in such capital projects should reduce the requirements for Distribution Growth capital projects by several million dollars over the 10 year period.

Q45.0 Reference: BCUC IR #1, A1.1, A2.1, and A13.1

FortisBC states that improved reliability is one of the benefits of the project, but the company did not provide an estimate of the impact on reliability.

Q45.1 Based on the restoration-time estimate provided in the response to BCUC IR#1 A1.1 and on the number of customers typically affected by the type of outage that would be reduced through this program, please estimate the annual reduction in MWh of energy not served.

A45.1 As noted on page 14 of the CPCN Application (Exhibit B-1), the total number of customers associated with the 197 outages was 16,370, for an average of 83 customers (16,370/197) per outage. These 197 outages spanned approximately 4.5 years for an average of 44 outages per year. Using an average of 2.5 kW per customer, a calculation of MWh not served on an annual basis can be performed as follows.

Annual reduction in energy not served= 83 customers x 44 outages x 3 hours x (2.5 kW/1000) = 27.4 MWh

Q45.2 Based on the project's costs and the response to the previous question, please indicate the cost of the reliability improvements each year in $/MWh.

A45.2 Using an average annual project cost of $103 million / 10 years or $10.3 million per year, the calculation requested shows a cost of $10.3 million / 27.4 MWh or $0.38 million per MWh.

Q45.3 Given that the feeders containing legacy copper conductor have typically seen very slow load growth, please provide an estimate of the number of feeders on which upgrades like the Christina Lake Feeder 1 upgrade are likely to be avoided.

A45.3 The Company estimates that over the course of the ten year project, there will be approximately 10 feeders on which upgrades like the Christina Lake Feeder Upgrade will be avoided. It is reasonable to assume that not all upgrades will be as extensive as the Christina Lake Upgrade. As noted in the response to Q44.1 above, the reduction in such projects should reduce the requirements for Distribution Growth projects by several million dollars over the 10 year period.

Q46.0 Reference: CCR Replacement Costs
Exhibit No. B-2, p. 6
BCUC IR 3.1 (Attachment 3.1)

Q46.1 Provide all solutions and recommendations included in the Generation of Solution Options / Concepts by Engineers & Planners with all relevant Recommendations.

A46.1 Due to the underlying safety concerns driving the project, it was viewed from the onset as having a single solution – replacement. The generation of project options focused on implementation, however, these initial discussions were of a general nature, and were not recorded. The results of the process are the implementation options and project timing that constitute the proposed project.

Q47.0 Reference: CCR Replacement Costs
Exhibit No. B-2, p. 8
BCUC IR 3.2

Q47.1 As requested in BCUC IR 3.2, provide the business case for the CCR Project.

A47.1 The business case prepared was required in order to obtain Executive approval prior to developing the CPCN Application. Once such approval was obtained, further updates were not undertaken. The business case is preliminary in nature. Please see BCUC Appendix A47.1.

Q48.0 Reference: CCR Replacement Costs
Exhibit No. B-2, p. 26
BCUC IR 14.3

Q48.1 Provide a breakdown of the $5,300 / legacy pole replacement cost by resource (labour, material, vehicle, contingency and contractor) and activity. Also provide a breakdown of the labour cost by cost per hour and number of hours for each type of labour.

A48.1 Table A48.1 below provides the requested information.

Table A48.1
Legacy Pole Replacement Cost

	Rate	**Hours**	**Total**
	($/hr)		**($)**
Line Staff (2 Crews)	232.92	7	1,630
Flagging	29	7	203
Vehicles (2)	79.52	7	557
Material	850	1	850
Civil	100	7	700
Admin	0.15		591
Loading	0.17		770
Total			**5,301**

Q48.2 Do the $5,300 / legacy pole replacement costs include ancillary costs (flagging, pole disposal, salvage, restoration and travel)? If yes, provide the ancillary costs. If not, please provide an estimate of the ancillary costs.

A48.2 Yes, please refer to Table A48.1 above.

Q48.3 Provide an estimate of the replacement cost of a more complex structure by resource (labour, material, vehicle, overhead and contractor). Also provide a breakdown of the labour cost by cost per hour and number of hours for each type of labour.

A48.3 Table A48.3 below provides an estimate for a complex pole replacement. The estimate is to replace a 3 phase tangent, 3 phase dip structure, with damaged 3 phase No. 2 underground conductor running to an underground device 50 meters away.

Table A48.3
Complex Pole Replacement Cost Estimate

	Rate	**Hours**	**Total**
	($/hr)		**($)**
Line Staff (2 Crews)	232.92	24	5,590
Flagging	29	24	696
Vehicles (2)	79.52	24	1,908
Material	6,000	1	6,000
Civil	100	8	800
Subtotal			14,994
Project Management and Administration	15%		2,249
Loading	17%		2,931
Total			**20,174**

Q49.0 Reference: CCR Replacement Costs
Exhibit No. B-2, pp. 26-27
BCUC IR 14.4

Q49.1 Please confirm that legacy pole failures are not included in the 350 incidents of distribution conductor failure over the past five years.

A49.1 Confirmed.

Q49.2 Provide a breakdown of the 130 poles that failed by age: > 65 years, >50 years and ≤ 50 years.

A49.2 Table A49.2 below shows the breakdown of the poles that needed to be replaced during the 2003 - 2007 time period based on the current record.

Table A49.2
Poles Replaced 2003 – 2007

Age Profile (years)	10-20	20-30	30-40	40-50	50+
Number	13	41	116	224	306

Q50.0 Reference: CCR Replacement Costs
Exhibit No. B-2, p. 33
BCUC IR 17.1

Q50.1 Provide the allowance for the mitigation of landowner impacts included in the $11.7 million.

A50.1 The allowance for the mitigation of landowner impacts due to shift in pole locations or new anchor positions including loadings is estimated at approximately $860,000.

Q51.0 Reference: CCR Replacement Costs
Exhibit No. B-2, pp. 16, 43
BCUC IR 6.1 and BCUC IR 23.1

Q51.1 Provide a breakdown of the Beaver Park-Fruitvale Tie costs (BCUC IR 6.1) in the same format as the response to BCUC IR 23.1.

A51.1 Please see Table A51.1 below.

Table A51.1

	SCOPE ITEM	**2010**
		($000s)
1	Labour - Assembly, Framing, Setting, Stringing, etc	370
2	Materials	132
3	Engineering	70
4	Other Costs including Traffic Control, Surveyors, Brushing, Helicopter Work, etc.	164
5	Project Management	50
6	Planning and Pre-Engineering	0
7	Regulatory Cost	0
8	Annual Public Consultation Cost	0
9	Capitalized and Direct Overheads (AFUDC=0)	180
10	Cost of Removals	91
11	Contingency	170
12	Total cost	1,227
13	Credit from sale of Copper	(16)
	Total Capital Cost (Till 2010)	**1,211**

Q52.0 Reference: CCR Replacement Costs
Exhibit No. B-2, p. 60
BCUC IR 31.1 Attachment
NPV of Revenue Requirements Analysis

Q52.1 For the Net Present Value of Revenue Requirements Analysis of Implementation Plans 1-3, please provide functional MS Excel spreadsheets for each of the cost items listed below.

- **Project Cost (Unloaded & Inflation Corrected)**
- **Regulatory Cost (Oral Hearing)**
- **Yearly Public Consultation Cost**
- **Yearly Capital Cost Savings**
- **Total Construction Cost in Year (Less Land Cost)**
- **Cost of Removal**

A52.1 Please see Table A52.1 below.

Table A52.1

PARAMETERS	YEAR	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Project Cost Unloaded & Inflation Corrected	Plan-1	0	3,808	5,297	12,989	8,521	8,691	8,865	9,042	9,223	9,408	9,596	0	0	0	0	0	85,440
	Plan-2	0	5,942	6,363	6,750	6,867	7,284	7,727	8,197	8,695	9,224	9,785	10,380	11,011	11,680	0	0	109,907
	Plan-3	0	4,987	5,341	5,666	6,010	6,375	6,763	7,174	7,610	8,073	8,564	9,085	9,637	10,223	10,845	11,504	117,857
Regulatory Cost (Oral Hearing)	Plan-1	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150
	Plan-2	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150
	Plan-3	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150
Yearly Public Consultation Cost	Plan-1	0	75	77	78	80	81	83	84	86	88	90	0	0	0	0	0	821
	Plan-2	0	75	77	78	80	81	83	84	86	88	90	91	93	95	0	0	1,101
	Plan-3	0	75	77	78	80	81	83	84	86	88	90	91	93	95	97	99	1,297
Yearly Capital Cost Savings	Plan-1	0	5	11	27	38	48	59	71	95	111	128	130	133	136	138	141	1,271
	Plan-2	0	7	15	22	30	38	46	55	64	85	99	113	128	145	147	150	1,144
	Plan-3	0	6	12	19	25	32	40	47	55	63	85	98	111	125	141	157	1,017
Total Construction Cost in Year (Less Land Cost)	Plan-1	150	4,567	6,259	14,988	9,841	10,028	10,218	10,413	10,598	10,796	10,997	0	0	0	0	0	98,855
	Plan-2	150	7,084	7,503	7,819	7,947	8,420	8,923	9,456	10,022	10,610	11,244	11,916	12,628	13,383	0	0	127,104
	Plan-3	150	5,958	6,310	6,575	6,966	7,381	7,821	8,288	8,783	9,309	9,853	10,441	11,065	11,726	12,428	13,171	136,224
Cost of Removal	Plan-1	0	156	222	554	363	371	378	385	393	401	422	0	0	0	0	0	3,644
	Plan-2	0	249	272	293	303	325	349	375	403	432	463	496	531	568	0	0	5,059
	Plan-3	0	209	229	246	265	285	306	328	352	378	405	434	464	497	532	569	5,499

Q53.0 Reference: CCR Replacement Costs

Exhibit B-1, Appendix B, Net Present Value of Revenue Requirements Analysis, pp. 1-9
Exhibit No. B-1-1, Table 7 (Updated), Updated p. 50
Exhibit No. B-2, p. 47
BCUC IR 24.2
FortisBC Okanagan Transmission Reinforcement Project
FortisBC 2009 -2010 Capital Expenditure Plan

Q53.1 Provide the analysis justifying the 5 percent and 4 percent escalation factors.

A53.1 The 5 percent and 4 percent escalation factors are based on the MMK Consulting Report of September 17, 2007, which indicated that all Construction Projects are expected to experience 4 to 6 percent inflation during 2007-2010 and 3 to 4 percent from 2011-2015.

MMK Consulting kept their recommendations unchanged in their April 2008 Report.

The recommended Project Inflation Rates by BC Hydro in their May 16, 2008 Report recommended 5 percent inflation during 2009-2010, 4 percent in 2011 and 3 percent during 2012-2013.

Considering the above, FortisBC took a conservative approach and adopted inflation factors of 5 percent in 2009-2010 and 4 percent thereafter.

Q53.1.1 For Exhibit B-1, Appendix B: Plans 1, 2 and 3, Total Construction Cost in Year, which costs/resources (labour, materials, land and contractor) are subject to escalation?

A53.1.1 All the scope items as indicated in response to BCUC IR No. 1 Q23.1, Revised Table 6, will be subject to escalation.

Q53.2 Provide the escalation factors used in the FortisBC Okanagan Transmission Reinforcement Project and the 2009-2010 Capital Expenditure Plan.

A53.2 The escalation factors used in the FortisBC Okanagan Transmission Reinforcement (OTR) Project and the 2009-2010 Capital Expenditure Plan are as follows:

Year	OTR Project[1]	2009/10 Capital Plan[2]
2008	5%	NA
2009	5%	5%
2010	4%	5%
2011	3%	NA
2012	3%	NA

(1) OTR CPCN Application, Appendix-G, Page 3, Lines 8-11

(2) 2009-2010 Capital Expenditure Plan, Page 12, Lines 3-5

Q53.2.1 Explain any differences between the escalation factors in the CCR Project and the FortisBC Okanagan Transmission Reinforcement Project and 2009-2010 Capital Expenditure Plan.

A53.2.1 The escalation factors used in the CCR Project are in line with those used in the 2009/10 Capital Plan. There is, however, a difference with the escalation factors used in the OTR Project since additional information by way of the MMK Consulting Report of April 2008 and BC Hydro recommendation of May 16, 2008 was available prior to filing of the CCR CPCN Application.

Q53.3 Provide the analysis justifying the 2 percent inflation rate.

A53.3 The justification of the 2 percent inflation rate is based on published forecast indicators for 2009 by four different financial entities during the first and second quarters of 2008, as given below:

Forecast 2009:

Toronto Dominion Bank - April 2008	1.7%
Royal Bank of Canada - April 2008	1.6%
Conference Board - April 2008	2.2%
BC Ministry of Finance - February 2008	2.1%
Average:	**1.9%**

However, the Company took a conservative approach in its assumptions by considering the inflation at 2 percent in its calculations. A recent update of the inflation rate by some the above financial institutions for 2009 is in fact presently averaging at 2 percent as indicated below:

Updated Forecast 2009:

Toronto Dominion Bank - April 2008	1.7%
Royal Bank of Canada - April 2008	1.5%
Conference Board - July 18, 2008	2.5%
BC Ministry of Finance - February 2008	2.1%
Average:	**2.0%**

Q53.4 In the same format as Table 7 (Updated), recalculate Exhibit B-1, Appendix B: Plans 1, 2 and 3 excluding the escalation factors. Also add a line to Table 7 (Updated) to show the circuit kilometers replaced each year.

A53.4 Please see Tables A53.4a, A53.4b, and A53.4c below. Please note, all costs are in $2009.

Table A53.4a
Plan 1

Line No.	Capital Expenditures	Yearly Cash Flow During the Project Life										
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
1	Circuit kilometers to be replaced (km)	0	22	29	66	44	45	45	45	45	45	45
2		($000s)										
3	Project Cost (Unloaded & Not Inflation Corrected) without COR	0	3,808	4,946	12,005	7,720	7,720	7,720	7,720	7,720	7,720	7,720
4	Planning & Pre-Engineering	150	0	0	0	0	0	0	0	0	0	0
5	Regulatory Cost (Oral Hearing)	150	0	0	0	0	0	0	0	0	0	0
6	Yearly Public Consultation Cost	0	75	75	75	75	75	75	75	75	75	75
7	Capital Cost Saving: Conductor	0	(5)	(11)	(26)	(35)	(45)	(54)	(63)	(72)	(81)	(90)
8	Capital Cost Saving: Poles	0	0	0	0	0	0	0	0	(11)	(14)	(17)
9	Capitalized & Direct Overheads (AFUDC = 0)	0	689	897	1,801	1,158	1,158	1,158	1,158	1,158	1,158	1,158
10	Credit from Sale of Copper	0	(70)	(91)	(209)	(135)	(135)	(135)	(135)	(135)	(135)	(125)
11	Cost of Removals (without adjusting for sale of Copper)	0	226	294	713	459	459	459	459	459	459	459
12	**O & M Cost Savings**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
13	Electrical Loss Saving	0	(31)	(72)	(172)	(233)	(294)	(356)	(418)	(482)	(546)	(611)
14	**Project Financial Parameters**											
15	**Project Capital Cost**	**90.49**										
16	**Net Present Value**	**52.47**										
17	**NPV of Rate Impact**	**0.13%**										
18	**Max. One Time Rate Impact**	**0.51%**										

Table A53.4b
Plan 2

Line No.	Capital Expenditures	Yearly Cash Flow During the Project Life													
		2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
1	Circuit kilometers to be replaced (km)	0	39	39	39	31	31	31	31	31	31	31	31	31	32
2		**($000s)**													
3	Project Cost (Unloaded & Not Inflation Corrected) without COR	0	5,942	5,942	5,942	5,698	5,698	5,698	5,698	5,698	5,698	5,698	5,698	5,698	5,698
4	Planning & Pre-Engineering	150	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Regulatory Cost (Oral Hearing)	150	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Yearly Public Consultation Cost	0	75	75	75	75	75	75	75	75	75	75	75	75	75
7	Capital Cost Saving: Conductor	0	(5)	(11)	(26)	(35)	(45)	(54)	(63)	(72)	(81)	(90)	(90)	(90)	(90)
8	Capital Cost Saving: Poles	0	0	0	0	0	0	0	0	(11)	(14)	(17)	(17)	(17)	(17)
9	Capitalized & Direct Overheads (AFUDC = 0)	0	1,075	1,078	891	855	855	855	855	855	855	855	855	855	855
10	Credit from Sale of Copper	0	(104)	(104)	(104)	(99)	(99)	(99)	(99)	(99)	(99)	(99)	(99)	(99)	(99)
11	Cost of Removals (without adjusting for sale of Copper)	0	353	353	353	339	339	339	339	339	339	339	339	339	339
12	**O & M Cost Savings**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
13	Electrical Loss Saving	0	(46)	(93)	(140)	(185)	(232)	(278)	(326)	(374)	(422)	(472)	(522)	(572)	(624)
14	**Project Financial Parameters**														
15	**Project Capital Cost**	**90.81**													
16	**Net Present Value**	**48.27**													
17	**NPV of Rate Impact**	**0.12%**													
18	**Max. One Time Rate Impact**	**0.28%**													

Table A53.4c
Plan 3

Line No.	Capital Expenditures	Yearly Cash Flow During the Project Life															
		2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
1	Circuit kilometers to be replaced (km)	0	29.0	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5
2		**($000s)**															
3	Project Cost (Unloaded & Not Inflation Corrected) without COR	0	4,987	4,987	4,987	4,987	4,987	4,987	4,987	4,987	4,987	4,987	4,987	4,987	4,987	4,987	4,987
4	Planning & Pre-Engineering	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Regulatory Cost (Oral Hearing)	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Yearly Public Consultation Cost	0	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
7	Capital Cost Saving: Conductor	0	(5)	(11)	(26)	(35)	(45)	(54)	(63)	(72)	(81)	(90)	(90)	(90)	(90)	(90)	(90)
8	Capital Cost Saving: Poles	0	0	0	0	0	0	0	0	(11)	(14)	(17)	(17)	(17)	(17)	(22)	(23)
9	Capitalized & Direct Overheads (AFUDC = 0)	0	902	904	748	748	748	748	748	748	748	748	748	748	748	748	748
10	Credit from Sale of Copper	0	(87)	(87)	(87)	(87)	(87)	(87)	(87)	(87)	(87)	(87)	(87)	(87)	(87)	(87)	(87)
11	Cost of Removals (without adjusting for sale of Copper)	0	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296
12	**O & M Cost Savings**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
13	Electrical Loss Saving	0	(39)	(93)	(140)	(185)	(232)	(278)	(326)	(374)	(422)	(472)	(522)	(572)	(624)	(628)	(632)
14	**Project Financial Parameters**																
15	**Project Capital Cost**	**90.90**															
16	**Net Present Value**	**44.33**															
17	**NPV of Rate Impact**	**0.11%**															
18	**Max. One Time Rate Impact**	**0.16%**															

Q53.5 Provide contingency amount and analysis for F2009/F2010 and the total program for all plans.

A53.5 Table A53.5 below provides the requested information. The contingency has been calculated based on approximately 13.6 percent of the unloaded construction cost.

Table A53.5
Plan Contingency F2009/F2010

	2009	2010	Remainder	Total
	($000s)			
Plan 1	437	636	9,161	10,234
Plan 2	713	764	11,712	13,189
Plan 3	598	641	12,904	14,143

Q54.0 Reference: CCR Replacement Costs

Exhibit No. B-1, Section 3.1 Description of the Existing System, p. 10

Project Need

"Records show that of the 8,100 poles approximately 4,450 (legacy poles) are in excess of 50 years in age."

Q54.1 Provide a breakdown of the 4,450 legacy poles by age: > 65 years, >50 years and ≤ 50 years

A54.1 A breakdown of the approximately 4,450 legacy poles by age is provided below:

Pole age over 65 years:	634
Pole Age over 50 years and under 65 years:	3,720
Pole Age equal to 50 years:	96
Total	**4,450**

Q55.0 Reference: CCR Replacement Costs
Exhibit No. B-1, Section 5.3 Public Consultation, p. 47
Capital Expenditure Plan

"Additionally, all major power interruptions in any region as a result of the Project will be publicized in local print and electronic media in advance. ...FortisBC may consider using mobile generators for limited power restoration in cases of interruptions exceeding six hours or for multiple interruptions within a short period of time."

Q55.1 Provide estimated cost per hour including fuel of using mobile generators for limited power restoration in cases of interruptions exceeding six hours.

A55.1 The estimated cost per hour for the use of mobile generators is approximately $ 395. This is based on the following. A 100 kW generator uses 30 litres of fuel per hour when fully loaded. With fuel estimated at $1.50 per hour, fuel costs are about $45 per hour. Setup costs, fuel checks/voltage checks, phasing in, and removal after completion (2 power line technicians, 2 hours each time, 2 times at $150 per hour [Overtime rate]) for each install equals about $1,200. A minimum outage duration of 6 hours would average $200 per hour. Maintenance costs, security, power line technician standby and safety watch are estimate at approximately $150 per hour. Therefore, total costs of $45 + $200 + $150 = $395 per hour per generator.

Q55.2 Provide the total cost allowance for using mobile generators for limited power restoration in cases of interruptions exceeding six hours or for multiple interruptions within a short period of time.

A55.2 FortisBC has included a total allowance including loadings of approximately $580,000 to cover the cost of operating the mobile generators for the 2009 and 2010 period.

Q56.0 Reference: CCR Replacement Costs
Exhibit B-1, Appendix B, Net Present Value of Revenue Requirements Analysis, Plan 1, p. 2
Exhibit B-1-1, Errata, Table 7 (Updated), Summary of Costs Present Value Analysis

Q56.1 For Appendix B, Plan 1, NPV of Revenue Requirements Analysis, Plan 1, page 2, Dec-09 to Dec-11, show calculation of the Project Costs (Unloaded & Inflation Corrected) by year.

A56.1 Please see Table A56.1 below.

Table A56.1
Calculation of Project Costs (unloaded and inflation adjusted)

	($000s)		
	2009	**2010**	**2011**
Labor	1,523	2,119	5,196
Three man crews and trucks, to complete the assembly, framing and setting. The travel, setup, safety planning and grounding time for the crews based on the assumption that crews are based in local districts. A person in charge (PIC) to complete necessary switching, setting up the generator sets, etc.			
Materials	1,028	1,430	3,507
The Material and transportation cost include : The #2 ACSR Conductor and Accessories assuming 1 phase and 1 neutral. Nine 45 foot class three poles Framing material assuming 70% tangent and 30% angle or deadend structures			
Engineering	114	159	390
Preliminary Engineering- planning and estimates Field Reviews - Including routing, staking & survey review Detail Design, documentation, drawings, material specifications and Construction packages Administration and Clerical Support for tenders and contracts			
Project Management	114	159	390
Other Costs	571	794	1,948
Traffic control based on the assumption that the work will be in populated areas and flag persons will be required Cost of on site generation for longer outages. Acquisition of land for new rights of way and anchors			
SUBTOTAL	685	953	2,338
Contingency	457	636	1,559
Total	**3,807**	**5,297**	**12,989**

Q56.1.1 Explain the term Project Cost (Unloaded & Inflation Corrected). Which loadings are not included in the Projects Cost? Are escalation factors included?

A56.1.1 The term Project Cost (Unloaded & Inflation Corrected) in the specific context indicates Project Costs without:

- Capitalized and Direct Overheads
- Cost of Removal
- Capital Cost Savings
- Public Consultation Costs

The Loadings of Capitalized and Direct Overheads are not included in the Unloaded Project Costs, but escalation factors are included.

Q56.1.2 Provide an estimate of the Project Cost (Loaded & Inflation Corrected) by year.

A56.1.2 Please refer to the response to BCUC IR No. 1 (Exhibit B-2) Q24.1, Revised Table 7, Total Capital Expenditure.

Q56.2 For Appendix B, Plan 1, NPV of Revenue Requirements Analysis, Plan 1, page 2, Dec-09 to Dec-11, show the calculation of the Capitalized and Direct Overheads by year.

A56.2 The Capitalized and Direct Overheads are assumed to be a fixed percentage of the unloaded Capital Cost. Please refer to the response to BCUC IR No. 1 (Exhibit B-2) Q26.1, Table A26.1, for the detailed calculation.

Q56.3 Add a line to Appendix B, Table 7(Updated) subtotaling the total capital expenditures.

A56.3 Please see Table A56.3 below. The subtotaled capital expenditures are shown in the highlighted line.

Table A56.3
Summary of Costs

Line No.	Capital Expenditures	Yearly Cash Flow During the Project Life ($000s)											
		2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**Total**
1	Project Cost (Unloaded & Inflation Corrected) without COR	0	3,808	5,297	12,989	8,521	8,691	8,865	9,042	9,223	9,408	9,596	85,440
2	Planning & Pre-Engineering	150	0	0	0	0	0	0	0	0	0	0	150
3	Regulatory Cost (Oral Hearing)	150	0	0	0	0	0	0	0	0	0	0	150
4	Yearly Public Consultation Cost	0	75	77	78	80	81	83	84	86	88	90	822
5	Capitalized & Direct Overheads (AFUDC = 0)	0	689	897	1,948	1,278	1,304	1,330	1,356	1,383	1,411	1,439	13,035
	Subtotal (Total Capital)	300	4,572	6,271	15,015	9,879	10,076	10,278	10,482	10,692	10,907	11,125	99,597
6	Credit from Sale of Copper	0	(70)	(93)	(218)	(143)	(146)	(149)	(152)	(155)	(158)	(148)	-1,432
7	Cost of Removals (without adjusting for sale of Copper)	0	226	315	772	506	516	527	537	548	559	570	5,076
8	**Total Capital Expenditure (without adjusting for COR, Sale of Copper & Capital Cost Savings)**	**300**	**4,728**	**6,493**	**15,569**	**10,242**	**10,446**	**10,656**	**10,867**	**11,085**	**11,308**	**11,547**	**103,241**
	O & M Cost Savings	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**Total**
9	Electrical Loss Saving	0	(31)	(72)	(172)	(233)	(294)	(356)	(418)	(482)	(546)	(611)	-3,215
	Project Financial Parameters												
10	**Project Capital Cost**	**103.24**											
11	**Net Present Value**	**59.38**											
12	**NPV of Rate Impact**	**0.15%**											
13	**Max. One Time Rate Impact**	**0.56%**											

Q56.4 For 2009-2018, reconcile the total Capital Expenditures in Exhibit B-1-1, Table 7 (Updated) to Exhibit B-1, Appendix B, Plan 1, Total Construction Costs in Year, page 2, line 43.

A56.4 As part of Exhibit B-1-1 in the Copper Conductor Replacement Project FortisBC filed as item 5, an update of Exhibit B-1 Appendix B, correcting an error in the original Appendix B, it is more appropriate to reconcile the Updated Table 7 to the Updated Appendix B. Table A56.4 below provides the reconciliation.

Table A56.4
Total Capital Expenditures Table 7 (Updated) reconciled to Appendix B, Plan 1, Total Construction Costs in Year

	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Total Capital Expenditure – Updated Table 7	300	4,728	6,493	15,569	10,242	10,446	10,656	10,867	11,085	11,308	11,547
Exhibit B-1-1, Appendix B, Line 43	0	4,723	6,481	15,542	10,204	10,398	10,596	10,798	10,991	11,197	11,419
Difference		(5)	(12)	(27)	(38)	(48)	(60)	(69)	(94)	(111)	(128)
Exhibit B-1-1, Appendix B, Line 35 (Yearly Capital Savings)		(5)	(11)	(27)	(38)	(48)	(59)	(71)	(95)	(111)	(128)

Note: Difference due to rounding.

The difference between the total capital expenditure in Exhibit B-1-1 Table 7 (Updated) and Exhibit B-1-1, Appendix B (Updated), Plan 1, line 43, is due to the inclusion of capital savings in Appendix B (Updated) which is used to show the NPV of the Project, while Table 7 is used to show the total capital expenditures.

Q57.0 Reference: CCR Replacement Costs Exhibit B-1-1, Errata, Table 7 (Updated), Summary of Costs; Table 10 (Updated), Economic Comparison of Alternative Implementation PlansSummary of Costs

Q57.1 Reconcile the total Capital Expenditures in Exhibit B-1-1, Table 7 to Exhibit B-1-1, Table 10 (Updated), Plan 1, Project Capital Cost including COR and Salvage.

A57.1 Please see the reconciled tables below.

Table A57.1
Reconciled Capital Expenditures

Capital Expenditures	**Yearly Cash Flow During the Project Life ($000s)**													**($millions)**
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**Total Table 7 Updated (Exhibit B-1-1, page 50)**		**Table 10 Updated Plan 1 (Exhibit B-1-1, page 58)**
Project Cost (Unloaded & Inflation Corrected) without COR	0	3,808	5,297	12,989	8,521	8,691	8,865	9,042	9,223	9,408	9,596	**85,440**		
Planning & Pre-Engineering	150	0	0	0	0	0	0	0	0	0	0	**150**		
Regulatory Cost (Oral Hearing)	150	0	0	0	0	0	0	0	0	0	0	**150**		
Yearly Public Consultation Cost	0	75	77	78	80	81	83	84	86	88	90	**822**		
Subtotal Project Cost (Unloaded & Inflation adjusted) without COR	300	3,883	5,374	13,067	8,601	8,772	8,948	9,126	9,309	9,496	9,686	**86,562**		**86.56**
Capitalized & Direct Overheads (AFUDC = 0)	0	689	897	1,948	1,278	1,304	1,330	1,356	1,383	1,411	1,439	**13,035**		**13.04**
Loaded Capital Cost Without cost of Removals (COR)												**99,597**		**99.60**
Credit from Sale of Copper	0	(70)	(93)	(218)	(143)	(146)	(149)	(152)	(155)	(158)	(148)	**(1,432)**		**(1.43)**
Cost of Removals (without adjusting for sale of Copper)	0	226	315	772	506	516	527	537	548	559	570	**5,076**		**5.08**
Project Capital Cost including COR and Salvage												103,241		103.24
O & M Cost Savings	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**Total 10 Years**		**Total 15 Years**
Electrical Loss Saving	0	(31)	(72)	(172)	(233)	(294)	(356)	(418)	(482)	(546)	(611)	(3,215)		(6.33)

Q58.0 Reference: CCR Replacement Costs

Exhibit No. B-2, p. 7

Table A15.5

		Circuit Length	Cost per Circuit km	Total Cost per Circuit km
		km	($000s)	
1	Single phase No. 8 to No. 2 ACSR	62.8	130.1	$ 8,170.28
2	Two phase No. 8 to No. 2 ACSR	9.4	155.8	$ 1,464.52
3	Three phase No. 8 to No. 3/0 ACSR	14.1	237.8	$ 3,352.98
4	Three phase No. 8 to 477 ACSR	6	290.9	$ 1,745.40
5	Single phase No. 6 to No. 2 ACSR	143.6	130.1	$ 18,682.36
6	Two phase No. 6 to No. 2 ACSR	31.2	155.8	$ 4,860.96
7	Three phase No. 6 to No. 3/0 ACSR	67.1	237.8	$ 15,956.38
8	Three phase No. 6 to 477 ACSR	28.7	290.9	$ 8,348.83
9	Three phase 90 MCM to No. 3/0 ACSR	29	237.8	$ 6,896.20
10	Three phase 90 MCM to 477 ACSR	29	290.9	$ 8,436.10
	Total	420.9		$ 77,914.01
	Average Circuit Length Cost per km			$ 185.11
	CPCN Circuit Length			51
	CPCN Amount			$ 9,440.76

Q58.1 Would FortisBC confirm that the average cost per km is $185,110 and that the cost to replace 51 km is $9.44 million not $11.7 million? If not, would FortisBC please explain why it feels the cost is still $11.7 million is required for the CPCN Application?

A58.1 The Project cost will not be $9.44 million. As noted in response to BCUC IR No. 1 Q15.5, the cost per circuit kilometre is an unloaded cost in $2009. The $11.7 million takes into account capital loadings and the fact that more than 50 percent of the work will be completed in 2010, with the associated cost provided in $2010.

Q58.2 Provide detailed worksheets showing the estimate of the cost per circuit km for items 1 through 10 as shown in Table A15.5.

A58.2 Tables A58.2.1 thru A58.2.10 below provide the requested information.

Table A58.2.1
Cost per Kilometre for Single Phase No. 8 to No. 2 ACSR

	($000s)
Labor	**52.1**
Three man crews and trucks, to complete the assembly, framing and setting. The travel, setup, safety planning and grounding time for the crews based on the assumption that crews are based in local districts. A person in charge (PIC) to complete necessary switching, setting up the generator sets, etc.	
Materials	**35.1**
The Material and transportation cost include : The #2 ACSR Conductor and Accessories assuming 1 phase and 1 neutral. Nine 45 foot class three poles Framing material assuming 70% tangent and 30% angle or deadend structures	
Engineering	**3.8**
Preliminary Engineering- planning and estimates Field Reviews - Including routing, staking & survey review Detail Design, documentation, drawings, material specifications and, Construction packages Administration and Clerical Support for tenders and contracts	
Project Management	**3.9**
Other Costs	**19.6**
Traffic control based on the assumption that the work will be in populated areas and flag persons will be required Cost of on-site generation for longer outages. Acquisition of land for new rights of way and anchors	
SUBTOTAL	**114.5**
Contingency	**15.6**
Total	**130.1**

Table A58.2.2
Cost per Kilometre for Two Phase No. 8 to No. 2 ACSR

	($000s)
Labor	**62.3**
Three man crews and trucks, to complete the assembly, framing and setting. The travel, setup, safety planning and grounding time for the crews based on the assumption that crews are based in local districts. A person in charge (PIC) to complete necessary switching, setting up the generator sets, etc.	
Materials	**42.1**
The Material and transportation cost include : The #2 ACSR Conductor and Accessories assuming two phase and 1 neutral. Nine 45 foot class three poles Framing material assuming 70% tangent and 30% angle or deadend structures	
Engineering	**4.7**
Preliminary Engineering- planning and estimates Field Reviews - Including routing, staking & survey review Detail Design, documentation, drawings, material specifications and, Construction packages Administration and Clerical Support for tenders and contracts	
Project Management	**4.7**
Other Costs	**23.4**
Traffic control based on the assumption that the work will be in populated areas and flag persons will be required Cost of on-site generation for longer outages. Acquisition of land for new rights of way and anchors	
SUBTOTAL	**137.2**
Contingency	**18.6**
Total	**155.8**

Table A58.2.3
Cost per Kilometre for Three Phase No. 8 to No. 3/0 ACSR

	($000s)
Labor	**95.1**
Three man crews and trucks, to complete the assembly, framing and setting. The travel, setup, safety planning and grounding time for the crews based on the assumption that crews are based in local districts. A person in charge (PIC) to complete necessary switching, setting up the generator sets, etc.	
Materials	**64.3**
The Material and transportation cost include : The 3/0 ACSR Conductor and Accessories assuming three phase and 1 neutral. Nine 45 foot class three poles Framing material assuming 70% tangent and 30% angle or deadend structures	
Engineering	**7.1**
Preliminary Engineering- planning and estimates Field Reviews - Including routing, staking & survey review Detail Design, documentation, drawings, material specifications and, Construction packages Administration and Clerical Support for tenders and contracts	
Project Management	**7.1**
Other Costs	**35.7**
Traffic control based on the assumption that the work will be in populated areas and flag persons will be required Cost of on-site generation for longer outages. Acquisition of land for new rights of way and anchors	
SUBTOTAL	**209.3**
Contingency	**28.5**
Total	**237.8**

Table A58.2.4
Cost per Kilometre for Three Phase No. 8 to No. 477 ACSR

	($000s)
Labor	**116.3**
Three man crews and trucks, to complete the assembly, framing and setting. The travel, setup, safety planning and grounding time for the crews based on the assumption that crews are based in local districts. A person in charge (PIC) to complete necessary switching, setting up the generator sets, etc.	
Materials	**78.5**
The Material and transportation cost include : The 477 ACSR Conductor and Accessories assuming 3 phase and 1 neutral. Nine 45 foot class three poles Framing material assuming 70% tangent and 30% angle or deadend structures	
Engineering	**8.7**
Preliminary Engineering- planning and estimates Field Reviews - Including routing, staking & survey review Detail Design, documentation, drawings, material specifications and, Construction packages Administration and Clerical Support for tenders and contracts	
Project Management	**8.7**
Other Costs	**43.6**
Traffic control based on the assumption that the work will be in populated areas and flag persons will be required Cost of on-site generation for longer outages. Acquisition of land for new rights of way and anchors	
SUBTOTAL	**255.8**
Contingency	**35.1**
Total	**290.9**

Table A58.2.5
Cost per Kilometre for Single Phase No. 6 to No. 2 ACSR

	($000s)
Labor	**52.1**
Three man crews and trucks, to complete the assembly, framing and setting. The travel, setup, safety planning and grounding time for the crews based on the assumption that crews are based in local districts. A person in charge (PIC) to complete necessary switching, setting up the generator sets, etc.	
Materials	**35.1**
The Material and transportation cost include : The #2 ACSR Conductor and Accessories assuming 1 phase and 1 neutral. Nine 45 foot class three poles Framing material assuming 70% tangent and 30% angle or deadend structures	
Engineering	**3.8**
Preliminary Engineering- planning and estimates Field Reviews - Including routing, staking & survey review Detail Design, documentation, drawings, material specifications and, Construction packages Administration and Clerical Support for tenders and contracts	
Project Management	**3.9**
Other Costs	**19.6**
Traffic control based on the assumption that the work will be in populated areas and flag persons will be required Cost of on-site generation for longer outages. Acquisition of land for new rights of way and anchors	
SUBTOTAL	**114.5**
Contingency	**15.6**
Total	**130.1**

Table A58.2.6
Cost per Kilometre for Two Phase No. 6 to No. 2 ACSR

	($000s)
Labor	**62.3**
Three man crews and trucks, to complete the assembly, framing and setting. The travel, setup, safety planning and grounding time for the crews based on the assumption that crews are based in local districts. A person in charge (PIC) to complete necessary switching, setting up the generator sets, etc.	
Materials	**42.1**
The Material and transportation cost include : The # 2 ACSR Conductor and Accessories assuming 2 phase and 1 neutral. Nine 45 foot class three poles Framing material assuming 70% tangent and 30% angle or deadend structures	
Engineering	**4.7**
Preliminary Engineering- planning and estimates Field Reviews - Including routing, staking & survey review Detail Design, documentation, drawings, material specifications and, Construction packages Administration and Clerical Support for tenders and contracts	
Project Management	**4.7**
Other Costs	**23.4**
Traffic control based on the assumption that the work will be in populated areas and flag persons will be required Cost of on-site generation for longer outages. Acquisition of land for new rights of way and anchors	
SUBTOTAL	**137.2**
Contingency	**18.6**
Total	**155.8**

Table A58.2.7
Cost per Kilometre for Three Phase No. 6 to No. 3/0 ACSR

	($000s)
Labor	**95.1**
Three man crews and trucks, to complete the assembly, framing and setting. The travel, setup, safety planning and grounding time for the crews based on the assumption that crews are based in local districts. A person in charge (PIC) to complete necessary switching, setting up the generator sets, etc.	
Materials	**64.3**
The Material and transportation cost include : The 3/0 ACSR Conductor and Accessories assuming 3 phase and 1 neutral. Nine 45 foot class three poles Framing material assuming 70% tangent and 30% angle or deadend structures	
Engineering	**7.1**
Preliminary Engineering- planning and estimates Field Reviews - Including routing, staking & survey review Detail Design, documentation, drawings, material specifications and, Construction packages Administration and Clerical Support for tenders and contracts	
Project Management	**7.1**
Other Costs	**35.7**
Traffic control based on the assumption that the work will be in populated areas and flag persons will be required Cost of on-site generation for longer outages. Acquisition of land for new rights of way and anchors	
SUBTOTAL	**209.3**
Contingency	**28.5**
Total	**237.8**

Table A58.2.8
Cost per Kilometre for Three Phase No. 6 to No. 477 ACSR

	($000s)
Labor	**116.3**
Three man crews and trucks, to complete the assembly, framing and setting. The travel, setup, safety planning and grounding time for the crews based on the assumption that crews are based in local districts. A person in charge (PIC) to complete necessary switching, setting up the generator sets, etc.	
Materials	**78.5**
The Material and transportation cost include : The # 477 ACSR Conductor and Accessories assuming 3 phase and 1 neutral. Nine 45 foot class three poles Framing material assuming 70% tangent and 30% angle or deadend structures	
Engineering	**8.7**
Preliminary Engineering- planning and estimates Field Reviews - Including routing, staking & survey review Detail Design, documentation, drawings, material specifications and, Construction packages Administration and Clerical Support for tenders and contracts	
Project Management	**8.7**
Other Costs	**43.6**
Traffic control based on the assumption that the work will be in populated areas and flag persons will be required Cost of on-site generation for longer outages. Acquisition of land for new rights of way and anchors	
SUBTOTAL	**255.8**
Contingency	**35.1**
Total	**290.9**

Table A58.2.9
Cost per Kilometre for Three Phase No. 90 MCM to No. 3/0 ACSR

	($000s)
Labor	**95.1**
Three man crews and trucks, to complete the assembly, framing and setting. The travel, setup, safety planning and grounding time for the crews based on the assumption that crews are based in local districts. A person in charge (PIC) to complete necessary switching, setting up the generator sets, etc.	
Materials	**64.3**
The Material and transportation cost include : The # 3/0 ACSR Conductor and Accessories assuming 3 phase and 1 neutral. Nine 45 foot class three poles Framing material assuming 70% tangent and 30% angle or deadend structures	
Engineering	**7.1**
Preliminary Engineering- planning and estimates Field Reviews - Including routing, staking & survey review Detail Design, documentation, drawings, material specifications and, Construction packages Administration and Clerical Support for tenders and contracts	
Project Management	**7.1**
Other Costs	**35.7**
Traffic control based on the assumption that the work will be in populated areas and flag persons will be required Cost of on-site generation for longer outages. Acquisition of land for new rights of way and anchors	
SUBTOTAL	**209.3**
Contingency	**28.5**
Total	**237.8**

Table A58.2.10
Cost per Kilometre for Three Phase No. 90 MCM to No. 477 ACSR

	($000s)
Labor	**116.3**
Three man crews and trucks, to complete the assembly, framing and setting. The travel, setup, safety planning and grounding time for the crews based on the assumption that crews are based in local districts. A person in charge (PIC) to complete necessary switching, setting up the generator sets, etc.	
Materials	**78.5**
The Material and transportation cost include : The # 477 ACSR Conductor and Accessories assuming 3 phase and 1 neutral. Nine 45 foot class three poles Framing material assuming 70% tangent and 30% angle or deadend structures	
Engineering	**8.7**
Preliminary Engineering- planning and estimates Field Reviews - Including routing, staking & survey review Detail Design, documentation, drawings, material specifications and, Construction packages Administration and Clerical Support for tenders and contracts	
Project Management	**8.7**
Other Costs	**43.6**
Traffic control based on the assumption that the work will be in populated areas and flag persons will be required Cost of on-site generation for longer outages. Acquisition of land for new rights of way and anchors	
SUBTOTAL	**255.8**
Contingency	**35.1**
Total	**290.9**

Q59.0 Reference: CCR Replacement Costs
Exhibit No. B-2, pp. 31
Table A5.1

	Project Name	General Area	Conductor Type Replaced	New Conductor Used	Circuit length (km)	Number of Phases	Conductor Length (km)	Zone	Number of poles	Cost +/- 20% ($000s)
37	Capitalized and Direct Overheads									$ 689.00
38	2009 Total				22.2		39.9		199	$ 4,798.00
80	Capitalized and Direct Overheads									$ 897.00
81	2010 Total				28.8		54.3		259	$ 6,585.00
	CPCN Total				51		94.2			$12,969.00

Q59.1 Explain why the totals for 2009 and 2010 add up to $ 12.97 million and not $ 11.7 million sought.

A59.1 From Table A5.1 in response to BCUC IR No. 1 Q5.1 (Exhibit B-2), line 38 (2009 Total) includes line 37 (Capitalized and Direct Overhead). Line 81 (2010 Total) includes Line 80 (Capitalized and direct overhead). When lines 38 and 81 are added, the result is $11.38 million. When this amount is added to the 2008 expenditure of $0.3 million the sum is $11.68 million which has been rounded to $11.7 million. The amount of $12.97 million noted in the question is in error since it double counts the capitalized and direct overheads.

Q59.2 Explain why the order sought is for $ 11.7 million and not $ 12.97 million.

A59.2 Please see the response to Q59.1 above.

Q59.3 Explain Capitalized and Direct Overheads in detail.

A59.3 Cost accounting is the practice of allocating costs to the various products and services a business produces. In order to reflect the true costs of constructing capital assets, a method of allocating direct and indirect overhead costs to capital expenditures is required. FortisBC has developed a mechanism that is simple and applied consistently throughout the Company.

For the operating business units; Generation, Network Services, and Customer Service, the identification of those costs that support capital work is generally straightforward. Such costs are charged directly to a capital project and are known as direct overheads. Similarly, where appropriate, some corporate overhead costs are charged directly to a capital project. For example, where a purchaser is assigned to a capital project team to provide contract administration support, those costs are charged directly to the project. The balance of corporate overhead (indirect corporate overhead) is then allocated to capital through a method approved in BCUC order G-58-06. The indirect corporate overhead referred to as Capitalized overhead is deemed to be a flat 20 percent of forecast Gross O&M expenditures and is charged on a pro rata basis to each capital project.

Q59.4 If we add the Capitalized and Direct Overheads to Table A15.5 CPCN amount of $9.440 million the total is $11.036 million which is less than both the $ 11.7 million sought and the $ 12.97 million shown in Table A5.1. Reconcile these amounts.

A59.4 The difference is due to the fact that the $11.7 million includes expenditures of $0.3 million in 2008 and that more than 50 percent of the expenditures are in $2010 which has been inflated by 7 percent over the $2009. The $12.97

million noted in the question is in error since it double counts the capitalized and direct overheads. Please see Table A59.4a and A59.4b below.

Table A59.4a

	($millions)
Direct Cost	9.440
Overheads	1.586
2008 Cost	0.300
2010 inflation (See BCUC IR2 Q64.1)	0.370
Total	11.696

Table A59.4b

	($millions)	
Capitalized and Direct Overheads	0.689	Included in 2009 Total
2009 Total	4.798	4.798
Capitalized and Direct Overheads	0.897	Included in 2010 Total
2010 Total	6.585	6.585
2008 Cost		0.300
Total	12.969	11.683

Q59.5 Would FortisBC confirm the total circuit length for 2009 and 2010 adds up to 51 km.

A59.5 Confirmed.

Q59.6 Provide area maps for the lines to be replaced in F2009/F2010 highlighting the lines to be replaced.

A59.6 The Company has not developed area maps for the lines to be replaced in

F2009/F2010, however area maps showing the location of all conductors being replaced is included in response to Q59.12 below.

Q59.7 Provide an explanation as to the cost efficiency methods employed in replacing short circuit lengths in the same areas.

A59.7 FortisBC will review the short circuit lengths in the same geographical area, both in the design phase as well as the construction phase. The main driver in the first three years is eliminating copper in "Sensitive Areas". However if there is a short circuit length in the same geographical area currently scheduled for later replacement it may be grouped with the priority circuits and completed in the first three years. The determining factors could be: number of short circuits lengths in the same area, proximity to each other, actual lengths and number of customers affected.

Q59.7.1 Discuss the impact on service, safety, and reliability when using splices to connect these replaced short circuit lengths to the existing copper circuits.

A59.7.1 FortisBC does not splice aluminum to copper conductor. The standard is to dead-end on the structures and make the transition. The Company uses a parallel groove or wedge type connectors made by the manufactures for ASCR to copper connections.

Q59.7.2 Discuss the copper to aluminum splice used and its reliability.

A59.7.2 FortisBC does not splice aluminum to copper conductor. Please see Appendix 59.7.2 which illustrates the connector used to make the transition from copper to aluminum on a dead-end structure. The Company has not experienced any reliability issues associated with such connectors.

Q59.8 Please explain if there would be any cost efficiencies to replacing circuit lengths that are longer as those in Table A5.1 appear to be quite short.

A59.8 Please see the responses to Q39.1, Q39.2, and Q39.4 above.

Q59.9 Provide a listing of the lines in a similar format as in Table A5.1 and a map for the lines to be replaced in F2011.

A59.9 Please see Table A59.9 below. The Company has not developed area maps for the lines to be replaced in F2011; however area maps showing the location of all conductors being replaced is included in the response to Q59.12 below.

Table A59.9
Project Plan (2011)

	Project Name	General Area	Conductor Type Replaced	New Conductor Used	Circuit length (km)	Number of Phases	Conductor Length (km)	Zone	Number of poles	Cost +/- 20% ($000s)
1	Hwy 97 (322/330)	Oliver	No. 90	No. 3/0	1.5	3	4.5	Residential	14	405
2	East Lake Shore Dr	Osoyoos	No. 90	No. 3/0	1.8	3	5.4	Residential	16	485
3	Moorpark Drive	Penticton	No. 90	No 477 MCM	1.3	3	3.75	Residential	16	412
4	GN Av/6th St	Grand Forks	No. 8	No. 2 ACSR	0.5	2	1	Residential	5	88
5	Hilliview Rd	Grand Forks	No. 8	No. 2 ACSR	0.4	2	0.8	Residential	4	71
6	Lakeshore Road	Kelowna	No. 8	No. 2 ACSR	0.2	1	0.2	Residential	2	30
7	89th St/148 Ave	Osoyoos	No. 8	No. 2 ACSR	0.5	1	0.5	Residential	5	74
8	22nd Ave	Osoyoos	No. 8	No. 2 ACSR	0.6	1	0.6	Residential	5	89
9	Meadowlark Drive	Osoyoos	No. 8	No. 3/0	0.7	3	2.1	Residential	6	189
10	4th/Sinclair	Creston	No. 6	No. 2 ACSR	0.8	1	0.8	Commercial	7	118
11	36th Street	Creston	No. 6	No. 2 ACSR	0.5	1	0.5	Commercial	5	74
12	Sylvester Rd	Creston	No. 6	No. 2 ACSR	0.3	1	0.3	Commercial	3	44
13	25th/Sunset	Creston	No. 6	No. 2 ACSR	3	1	3	Residential	27	443
14	Cedar St	Creston	No. 6	No. 2 ACSR	1	1	1	Residential	9	148
15	Kimberley S	Greenwood	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
16	Lake Street	Greenwood	No. 6	No. 2 ACSR	0.6	1	0.6	Residential	5	89
17	Cavell St	Creston	No. 6	No. 3/0	2.5	3	7.5	Residential	23	674
18	28th/Crestview	Creston	No. 6	No. 3/0	4.3	3	12.9	Residential	39	1160
19	Dimission St	Greenwood	No. 6	No. 3/0	1.2	3	3.6	Residential	11	324
20	Hartman/Craig	Kelowna	No. 6	No. 3/0	1	3	3	Residential	9	270
21	H97-NearMcurd	Kelowna	No. 6	No. 3/0	0.1	3	0.3	Commercial	1	27

Table A59.9 cont'd

	Project Name	General Area	Conductor Type Replaced	New Conductor Used	Circuit length (km)	Number of Phases	Conductor Length (km)	Zone	Number of poles	Cost +/- 20% ($000s)
22	H97_Penno Rd	Kelowna	No. 6	No. 3/0	0.4	3	1.2	Residential	4	108
23	Asher Road	Kelowna	No. 6	No. 3/0	0.5	3	1.5	Residential	5	135
24	Cornish Rd	Kelowna	No. 6	No. 3/0	0.2	3	0.6	Commercial	2	54
25	Wilkinson Rd	Kelowna	No. 6	No. 3/0	0.2	3	0.6	Residential	2	54
26	Fuller Collett Rd	Kelowna	No. 6	No. 3/0	0.4	3	1.2	Residential	4	108
27	Hollydell Rd	Kelowna	No. 6	No. 3/0	0.3	3	0.9	Residential	3	81
28	Carry Rd	Kelowna	No. 6	No. 3/0	0.3	3	0.9	Commercial	3	81
29	Braeloch Rd	Kelowna	No. 6	No. 3/0	0.2	3	0.6	Residential	2	54
30	Hobson rd	Kelowna	No. 6	No. 3/0	1	3	3	Residential	9	270
31	Dease Rd	Kelowna	No. 6	No. 3/0	0.3	3	0.9	Residential	3	81
32	McCulloch Rd	Kelowna	No. 6	No. 3/0	0.5	3	1.5	Commercial	5	135
33	H97_CNR	Kelowna	No. 6	No. 2 ACSR	0.5	2	1	Commercial	5	88
34	GL_ Watson Rd	Kelowna	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
35	Mclure Rd	Kelowna	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
36	KLO_Raymer	Kelowna	No. 6	No. 2 ACSR	0.7	1	0.7	Residential	6	103
37	Mclure Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
38	Montgomery Rd	Kelowna	No. 6	No. 2 ACSR	0.1	1	0.1	Residential	1	15
39	Mcdonald	Kelowna	No. 6	No. 2 ACSR	0.1	1	0.1	Residential	1	15
40	Jade Rd	Kelowna	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
41	Stillingfleet Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
42	Tataryn Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44

Table A59.9 cont'd

	Project Name	General Area	Conductor Type Replaced	New Conductor Used	Circuit length (km)	Number of Phases	Conductor Length (km)	Zone	Number of poles	Cost +/- 20% ($000s)
43	Elwyn Rd	Kelowna	No. 6	No. 2 ACSR	0.4	1	0.4	Residential	4	59
44	Graham Rd	Kelowna	No. 6	No. 2 ACSR	0.5	1	0.5	Residential	5	74
45	Moubray Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
46	Dallas Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
47	Yates Rd	Kelowna	No. 6	No. 2 ACSR	0.4	1	0.4	Residential	4	59
48	Old Meadows Rd	Kelowna	No. 6	No. 2 ACSR	0.5	1	0.5	Residential	5	74
49	Perry Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
50	Gibbs Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
51	Merrifield Rd	Kelowna	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
52	Saddler Rd	Kelowna	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
53	Woods Rd	Kelowna	No. 6	No. 2 ACSR	0.4	1	0.4	Residential	4	59
54	Taylor Rd	Kelowna	No. 6	No. 2 ACSR	0.8	1	0.8	Residential	7	118
55	Juniper Rd	Kelowna	No. 6	No. 2 ACSR	0.1	1	0.1	Residential	1	15
56	Knowles Rd	Kelowna	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
57	Uplands dr	Kelowna	No. 6	No. 2 ACSR	0.5	1	0.5	Residential	5	74
58	Lakeshore Rd	Kelowna	No. 6	No. 2 ACSR	0.04	1	0.04	Residential	0	6
59	Braeloch Rd	Kelowna	No. 6	No. 2 ACSR	0.1	1	0.1	Residential	1	15
60	Lakeshore Rd	Kelowna	No. 6	No. 2 ACSR	0.1	1	0.1	Residential	1	15
61	Sherwood Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
62	Lester Rd	Kelowna	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
63	Henn Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
64	Flemming Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44

Table A59.9 cont'd

	Project Name	General Area	Conductor Type Replaced	New Conductor Used	Circuit length (km)	Number of Phases	Conductor Length (km)	Zone	Number of poles	Cost +/- 20% ($000s)
65	Fraser Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
66	Ford Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
67	Knorr Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
68	Douglas Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
69	Froeltch	Kelowna	No. 6	No. 2 ACSR	0.5	1	0.5	Residential	5	74
70	Cambie Rd	Kelowna	No. 6	No. 2 ACSR	0.1	1	0.1	Residential	1	15
71	Pemberton Rd	Kelowna	No. 6	No. 2 ACSR	0.1	1	0.1	Residential	1	15
72	Holbrook Rd W	Kelowna	No. 6	No. 2 ACSR	0.9	1	0.9	Residential	8	133
73	Robson Rd E	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
74	Holbrook Rd E	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
75	Pinegrove Rd	Kelowna	No. 6	No. 2 ACSR	0.6	1	0.6	Residential	5	89
76	Ambrosi Rd	Kelowna	No. 6	No. 2 ACSR	0.4	1	0.4	Residential	4	59
77	Vasile Rd	Kelowna	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
78	Dunn St	Kelowna	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
79	Cornwall Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
80	Collison Rd	Kelowna	No. 6	No. 2 ACSR	0.1	1	0.1	Residential	1	15
81	41st Ave	Osoyoos	No. 6	No. 2 ACSR	0.6	1	0.6	Residential	5	89
82	81st Street	Osoyoos	No. 6	No. 2 ACSR	0.5	1	0.5	Residential	5	74
83	89th St(78/77Ave)	Osoyoos	No. 6	No. 2 ACSR	0.4	1	0.4	Residential	4	59
84	42nd Ave	Osoyoos	No. 6	No. 2 ACSR	0.5	1	0.5	Commercial	5	74
85	2nd Ave	Osoyoos	No. 6	No. 2 ACSR	0.4	1	0.4	Commercial	4	59
86	85 Street	Oliver	No. 6	No. 2 ACSR	0.6	1	0.6	Residential	5	89

Table A59.9 cont'd

	Project Name	General Area	Conductor Type Replaced	New Conductor Used	Circuit length (km)	Number of Phases	Conductor Length (km)	Zone	Number of poles	Cost +/- 20% ($000s)
87	81st Street	Oliver	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
88	77th Street	Oliver	No. 6	No. 2 ACSR	0.1	1	0.1	Residential	1	15
89	109 St/352nd Ave	Oliver	No. 6	No. 2 ACSR	0.1	1	0.1	Residential	1	15
90	380Ave	Oliver	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
91	Seacrest	Oliver	No. 6	No. 2 ACSR	0.5	1	0.5	Residential	5	74
92	99th St/Hwy 97	Oliver	No. 6	No. 2 ACSR	0.3	1	0.3	Commercial	3	44
93	Kaleden	Kaleden	No. 6	No. 2 ACSR	0.8	1	0.8	Residential	7	118
94	Eastside Rd	OK Falls	No. 6	No. 2 ACSR	0.8	1	0.8	Residential	7	118
95	7th Avenue	Keremeos	No. 6	No. 2 ACSR	0.8	1	0.8	Residential	7	118
96	Finch Cres.	Osoyoos	No. 6	No. 2 ACSR	0.3	2	0.6	Residential	3	53
97	26th Ave	Osoyoos	No. 6	No. 2 ACSR	0.3	2	0.6	Residential	3	53
98	91St Along Sawmill	Oliver	No. 6	No. 2 ACSR	1.9	2	3.8	Residential	17	336
99	396 Avenue	Oliver	No. 6	No. 2 ACSR	0.7	2	1.4	Residential	6	124
100	Corey Rd	Keremeos	No. 6	No. 2 ACSR	1	2	2	Residential	9	177
101	107 St (46 to 6 Ave)	Osoyoos	No. 6	No. 3/0	2.3	3	6.9	Residential	21	620
102	Hwy 97/25th Ave	Osoyoos	No. 6	No. 3/0	0.9	3	2.7	Residential	8	243
103	Oleander Drive	Osoyoos	No. 6	No. 3/0	0.8	3	2.4	Residential	7	216
104	Tamarack drive	Osoyoos	No. 6	No. 3/0	0.6	3	1.8	Residential	5	162
105	81st Street	Oliver	No. 6	No. 3/0	1.6	3	4.8	Residential	14	432
106	Island Road	Oliver	No. 6	No. 3/0	1.6	3	4.8	Residential	14	432
107	384 Avenue	Oliver	No. 6	No. 3/0	3.4	3	10.2	Residential	31	917
108	99th St/Hwy 97	Oliver	No. 6	No. 3/0	0.4	3	1.2	Residential	4	108

Table A59.9 cont'd

	Project Name	General Area	Conductor Type Replaced	New Conductor Used	Circuit length (km)	Number of Phases	Conductor Length (km)	Zone	Number of poles	Cost +/- 20% ($000s)
109	Willow St	OK Falls	No. 6	No. 3/0	0.5	3	1.5	Residential	5	135
110	2nd Ave	Keremeos	No. 6	No. 3/0	0.8	3	2.4	Residential	7	216
111	Capitalized and Direct Overheads									1,948
112	**2011 total**				**66.14**		**134.79**		**618**	**15,804**

Note: differences due to rounding.

Q59.10 Provide area maps for the lines to be replaced in F2011 highlighting the lines to be replaced.

A59.10 Please see the response to Q59.9 above and Q59.12 below.

Q59.11 Provide the data and costs for F2011 (year 3) and add to Table A5.1 and re-submit.

A59.11 Please see Table A59.11 below.

Table A59.11
Project Summary (2009-2011)

	Project Name	General Area	Conductor Type Replaced	New Conductor Used	Circuit length (km)	Number of Phases	Conductor Length (km)	Zone	Number of poles	Cost +/- 20% ($000s)
2009										
1	Bell_Clarisson	Kelowna	No. 8	No. 2 ACSR	0.2	1	0.2	Park	1	20
2	McBride	Kelowna	No. 8	No. 2 ACSR	0.4	1	0.4	Park	3	47
3	KLO_Pandosy	Kelowna	No. 6	No. 2 ACSR	0.2	1	0.2	School	2	22
4	Mallach Rd	Kelowna	No. 6	No. 2 ACSR	0.1	1	0.1	School	0	7
5	Mayer Road	Kelowna	No. 6	No. 2 ACSR	0.5	1	0.5	School	5	65
6	GL_Union Road	Kelowna	No. 6	No. 2 ACSR	1.2	1	1.2	School	11	156
7	GL_Valley Rd	Kelowna	No. 6	No. 2 ACSR	1.0	1	1.0	School	9	130
8	Gordon	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	School	3	40
9	Ponderosa Ave	Kaleden	No. 90	No. 477 MCM	1.6	3	4.7	School	14	454
10	356 Ave	Oliver	No. 90	No. 477 MCM	0.6	3	1.7	School	5	163
11	HWY 3A	Keremeos	No. 90	No. 477 MCM	1.8	3	5.4	School	16	519
12	107th Street	Oliver	No. 6	No. 2 ACSR	0.4	1	0.4	School	3	50
13	356 Ave	Oliver	No. 6	No. 2 ACSR	0.1	1	0.1	School	1	9
14	Sparks	Keremeos	No. 6	No. 2 ACSR	0.5	1	0.5	School	5	65
15	10th Ave	Keremeos	No. 6	No. 2 ACSR	0.9	1	0.9	School	8	122
16	352nd Ave	Oliver	No. 6	No. 2 ACSR	0.5	2	0.9	School	4	70
17	Ponderosa Ave	Kaleden	No. 6	No. 477 MCM	0.9	3	2.7	School	8	265
18	Linden Ave	Kaleden	No. 6	No. 477 MCM	0.5	3	1.5	School	5	145
19	FrankBeinder	Castlegar	No. 8	No. 2 ACSR	0.4	1	0.4	School	4	56
20	7th Ave/4th St	Castlegar	No. 8	No. 2 ACSR	0.2	1	0.2	School	2	26

Table A59.11 cont'd

	Project Name	General Area	Conductor Type Replaced	New Conductor Used	Circuit length (km)	Number of Phases	Conductor Length (km)	Zone	Number of poles	Cost +/- 20% ($000s)
21	Macphee Rd	Castlegar	No. 8	No. 2 ACSR	1.2	1	1.2	Park	11	156
22	8th Ave	Castlegar	No. 8	No. 2 ACSR	0.1	1	0.1	Park	1	18
23	1st Avenue	Castlegar	No. 8	No. 2 ACSR	0.5	1	0.5	Park	5	65
24	8th Street	Creston	No. 8	No. 2 ACSR	2.0	1	2.0	School	18	260
25	Cedar St	Creston	No. 8	No. 2 ACSR	0.4	1	0.4	Park	3	46
26	Murray St	Midway	No. 8	No. 2 ACSR	0.6	1	0.6	Park	5	76
27	West Lake Rd	Christina Lake	No. 8	No. 2 ACSR	1.0	1	1.0	School	9	130
28	Hilliview Rd	Grand Forks	No. 8	No. 3/0 Al.	0.5	3	1.4	Park	4	109
29	Koftinkoff	Grand Forks	No. 8	No. 3/0 Al.	0.2	3	0.6	Park	2	49
30	Carnation Dr	Trail	No. 8	No. 3/0 Al.	0.6	3	1.8	Park	5	143
31	Cole St	Fruitvale	No. 8	No. 3/0 Al.	0.1	3	0.2	School	1	17
32	Old Salmo	Fruitvale	No. 8	No. 3/0 Al.	0.1	3	0.3	Park	1	25
33	Wilmes Lane	Trail	No. 8	No. 3/0 Al.	0.2	3	0.6	Park	2	51
34	Adam Robertson School	Creston	No. 6	No. 2 ACSR	1.0	1	1.0	School	9	130
35	Canyon Lista Elementary	Creston	No. 6	No. 3/0 Al.	0.2	3	0.6	School	2	48
36	Gretrude Ave	Midway	No. 6	No. 3/0 Al.	1.5	3	4.5	School	14	356
37	Capatalized and Direct Overheads									689
38	**2009 Total**				**22.2**		**39.9**		**199**	**4,798**

Table A59.11 cont'd

	Project Name	General Area	Conductor Type Replaced	New Conductor Used	Circuit length (km)	Number of Phases	Conductor Length (km)	Zone	Number of poles	Cost +/- 20% ($000s)
2010										
39	H97 Bulman Rd	Kelowna	No. 90	No 477MCM	1.2	3	3.6	Park	11	367
40	KLO_Cedar ave	Kelowna	No. 8	No. 2 ACSR	0.1	1	0.1	Park	1	14
41	Finns Road	Kelowna	No. 6	No 477MCM	0.3	3	1.0	Park	3	101
42	Eldorado Rd	Kelowna	No. 6	No 477MCM	0.7	3	2.1	Park	6	214
43	Rutland Rd N	Kelowna	No. 6	No 477MCM	0.1	3	0.3	Park	1	35
44	Hart Rd	Kelowna	No. 6	No. 3/0	0.8	3	2.4	Park	7	200
45	Barkley Walker	Kelowna	No. 6	No. 2 ACSR	0.5	2	1.0	Park	5	85
46	Bell	Kelowna	No. 6	No. 2 ACSR	0.2	1	0.2	Park	2	27
47	Mcintosh Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Park	2	36
48	Franklyn Rd	Kelowna	No. 6	No. 2 ACSR	0.4	1	0.4	Park	3	48
49	Swordy_Scott	Kelowna	No. 6	No. 2 ACSR	0.7	1	0.7	Park	6	89
50	Ethel-Grenfell Rd	Kelowna	No. 6	No. 2 ACSR	0.9	1	0.9	Park	8	118
51	Lakeshore Dr (16/55)	Osoyoos	No. 90	No. 477MCM	2.6	3	7.8	Park	23	794
52	Main St/Finch Cres	Osoyoos	No. 6	No. 2 ACSR	0.1	1	0.1	Park	1	15
53	Tuc-el-nuit drive	Oliver	No. 6	No. 2 ACSR	0.4	2	0.8	Park	4	65
54	83rd Street	Osoyoos	No. 6	No. 3/0	0.7	3	2.0	Park	6	167
55	16th Ave/Lakeshore	Osoyoos	No. 6	No 477MCM	1.1	3	3.3	Park	10	336
56	378 Avenue	Osoyoos	No. 6	No. 3/0	1.3	3	4.0	Park	12	335
57	18th Street	Castlegar	No. 8	No. 2 ACSR	0.2	1	0.2	Commercial	2	27
58	Soreson Rd	Castlegar	No. 8	No. 2 ACSR	0.5	1	0.5	Residential	5	70
59	4th Avenue	Castlegar	No. 8	No. 2 ACSR	0.7	1	0.7	Residential	6	96

Table A59.11 cont'd

	Project Name	General Area	Conductor Type Replaced	New Conductor Used	Circuit length (km)	Number of Phases	Conductor Length (km)	Zone	Number of poles	Cost +/- 20% ($000s)
60	6th Ave/4th St	Castlegar	No. 8	No. 2 ACSR	0.2	1	0.2	Residential	1	20
61	Columbia Rd	Castlegar	No. 8	No. 2 ACSR	0.5	1	0.5	Residential	5	68
62	Raspberry	Castlegar	No. 8	No. 2 ACSR	0.7	1	0.7	Residential	6	96
63	Upper Level	Castlegar	No. 8	No. 2 ACSR	1.5	1	1.5	Residential	14	205
64	12th Ave	Creston	No. 8	No. 2 ACSR	0.2	1	0.2	Residential	1	20
65	15th Ave	Creston	No. 8	No. 2 ACSR	0.2	1	0.2	Commercial	2	27
66	40th-Samuels	Creston	No. 8	No. 2 ACSR	2.5	1	2.5	Residential	23	342
67	51 & 52nd St	Creston	No. 8	No. 2 ACSR	2.0	1	2.0	Commercial	18	273
68	Hilton St	Creston	No. 8	No. 2 ACSR	0.5	1	0.5	Residential	5	68
69	Masuch Rd	Creston	No. 8	No. 2 ACSR	0.2	1	0.2	Residential	2	30
70	Andros	Grand Forks	No. 8	No. 2 ACSR	0.2	1	0.2	Residential	2	25
71	College Rd	Grand Forks	No. 8	No. 2 ACSR	1.3	1	1.3	Residential	12	178
72	Danville Hw	Grand Forks	No. 8	No. 2 ACSR	0.5	1	0.5	Residential	5	68
73	Aspen St	Trail	No. 8	No. 3/0	0.6	3	1.9	Residential	6	155
74	Dahlia Cr	Trail	No. 8	No. 3/0	0.3	3	0.9	Residential	3	75
75	Iris Cr	Trail	No. 8	No. 3/0	0.2	3	0.6	Residential	2	50
76	Marinna Cr	Trail	No. 8	No. 3/0	0.6	3	1.8	Residential	5	150
77	Regan Cres	Trail	No. 8	No. 3/0	0.3	3	0.9	Residential	3	79
78	Webster Rd	Fruitvale	No. 8	No. 3/0	1.4	3	4.2	Commercial	13	350
79	Beam Road	Creston	No. 6	No. 2 ACSR	1.3	1	1.3	Park	11	171
80	Capatalized and Direct Overheads									897
81	**2010 Total**				**28.8**		**54.3**		**259**	**6,585**

Table A59.11 cont'd

	Project Name	General Area	Conductor Type Replaced	New Conductor Used	Circuit length (km)	Number of Phases	Conductor Length (km)	Zone	Number of poles	Cost +/- 20% ($000s)
					2011					
82	Hwy 97 (322/330)	Oliver	No. 90	No. 3/0	1.5	3	4.5	Residential	14	405
83	East Lake Shore Dr	Osoyoos	No. 90	No. 3/0	1.8	3	5.4	Residential	16	485
84	Moorpark Drive	Penticton	No. 90	No 477 MCM	1.3	3	3.75	Residential	16	412
85	GN Av/6th St	Grand Forks	No. 8	No. 2 ACSR	0.5	2	1	Residential	5	88
86	Hilliview Rd	Grand Forks	No. 8	No. 2 ACSR	0.4	2	0.8	Residential	4	71
87	Lakeshore Road	Kelowna	No. 8	No. 2 ACSR	0.2	1	0.2	Residential	2	30
88	89th St/148 Ave	Osoyoos	No. 8	No. 2 ACSR	0.5	1	0.5	Residential	5	74
89	22nd Ave	Osoyoos	No. 8	No. 2 ACSR	0.6	1	0.6	Residential	5	89
90	Meadowlark Drive	Osoyoos	No. 8	No. 3/0	0.7	3	2.1	Residential	6	189
91	4th/Sinclair	Creston	No. 6	No. 2 ACSR	0.8	1	0.8	Commercial	7	118
92	36th Street	Creston	No. 6	No. 2 ACSR	0.5	1	0.5	Commercial	5	74
93	Sylvester Rd	Creston	No. 6	No. 2 ACSR	0.3	1	0.3	Commercial	3	44
94	25th/Sunset	Creston	No. 6	No. 2 ACSR	3	1	3	Residential	27	443
95	Cedar St	Creston	No. 6	No. 2 ACSR	1	1	1	Residential	9	148
96	Kimberley S	Greenwood	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
97	Lake Street	Greenwood	No. 6	No. 2 ACSR	0.6	1	0.6	Residential	5	89
98	Cavell St	Creston	No. 6	No. 3/0	2.5	3	7.5	Residential	23	674
99	28th/Crestview	Creston	No. 6	No. 3/0	4.3	3	12.9	Residential	39	1160
100	Dimission St	Greenwood	No. 6	No. 3/0	1.2	3	3.6	Residential	11	324
101	Hartman/Craig	Kelowna	No. 6	No. 3/0	1	3	3	Residential	9	270
102	H97-NearMcurd	Kelowna	No. 6	No. 3/0	0.1	3	0.3	Commercial	1	27

Table A59.11 cont'd

	Project Name	General Area	Conductor Type Replaced	New Conductor Used	Circuit length (km)	Number of Phases	Conductor Length (km)	Zone	Number of poles	Cost +/- 20% ($000s)
103	H97_Penno Rd	Kelowna	No. 6	No. 3/0	0.4	3	1.2	Residential	4	108
104	Asher Road	Kelowna	No. 6	No. 3/0	0.5	3	1.5	Residential	5	135
105	Cornish Rd	Kelowna	No. 6	No. 3/0	0.2	3	0.6	Commercial	2	54
106	Wilkinson Rd	Kelowna	No. 6	No. 3/0	0.2	3	0.6	Residential	2	54
107	Fuller Collett Rd	Kelowna	No. 6	No. 3/0	0.4	3	1.2	Residential	4	108
108	Hollydell Rd	Kelowna	No. 6	No. 3/0	0.3	3	0.9	Residential	3	81
109	Carry Rd	Kelowna	No. 6	No. 3/0	0.3	3	0.9	Commercial	3	81
110	Braeloch Rd	Kelowna	No. 6	No. 3/0	0.2	3	0.6	Residential	2	54
111	Hobson rd	Kelowna	No. 6	No. 3/0	1	3	3	Residential	9	270
112	Dease Rd	Kelowna	No. 6	No. 3/0	0.3	3	0.9	Residential	3	81
113	McCulloch Rd	Kelowna	No. 6	No. 3/0	0.5	3	1.5	Commercial	5	135
114	H97_CNR	Kelowna	No. 6	No. 2 ACSR	0.5	2	1	Commercial	5	88
115	GL_ Watson Rd	Kelowna	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
116	Mclure Rd	Kelowna	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
117	KLO_Raymer	Kelowna	No. 6	No. 2 ACSR	0.7	1	0.7	Residential	6	103
118	Mclure Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
119	Montgomery Rd	Kelowna	No. 6	No. 2 ACSR	0.1	1	0.1	Residential	1	15
120	Mcdonald	Kelowna	No. 6	No. 2 ACSR	0.1	1	0.1	Residential	1	15
121	Jade Rd	Kelowna	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
122	Stillingfleet Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
123	Tataryn Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
124	Elwyn Rd	Kelowna	No. 6	No. 2 ACSR	0.4	1	0.4	Residential	4	59

Table A59.11 cont'd

	Project Name	General Area	Conductor Type Replaced	New Conductor Used	Circuit length (km)	Number of Phases	Conductor Length (km)	Zone	Number of poles	Cost +/- 20% ($000s)
125	Graham Rd	Kelowna	No. 6	No. 2 ACSR	0.5	1	0.5	Residential	5	74
126	Moubray Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
127	Dallas Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
128	Yates Rd	Kelowna	No. 6	No. 2 ACSR	0.4	1	0.4	Residential	4	59
129	Old Meadows Rd	Kelowna	No. 6	No. 2 ACSR	0.5	1	0.5	Residential	5	74
130	Perry Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
131	Gibbs Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
132	Merrifield Rd	Kelowna	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
133	Saddler Rd	Kelowna	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
134	Woods Rd	Kelowna	No. 6	No. 2 ACSR	0.4	1	0.4	Residential	4	59
135	Taylor Rd	Kelowna	No. 6	No. 2 ACSR	0.8	1	0.8	Residential	7	118
136	Juniper Rd	Kelowna	No. 6	No. 2 ACSR	0.1	1	0.1	Residential	1	15
137	Knowles Rd	Kelowna	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
138	Uplands Dr	Kelowna	No. 6	No. 2 ACSR	0.5	1	0.5	Residential	5	74
139	Lakeshore Rd	Kelowna	No. 6	No. 2 ACSR	0.04	1	0.04	Residential	0	6
140	Braeloch Rd	Kelowna	No. 6	No. 2 ACSR	0.1	1	0.1	Residential	1	15
141	Lakeshore Rd	Kelowna	No. 6	No. 2 ACSR	0.1	1	0.1	Residential	1	15
142	Sherwood Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
143	Lester Rd	Kelowna	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
144	Henn Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
145	Flemming Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
146	Fraser Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44

Table A59.11 cont'd

	Project Name	General Area	Conductor Type Replaced	New Conductor Used	Circuit length (km)	Number of Phases	Conductor Length (km)	Zone	Number of poles	Cost +/- 20% ($000s)
147	Ford Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
148	Knorr Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
149	Douglas Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
150	Froeltch	Kelowna	No. 6	No. 2 ACSR	0.5	1	0.5	Residential	5	74
151	Cambie Rd	Kelowna	No. 6	No. 2 ACSR	0.1	1	0.1	Residential	1	15
152	Pemberton Rd	Kelowna	No. 6	No. 2 ACSR	0.1	1	0.1	Residential	1	15
153	Holbrook Rd W	Kelowna	No. 6	No. 2 ACSR	0.9	1	0.9	Residential	8	133
154	Robson Rd E	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
155	Holbrook Rd E	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
156	Pinegrove Rd	Kelowna	No. 6	No. 2 ACSR	0.6	1	0.6	Residential	5	89
157	Ambrosi Rd	Kelowna	No. 6	No. 2 ACSR	0.4	1	0.4	Residential	4	59
158	Vasile Rd	Kelowna	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
159	Dunn St	Kelowna	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
160	Cornwall Rd	Kelowna	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44
161	Collison Rd	Kelowna	No. 6	No. 2 ACSR	0.1	1	0.1	Residential	1	15
162	41st Ave	Osoyoos	No. 6	No. 2 ACSR	0.6	1	0.6	Residential	5	89
163	81st Street	Osoyoos	No. 6	No. 2 ACSR	0.5	1	0.5	Residential	5	74
164	89th St(78/77Ave)	Osoyoos	No. 6	No. 2 ACSR	0.4	1	0.4	Residential	4	59
165	42nd Ave	Osoyoos	No. 6	No. 2 ACSR	0.5	1	0.5	Commercial	5	74
166	2nd Ave	Osoyoos	No. 6	No. 2 ACSR	0.4	1	0.4	Commercial	4	59
167	85 Street	Oliver	No. 6	No. 2 ACSR	0.6	1	0.6	Residential	5	89
168	81st Street	Oliver	No. 6	No. 2 ACSR	0.3	1	0.3	Residential	3	44

Table A59.11 cont'd

	Project Name	General Area	Conductor Type Replaced	New Conductor Used	Circuit length (km)	Number of Phases	Conductor Length (km)	Zone	Number of poles	Cost +/- 20% ($000s)
169	77th Street	Oliver	No. 6	No. 2 ACSR	0.1	1	0.1	Residential	1	15
170	109 St/352nd Ave	Oliver	No. 6	No. 2 ACSR	0.1	1	0.1	Residential	1	15
171	380Ave	Oliver	No. 6	No. 2 ACSR	0.2	1	0.2	Residential	2	30
172	Seacrest	Oliver	No. 6	No. 2 ACSR	0.5	1	0.5	Residential	5	74
173	99th St/Hwy 97	Oliver	No. 6	No. 2 ACSR	0.3	1	0.3	Commercial	3	44
174	Kaleden	Kaleden	No. 6	No. 2 ACSR	0.8	1	0.8	Residential	7	118
175	Eastside Rd	OK Falls	No. 6	No. 2 ACSR	0.8	1	0.8	Residential	7	118
176	7th Avenue	Keremeos	No. 6	No. 2 ACSR	0.8	1	0.8	Residential	7	118
177	Finch Cres	Osoyoos	No. 6	No. 2 ACSR	0.3	2	0.6	Residential	3	53
178	26th Ave	Osoyoos	No. 6	No. 2 ACSR	0.3	2	0.6	Residential	3	53
179	91St Along Sawmill	Oliver	No. 6	No. 2 ACSR	1.9	2	3.8	Residential	17	336
180	396 Avenue	Oliver	No. 6	No. 2 ACSR	0.7	2	1.4	Residential	6	124
181	Corey Rd	Keremeos	No. 6	No. 2 ACSR	1	2	2	Residential	9	177
182	107 St (46 to 6 Ave)	Osoyoos	No. 6	No. 3/0	2.3	3	6.9	Residential	21	620
183	Hwy 97/25th Ave	Osoyoos	No. 6	No. 3/0	0.9	3	2.7	Residential	8	243
184	Oleander Drivc	Osoyoos	No. 6	No. 3/0	0.8	3	2.4	Residential	7	216
185	Tamarack drive	Osoyoos	No. 6	No. 3/0	0.6	3	1.8	Residential	5	162
186	81st Street	Oliver	No. 6	No. 3/0	1.6	3	4.8	Residential	14	432
187	Island Road	Oliver	No. 6	No. 3/0	1.6	3	4.8	Residential	14	432
188	384 Avenue	Oliver	No. 6	No. 3/0	3.4	3	10.2	Residential	31	917
189	99th St/Hwy 97	Oliver	No. 6	No. 3/0	0.4	3	1.2	Residential	4	108
190	Willow St	OK Falls	No. 6	No. 3/0	0.5	3	1.5	Residential	5	135

Table A59.11 cont'd

	Project Name	General Area	Conductor Type Replaced	New Conductor Used	Circuit length (km)	Number of Phases	Conductor Length (km)	Zone	Number of poles	Cost +/- 20% ($000s)
191	2nd Ave	Keremeos	No. 6	No. 3/0	0.8	3	2.4	Residential	7	216
192	Capitalized and Direct Overheads									1,948
193	**2011 total**				**66.14**		**134.79**		**618**	**15,804**

Note: differences due to rounding.

Q59.12 Provide area maps for the lines to be replaced from F2011 to program completion highlighting the lines to be replaced.

A59.12 The requested maps are attached as Appendix A59.12.

Q59.13 Provide an explanation as to the cost efficiency methods employed of replacing circuit lengths in the same areas and what methods FortisBC will undertaken to ensure the cost efficiency of this program.

A59.13 FortisBC will review individual projects using both maps and onsite visits to confirm data, then design staff will complete preliminary estimates. These estimates will be done for individual lines as well as for lines that are geographically close together. This will be used to determine if it is cost effective to complete the work all at once or separately in different years. For example: A one kilometre No. 6 copper line in a low sensitive area that feeds one span into school property may be completed all together, in the year scheduled for the school replacement. Estimates done in the design stage will include both scenarios and will be reviewed by the Project Manager to determine the best course of action.

Q60.0 Reference: CCR Replacement Costs
Exhibit No. B-1, pp. 31
Table 4

In Exhibit B-1, p. 27, FortisBC states:

- Legacy copper in 187 "Sensitive Public areas" (see table 4) will be eliminated in the first three years totalling approximately 117 circuit kilometres;

Q60.1 Explain how FortisBC can accomplish 117 km in three years if the replacement in the first two years is only 51 km.

A60.1 FortisBC plans to use the experience gained with respect to this project in 2009 and 2010 to develop the schedule to complete the remaining 66 kilometres of line in 2011. External resources will be utilized if required.

In Exhibit B-1, p. 26, FortisBC states:

- Replacement of 85 percent of all No. 8, No. 6, and No. 90 MCM legacy copper conductors constituting a net replacement of approximately 820 kilometres of copper conductor and approximately 3,900 distribution poles. The remaining 15 percent of the conductor is anticipated to be replaced by normal system growth requirements which will be covered under regular Distribution Growth / Sustaining Projects identified in the Capital Expenditure Plan (CEP) during the life of the project;

and Table 1, Exhibit B-1, page 11:

Table 1
Legacy Copper Conductor Type, Age Profile

Conductor type	Circuit Length	Conductor Length	Age Profile
	(km)		
No. 90 MCM	77	216	> 65 years
No. 8	109	167	> 50 years
No. 6	318	581	≥ 50 years
Subtotal	**504**	**964**	
85 percent of Subtotal	**428**	**819**	

Q60.2 Explain how FortisBC can accomplish 428 km-51 km or 311 km using the remaining project duration of each Plan considering the external labour and internal workforce constraints.

Q60.2.1 Plan 1 is 2018 Completion ten-two or eight years.

A60.2.1 FortisBC plans to use the experience gained with respect to this project in 2009 and 2010 to develop the schedule to complete the remaining 311 kilometres of line in the subsequent eight years. At this time, FortisBC has no reason to expect that the project will not be implemented as planned using either internal or external resources.

Q60.2.2 Plan 2 is 2021 Completion 13-2 or 11 years.

A60.2.2 FortisBC would use the experience gained with respect to this project in 2009 and 2010 to develop the schedule to complete the remaining 311 kilometres of line in the subsequent eleven years. At this time, FortisBC has no reason to expect that the project will not be implemented as planned using either internal or external resources.

Q60.2.3 Plan 3 is 2023 Completion 15-2 or 13 years.

A60.2.3 FortisBC would use the experience gained with respect to this project in 2009 and 2010 to develop the schedule to complete the remaining 311 kilometres of line in the subsequent thirteen years. At this time, FortisBC has no reason to expect that the project will not be implemented as planned using either internal or external resources.

Q60.3 Complete table below showing the planned circuit kilometers to be installed per two year window and update the circuit km, total program cost, NPV and NPV of Customer Rate impact with any changes.

	PLAN 1				PLAN 2				PLAN 3			
	Circuit km	Program Costs	NPV	NPVof Cust. Rate Impact	Circuit km	Program Costs	NPV	NPVof Cust. Rate Impact	Circuit km	Program Costs	NPV	NPVof Cust. Rate Impact
F2009/F2010	51											
F2011/F2012												
F2013/F2014												
F2015/F2016												
F2017/F2018												
F2019/F2020												
F2021/F2022												
F2023												
TOTAL AT COMPLETION												

A60.3 Please see Table A60.3 below. Please note that Table A60.3 does not include 2008 expenditures of $300,000.

Table A60.3

CPCN Schedule	Plan 1				Plan 2				Plan 3			
	Circuit km	Prog. Cost	NPV	NPV of Rate Impact	Circuit km	Prog. Cost	NPV	NPV of Rate Impact	Circuit km	Prog. Cost	NPV	NPV of Rate Impact
		($000s)		%		($000s)		%		($000s)		%
F2009/F2010	51	11,220	10,474	0.03	78	15,131	13,980	0.04	57	12,724	11,793	0.03
F2011/F2012	110	25,811	19,344	0.05	70	16,413	12,181	0.03	57	14,096	10,416	0.03
F2013/F2014	89	21,102	12,669	0.03	62	18,102	10,975	0.03	57	15,864	9,579	0.02
F2015/F2016	89	21,954	10,722	0.03	62	20,375	10,114	0.03	57	17,854	8,818	0.02
F2017/F2018	89	22,854	9,069	0.02	62	22,932	9,325	0.02	57	20,093	8,127	0.02
F2019/F2020					62	25,811	8,616	0.02	57	22,613	7,500	0.02
F2021/F2022					32	14,096	4,062	0.01	57	25,449	6,948	0.0
F2023									29	13,897	3,296	0.01
TOTAL	**428**	**102,941**			**428**	**132,860**			**428**	**142,590**		

Q61.0 Reference: CCR Replacement Costs
Exhibit No. B-2, p. 8
BCUC IR 27.1

FortisBC replies:

Q27.1 As the CCR Project has an overall cost of $102 million over a ten year project schedule, would FortisBC consider this Phase 1 of a multiphase CPCN with Phase 1 being over three years and costing $11.7 million?

A27.1 No. FortisBC is seeking a determination that the CCR Project as a whole is necessary and is in the public interest, and seeks funding only for the 2009/2010 period. Approval of future Project expenditures will be subject to Commission review of expenditures for each period corresponding with FortisBC's Capital Expenditure Plan Applications. Based on the safety impacts described in the Application, the Company believes that it has clearly shown that the entire project is necessary and in the public interest and that a re-establishment of this fact is not required. The Commission has an opportunity with each Capital Plan to examine the forecast expenditures. This approach is similar to the multi-year PCB program approved in the 2005 Capital Plan, for which expenditures are approved in subsequent Capital Plan decisions.

Q61.1 Considering that the entire program may be technically necessary and that the re-establishment of the technical facts may not be required in the future but that the magnitude of the cost of the CPCN and the total program expenditures against an under-defined scope may not be in the ratepayers interest in every circumstance or instance. Please comment on whether or not it would be reasonable and prudent to employ a multi-phase CPCN process for this program considering the level of definition of scope and cost beyond the initial CPCN range of two years.

A61.1 FortisBC does not consider the scope of the Copper Conductor Replacement Program to be under-defined. The CPCN Application contains the required information. The project need, justification, environmental and social impact, as well as considered alternatives are not expected to change, barring unforeseen circumstances, the Project schedule can reasonably be accommodated. The Company is of the opinion that the remaining significant component, Project cost, can be adequately addressed during Capital Expenditure Plan Applications, and that multiple CPCN Applications are unnecessary and may add to the overall program cost for ratepayers.

Q62.0 Reference: CCR Replacement Costs
Exhibit No. B-2, p. 8
BCUC IR 3.2

FortisBC replies:

> **Q3.2 Please provide the business case for the CCR project. If a business case was not prepared, please explain why.**
>
> A3.2 The business case for the project was developed in conjunction with the CPCN application and forms part of the application.

Q62.1 Provide the detailed business cases for the years F2009, F2010 and F2011.

A62.1 Please see BCUC Appendix A47.1.

Q63.0 Reference: CCR Replacement Costs
Exhibit No. B-2, p. 56
BCUC IR 27.1

FortisBC replies:

Q27.1 As the CCR Project has an overall cost of $102 million over a ten year project schedule, would FortisBC consider this Phase 1 of a multiphase CPCN with Phase 1 being over three years and costing $11.7 million?

A27.1 No. FortisBC is seeking a determination that the CCR Project as a whole is necessary and is in the public interest, and seeks funding only for the 2009/2010 period. Approval of future Project expenditures will be subject to Commission review of expenditures for each period corresponding with FortisBC's Capital Expenditure Plan Applications. Based on the safety impacts described in the Application, the Company believes that it has clearly shown that the entire project is necessary and in the public interest and that a re-establishment of this fact is not required. The Commission has an opportunity with each Capital Plan to examine the forecast expenditures. This approach is similar to the multi-year PCB program approved in the 2005 Capital Plan, for which expenditures are approved in subsequent Capital Plan decisions.

Q63.1 Assuming the average cost is about $185,110/km-replaced and Phase 1 is $11.7 million for 51 km-replaced then the remaining 370 km is about $68.49 million for a total of $80.91 million. Provide an explanation for the $103 million (revised) cost.

A63.1 As noted in response to BCUC IR No. 1 Q15.5 the cost per circuit kilometre is an unloaded cost in $2009. Therefore, the $185,110 per kilometre is based on unloaded $2009. The difference between the calculated number provided and $103 million is capital loadings and the related inflation impact.

Q63.2 Provide funding requirements and amounts in the following table format:

CPCN PROPOSED SCHEDULE	PLAN 1	PLAN 2	PLAN 3	NPV	RATE IMPACT (%)	PLAN 1	PLAN 2	PLAN 3	NPV	RATE IMPACT (%)
	REAL DOLLARS (000's)					NOMINAL DOLLARS (000's)				
F2009/F2010										
F2011/F2012										
F2013/F2014										
F2015/F2016										
F2017/F2018										
F2019/F2020										
F2021/F2022										
F2023										
TOTAL										

A63.2 Please see Tables A63.2a and A63.2b below. Please note that in order to show the NPV and Rate Impact of Plans 1, 2 and 3, two separate tables detailing the Plans have been provided expressed in real and nominal dollars respectively.

Table A63.2a
Funding Requirements – Real Dollars

CPCN Schedule	Plan 1			Plan 2			Plan 3		
	Prog. Cost	NPV	NPV of Rate Impact	Prog. Cost	NPV	NPV of Rate Impact	Prog. Cost	NPV	NPV of Rate Impact
	($000s)		(%)	($000s)		(%)	($000s)		(%)
F2009/F2010	11,220	10,474	0.03	15,131	13,980	0.04	12,724	11,793	0.03
F2011/F2012	25,811	19,344	0.05	16,413	12,181	0.03	14,096	10,416	0.03
F2013/F2014	21,102	12,669	0.03	18,102	10,975	0.03	15,864	9,579	0.02
F2015/F2016	21,954	10,722	0.03	20,375	10,114	0.03	17,854	8,818	0.02
F2017/F2018	22,854	9,069	0.02	22,932	9,325	0.02	20,093	8,127	0.02
F2019/F2020				25,811	8,616	0.02	22,613	7,500	0.02
F2021/F2022				14,096	4,062	0.01	25,449	6,948	0.02
F2023							13,897	3,296	0.01
TOTAL	**102,941**			**132,860**			**142,590**		

Note: the difference between the Plan 1 cost of $102.9 million and the $103.2 million in revised Table 7 is the $0.3 million expenditure in 2008.

Table A63.2b
Funding Requirements – Nominal Dollars

CPCN Schedule	Plan 1			Plan 2			Plan 3		
	Prog. Cost	NPV	NPV of Rate Impact	Prog. Cost	NPV	NPV of Rate Impact	Prog. Cost	NPV	NPV of Rate Impact
	($000s)		(%)	($000s)		(%)	($000s)		(%)
F2009/F2010	11,110	10,377	0.03	14,999	13,864	0.04	12,613	11,696	0.03
F2011/F2012	24,616	18,436	0.05	15,413	11,951	0.03	13,412	9,903	0.03
F2013/F2014	19,302	11,548	0.03	16,555	10,013	0.03	14,508	8,736	0.02
F2015/F2016	19,302	9,359	0.02	17,910	8,849	0.02	15,694	7,709	0.02
F2017/F2018	19,312	7,570	0.02	19,375	7,820	0.02	16,976	6,809	0.02
F2019/F2020				20,960	6,925	0.02	18,363	6,018	0.02
F2021/F2022				11,114	3,161	0.01	19,864	5,343	0.01
F2023							10,532	2,458	0.01
TOTAL	**93,642**			**116,326**			**121,962**		

Q64.0 Reference: CCR Replacement Costs
Exhibit B-2, pp. 11-15
BCUC IR 5.1

Q64.1 For the F2009/F2010 scope identified in Table A5.1, please complete the project estimate of cost table below and provide updated cost to match all information in the Application and responses to the information requests.

Item	F2009	F2010	Total	Percentage of Total Project Budget
Studies				
Direct Costs per attached scope: Labour Material				
Indirect Costs				
Corporate Overhead Costs				
Engineering				
Project Management Costs				
Project Support Costs				
AFUDC				
Salvage Costs				
Traffic Control				
On-Site Generation				

Item	F2009	F2010	Total	Percentage of Total Project Budget
Total Costs				
Escalation (includes Inflation)				
Performance Measurement Baseline ("PMB")				
Management or Project Reserves				
Total Allocated Budget				
Other Non-Contract Costs				
Legal				
Land Acquisition, Rights of Way, Anchors.				
First Nation Consultation & Accommodation				
Regulatory Cost – BCUC				
Contingency				
Total Project Budget				
Accuracy of Estimate				

1. List all assumptions and exclusions.
2. Provide a cashflow spreadsheet using the rows in the table above.
3. Provide a contingency analysis.
4. Provide any estimating benchmark data.

A64.1 FortisBC does not use Earned Value Methodology for project management however the requested table is provided below.

Please note:

- Escalation at 7 percent;
- There are no exclusions;
- The table is attached as an electronic spreadsheet titled BCUC Table A64.1.;
- Contingency is estimated at 13.6 percent of unloaded project cost (excluding salvage and public consultation); and
- The Company does not have any benchmark data for the Project.

Table A64.1
Project Cost Estimate

Item	F2009	F2010 in ($2009)	Total in ($2009)	Percentage of Total Project Budget
Escalation factor	0	1.07		
Studies	0	0	0	0
Direct Costs per attached scope:				
Labour	1,523	1,980	3,503	31%
Material	1,028	1,336	2,364	21%
Indirect Costs	0	0	0	0%
Corporate Overhead Costs	689	897	1,586	14%
Engineering	114	149	263	2%
Project Management Costs	114	149	263	2%
Project Support Costs (included in Engineering)	0	0	0	0%
AFUDC	0	0	0	0%
Salvage Costs	226	294	520	5%
Traffic Control	49	64	113	1%
On-Site Generation	212	276	488	4%
Total Costs	3,955	5,145	9,100	80%
Escalation (includes Inflation)	0	370	370	3%
Performance Measurement Baseline (“PMB”)	3,955	5,515	9,470	83%
Management or Project Reserves	0	0	0	0%
Total Allocated Budget	3,955	5,515	9,470	83%
Other Non-Contract Costs	0	0	0	0%
Legal	0	0	0	0%
Land Acquisition, Rights of Way, Anchors.	310	403	713	6%
First Nation Consultation & Accommodation	0	0	0	0%

Table A64.1 cont'd

Item	F2009	F2010 in ($2009)	Total in ($2009)	Percentage of Total Project Budget
Regulatory Cost – BCUC (Public Consultation)	75	75	150	1%
Contingency	456	592	1,048	9%
Total Project Budget	4,796	6,585	11,380	100%
Accuracy of Estimate	+/- 20%	+/- 20%	+/- 20%	

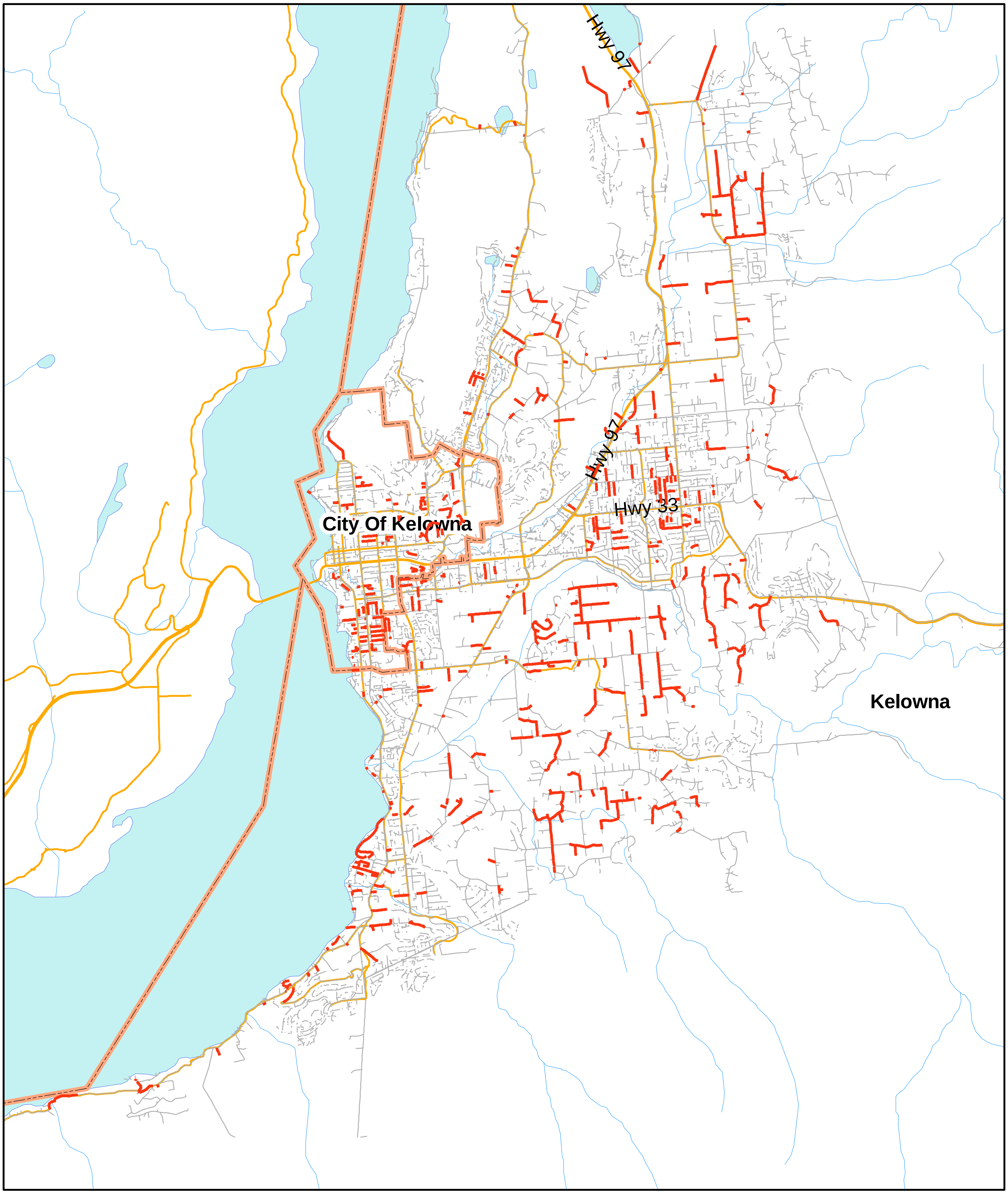
Note: Differences due to rounding.

Q65.0 Reference: CCR Spreadsheets

Q65.1 Provide fully functioning, unprotected excel spreadsheets for all tables.

A65.1 As requested, unprotected electronic copies in Excel format have been attached.

#6 Copper Conductor in the Kelowna Area



Legend

Collector or Arterial Road	Primary Overhead Conductor
Freeway, Expressway or Highway	#6 Copper Overhead Conductor
FortisBC Service Areas	Primary Underground Conductor

N

0 0.5 1 2 3 4 5
Kilometers

Created September 2, 2008
by the FortisBC Corporate Mapping Group

2008-09 Capital Expenditure Justification Document

Project Name: Copper Conductor replacement program

Project Number: 11031341

Project Cost: $4.8 Million/$6.9 Million
Project Classification: DS

Project Description:

The Copper Conductor Replacement (CCR) Project is required to address safety concerns and incidents that are the result of distribution copper conductor failures. The project is necessary to ensure a safe and reliable electrical distribution system that minimizes public and employee safety concerns while protecting plant and equipment.

The project consists of:

- replacement of all No. 8, No. 6 and 90 MCM Copper Distribution Conductors with Aluminum Conductor Steel Reinforced (ACSR) Conductor;
- assessment of poles for age and safety and replacement subject to the assessment result;
- updates to GIS (Geographic Information Systems) Database;
- standardization as per FortisBC existing standards for distribution lines; and
- disposal of the replaced copper conductors through sale.

Key Drivers: (Employee Safety, Public Safety, Customer Service, Reliability, Capacity, etc…)
Safety

Background:

Electrical distribution systems are usually designed with an economic life of 40 to 50 years, however within the FortisBC service area there are distribution systems with 70 year old poles supporting No. 6, No. 8 and No. 90 MCM (legacy) copper conductors installed in the 1930s that are still in service today. With the historically low customer growth rates in many of these areas and communities, the wholesale replacement of old lines with new ones having lower losses could not be justified on a purely economic basis. Of the various asset classes, conductor is one of the most expensive to replace. The result of not re-conductoring can be a tensile failure during emergency (heavy) loading or during adverse weather conditions. Unfortunately such local failures are not always a motivator to reconductor the whole section of the line due to the economic reasons cited above. Consequently as noted, many lines which were designed and commissioned well over 50 years ago are still in operation today.

Over the past five years, there have been approximately 350 incidents of distribution conductor failure of which approximately 200 or 57 percent involved legacy copper even though the legacy copper comprises only 10 percent of all conductor in service. FortisBC records show that between August 2004 and April 2008 there were 12 incidents where downed copper conductor remained energized on the ground, creating a public and employee electrocution risk and a fire hazard. Although the incidents have been isolated, a study of the situation was deemed necessary to determine the cause of such failures, and to initiate remedial action to prevent as far as practicable, similar incidents in the future. The assessment indicated that the root cause of these failures was primarily metal fatigue of old No. 6, No. 8 and No. 90 MCM copper conductors and conductor failure at tap-off connector points where connectors are directly applied on the main conductor without an accompanying stirrup.

An independent analysis commissioned by FortisBC and conducted by PowerTech Labs Inc., determined that the legacy copper conductors tested showed annealing and mechanical property values below specified requirements and that additional failures can be expected (See Appendix A). The report summary indicated that:

> *"The analysis showed annealing (softening) of the copper conductor leading to ductile overload failure under normal operating stresses. Annealing of the copper conductor is occurring due to elevated service temperatures from high contact resistance within the connections. Over time, the elevated service temperature caused recrystallization and grain growth in the copper microstructure, leading to a reduction in the tensile properties."*

It also states that:

> *"A material properties assessment was preformed on randomly selected samples of various sizes of copper conductor, both solid and stranded, used in the system outside of hardware connections. The conductor sizes tested showed mechanical property values below specified requirements for hard drawn copper wire by ASTM B1 "Standard Specification for Hard-Drawn Copper Wire".*

Other Canadian utilities including BC Hydro, Fortis Alberta and Newfoundland Power have replaced legacy copper conductor distribution lines to accommodate load growth and to improve public and employee safety as well as service reliability.

FortisBC, like other utilities must maintain its equipment and provide a safe environment for employees and the general public. This involves the replacement of deteriorated and unsafe plant even when the economic choice might suggest otherwise. There is no method to maintain bare overhead conductors and consequently they should be replaced if deemed inadequate and vulnerable. Unsafe lines compromise the safety and security of both employees and the general public.

The primary driver for this project is safety; however, the project will also result in other benefits, namely:

- improved reliability;
- reduced electrical loss savings;
- enhanced distribution network capacity;
- reductions in urgent capital repair cost; and
- reduction in future expenditures for the Distribution Rehabilitation and Rebuild programs.

Options Considered:

FortisBC evaluated three implementation plans involving 10 year, 13 year and 15 year schedules. The Company proposes the 10 year implementation plan for the following reasons:

- it ensures fastest elimination of the hazardous legacy copper conductors from the 187 sensitive public locations;
- it ensures fastest overall elimination of legacy copper conductor from the system; and
- it has the lowest NPV and the lowest rate impact.

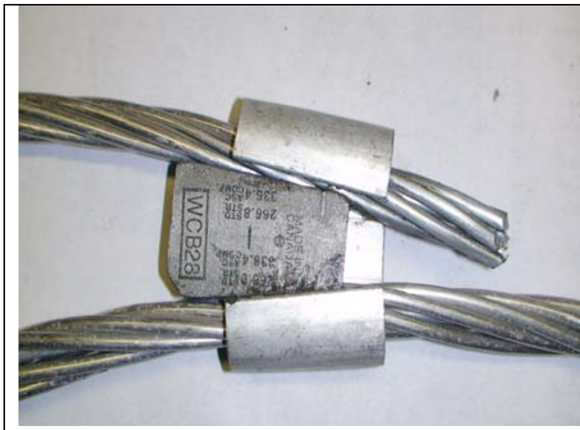
Financial Analysis/Assumptions Used

The project is expected to start in the first quarter of 2009 and be completed by the fourth quarter of 2018, with estimated capital expenditures of approximately $102 million, including the cost of removals, over the ten year life of the project. The net present value (NPV) of the Project is estimated at approximately $59 million with an estimated NPV of Customer Rate Impact at 0.15 percent.

Risks

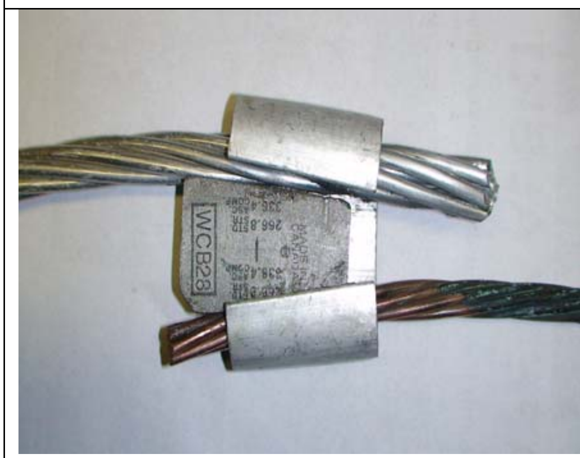
Do nothing option will put both the public and FBC employee at risk. To follow the best utility practices and mitigate power outages, safety risk. Customers are not expecting unreliable and unsafe power delivery from utility

Conductor Connection Procedure.



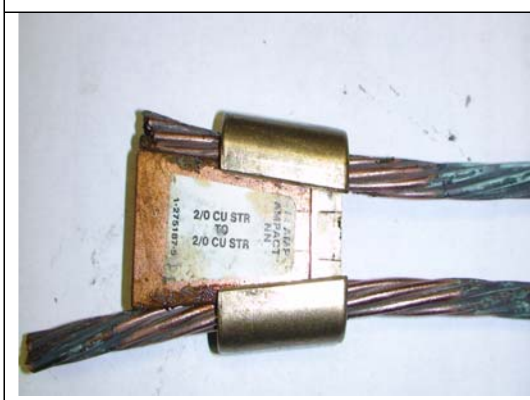
Aluminum to Aluminum

- **Modern aluminum connectors both SQUEEZE ON and WEDGE TYPE are designed for aluminum and bimetal connections.**
- **Ensure the conductor range of the connector being used, matches the size of conductors to be connected.**
- **Cable must be thoroughly brushed and cleaned.**
- **Inhibitor if not included in the connector must be used.**



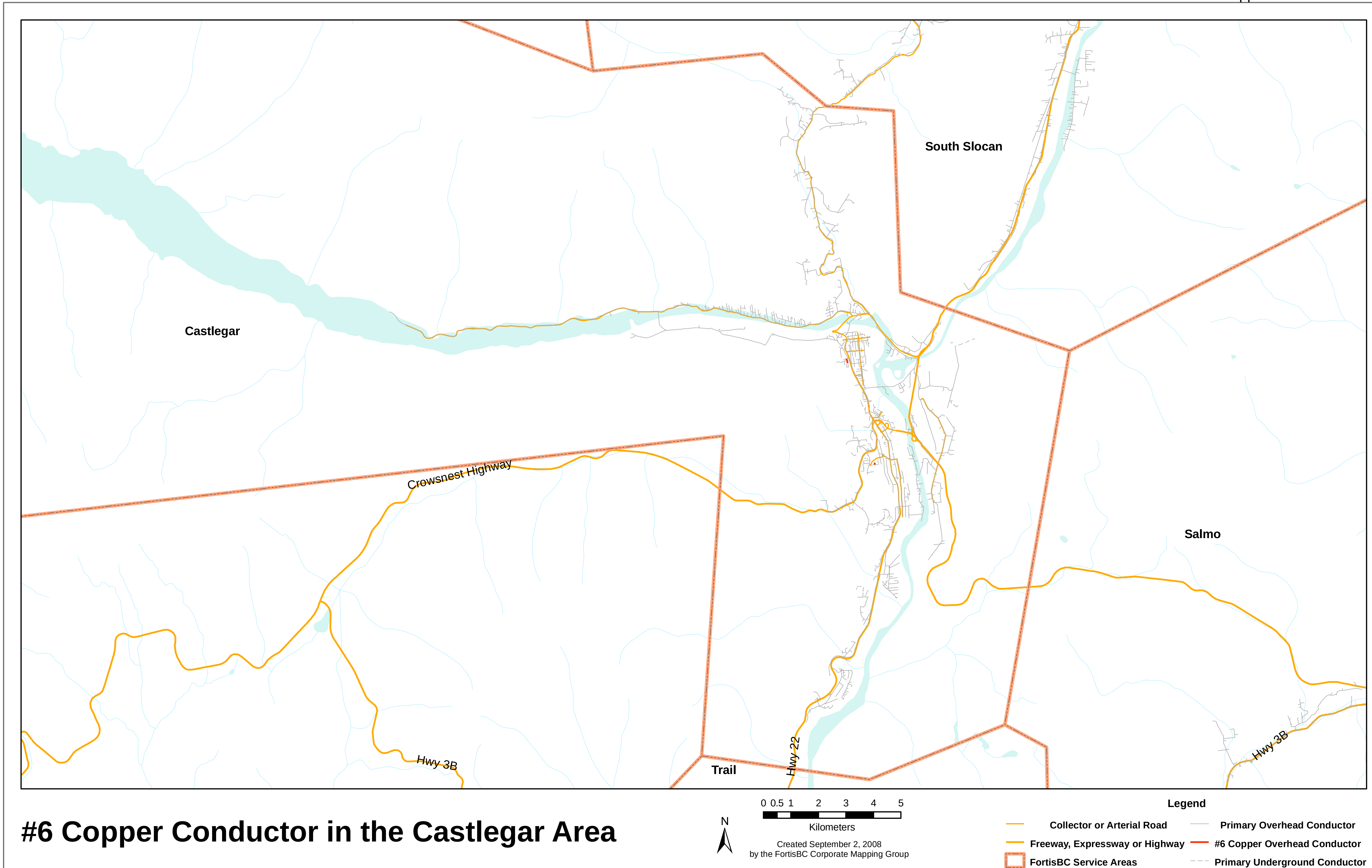
Aluminum to Copper

- **If making a bimetal connection, cable preparation is extremely important.**
- **Cable must be thoroughly brushed and cleaned.**
- **Inhibitor if not included in the connector must be used.**
- **To minimize galvanic corrosion, the copper conductor must be placed below the aluminum conductor.**
- **If connecting copper conductor with a hemp core, the core must be removed and replaced with a #8 solid copper filler.**



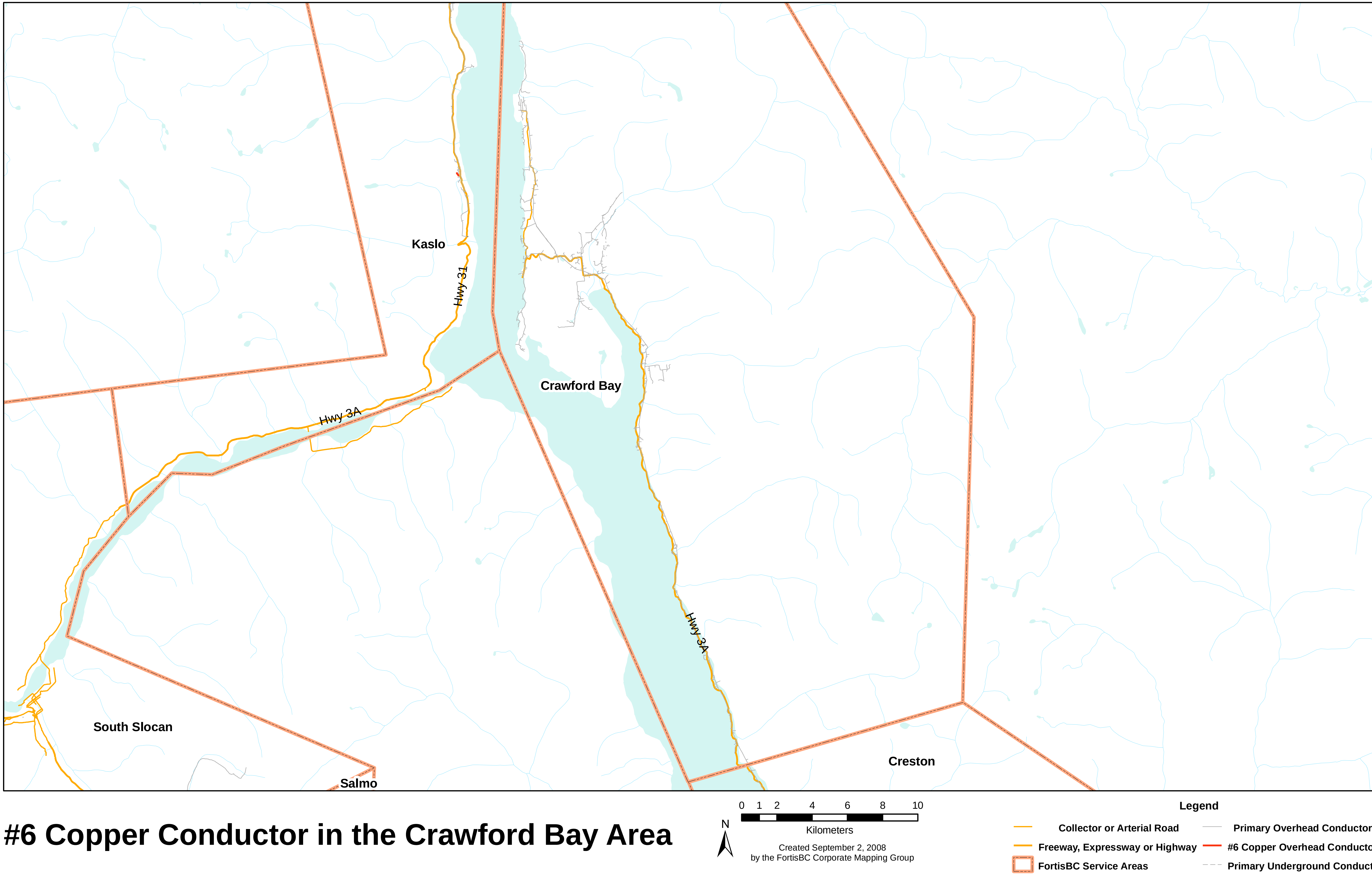
Copper to Copper

- **Ensure the conductor range of the connector being used, matches the size of conductors to be connected.**
- **In an emergency an aluminum connector may be used to connect two copper conductors.**
- **Cable must be thoroughly brushed and cleaned.**
- **Inhibitor if not included in the connector must be used.**
- **If connecting copper conductor with a hemp core, the core must be removed and replaced with a #8 solid copper filler.**



#6 Copper Conductor in the Castlegar Area

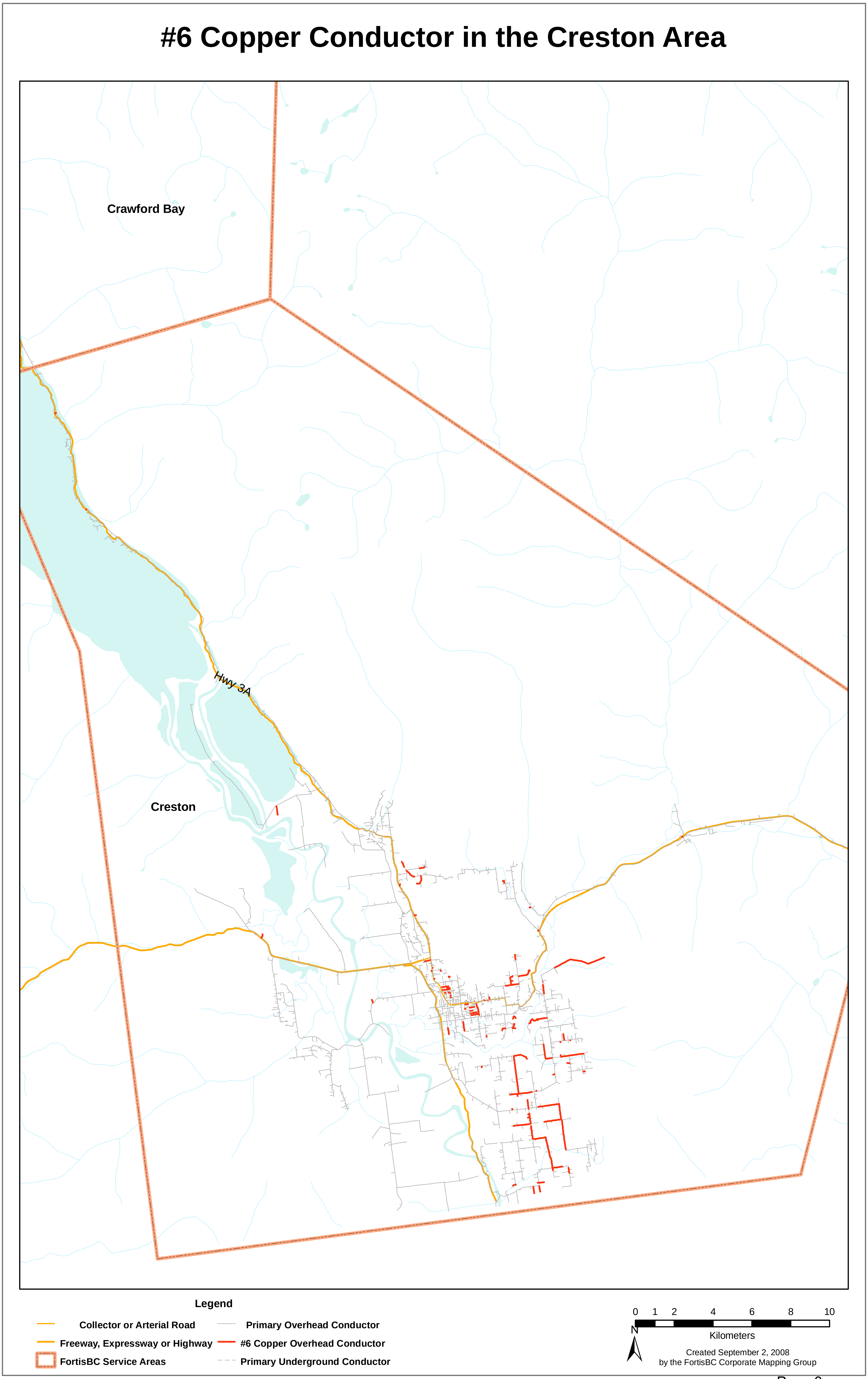
Created September 2, 2008
by the FortisBC Corporate Mapping Group

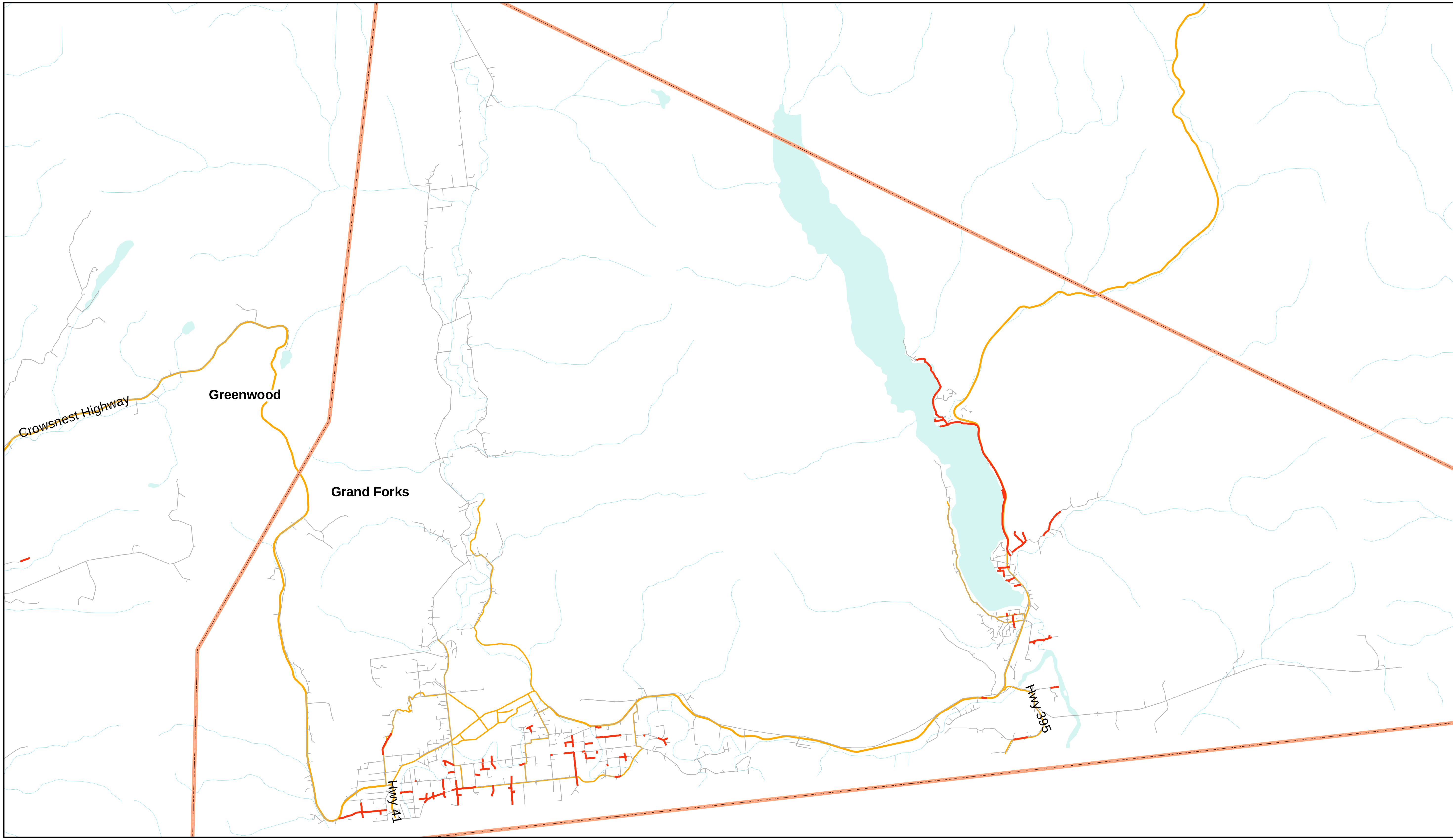


#6 Copper Conductor in the Crawford Bay Area

Created September 2, 2008
by the FortisBC Corporate Mapping Group

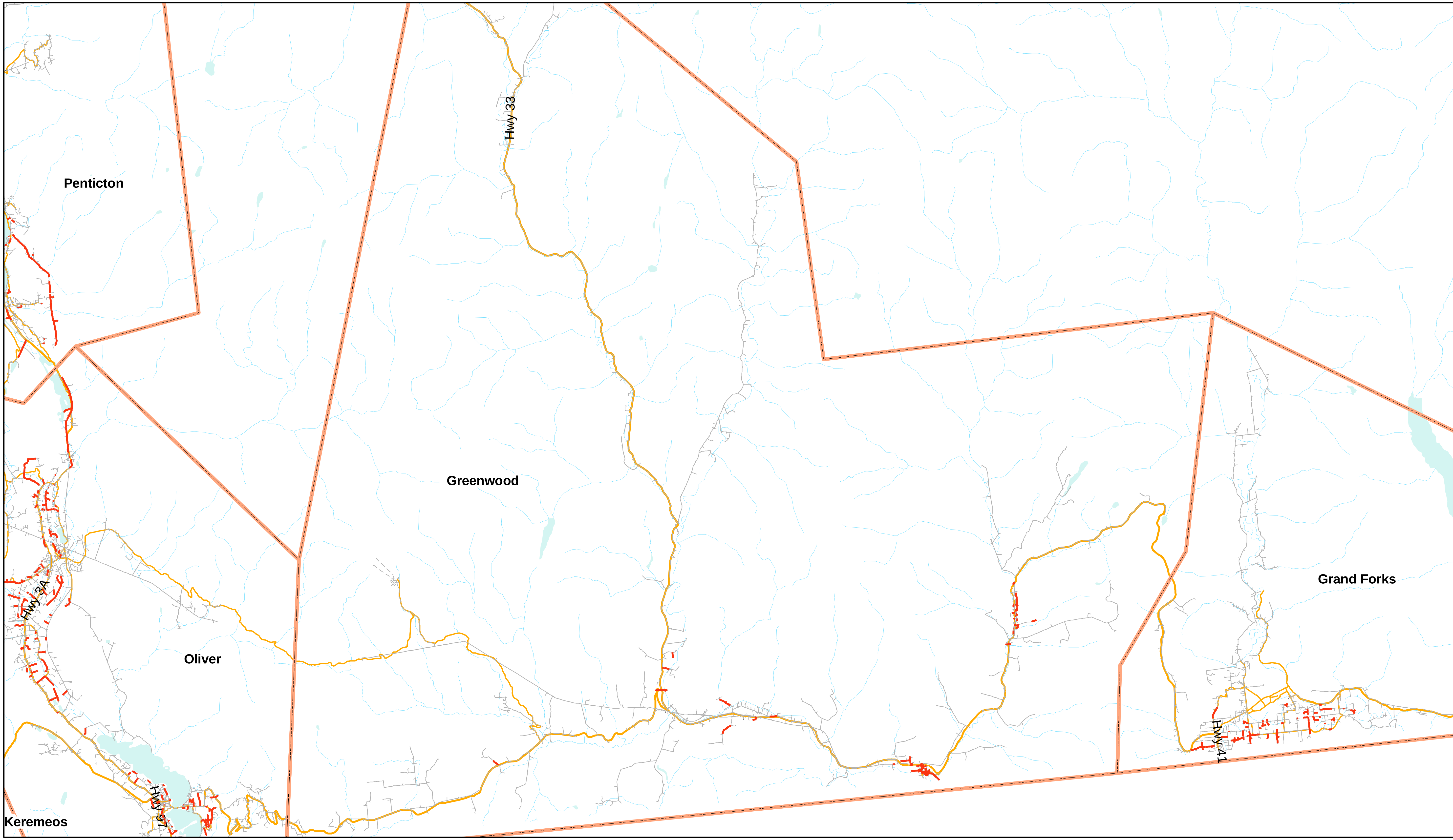
#6 Copper Conductor in the Creston Area





#6 Copper Conductor in the Grand Forks Area

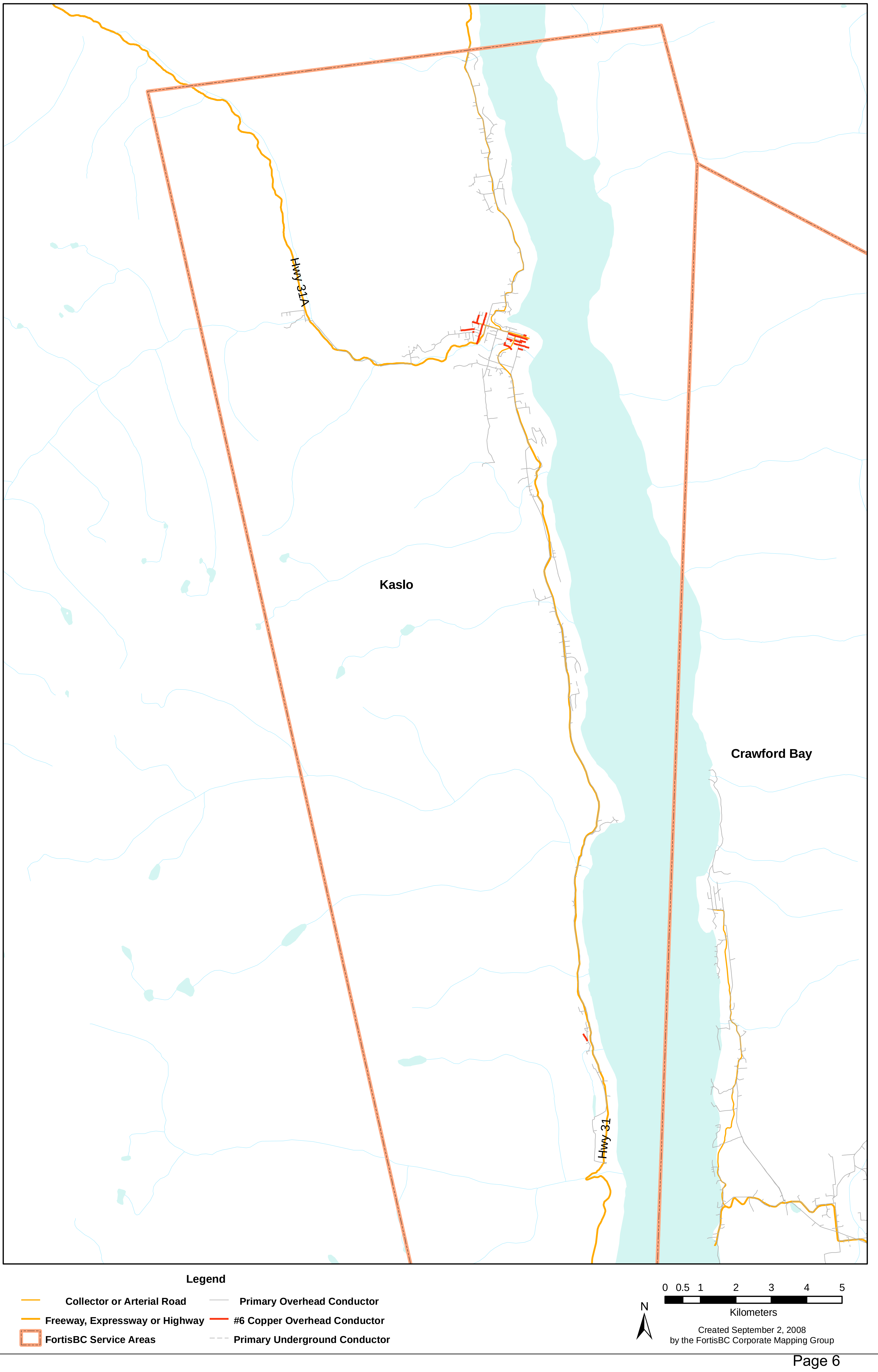
Created September 2, 2008
by the FortisBC Corporate Mapping Group

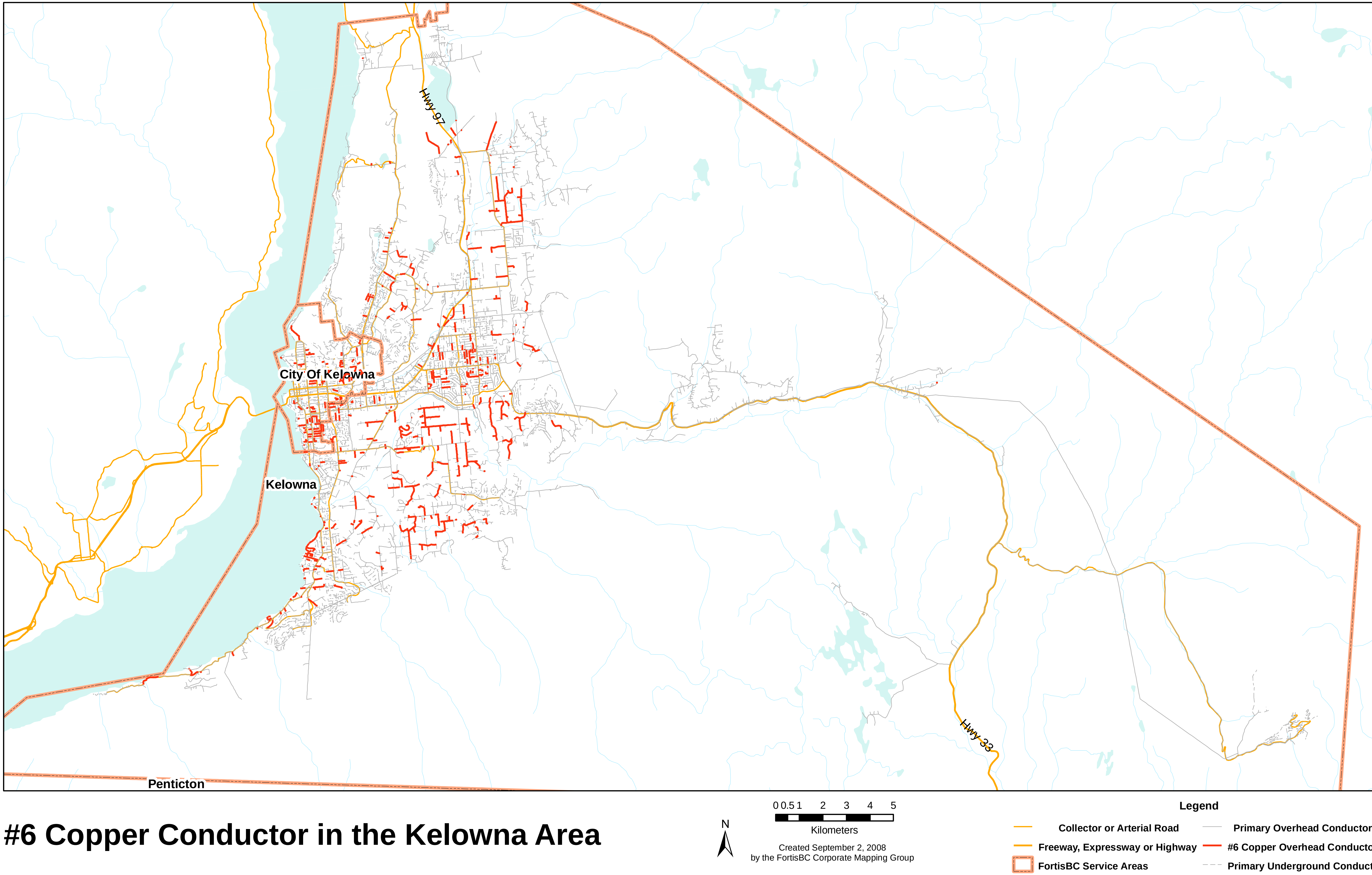


#6 Copper Conductor in the Greenwood Area

Created September 2, 2008
by the FortisBC Corporate Mapping Group

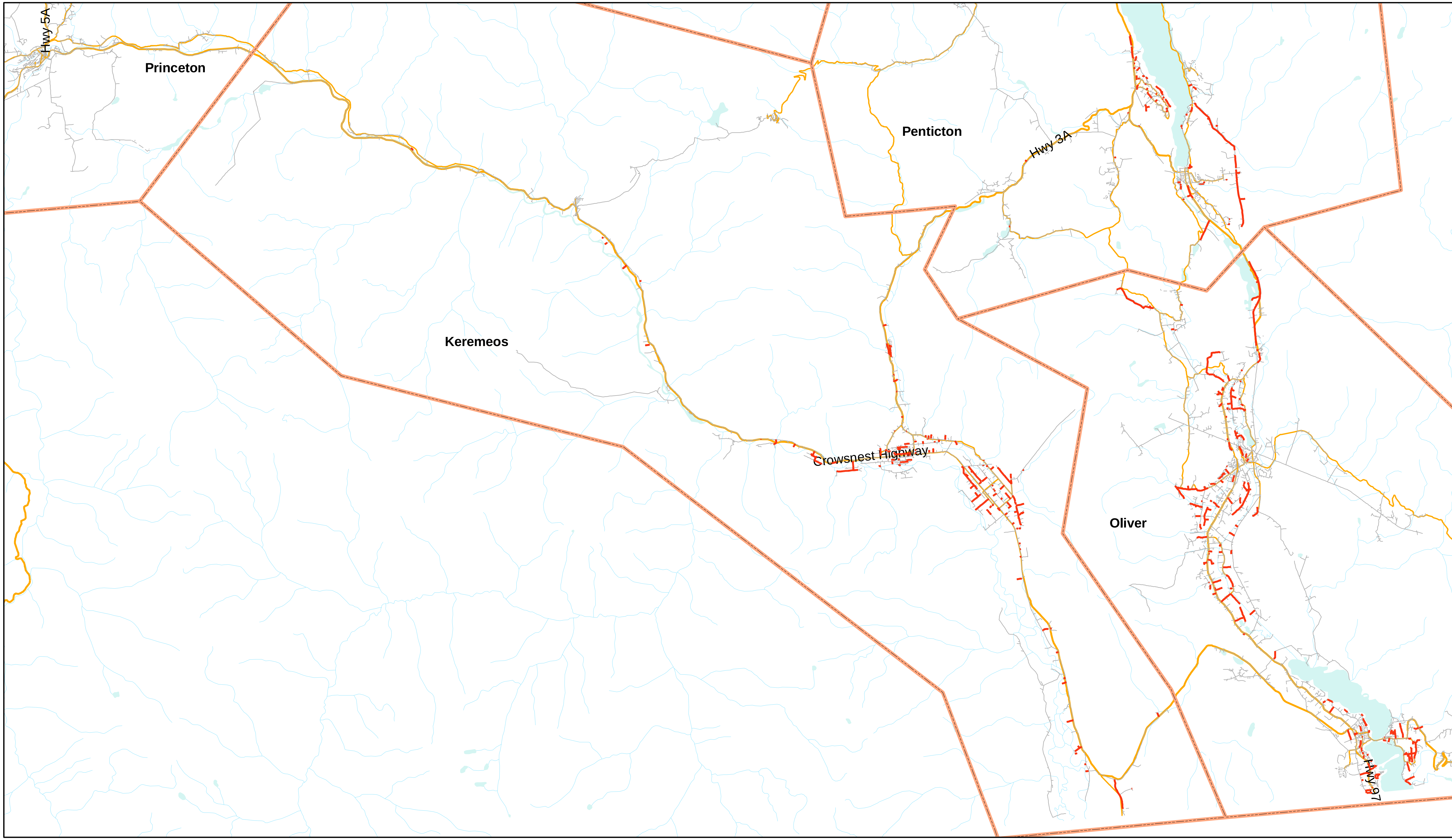
#6 Copper Conductor in the Kaslo Area





#6 Copper Conductor in the Kelowna Area

Created September 2, 2008
by the FortisBC Corporate Mapping Group



#6 Copper Conductor in the Keremeos Area

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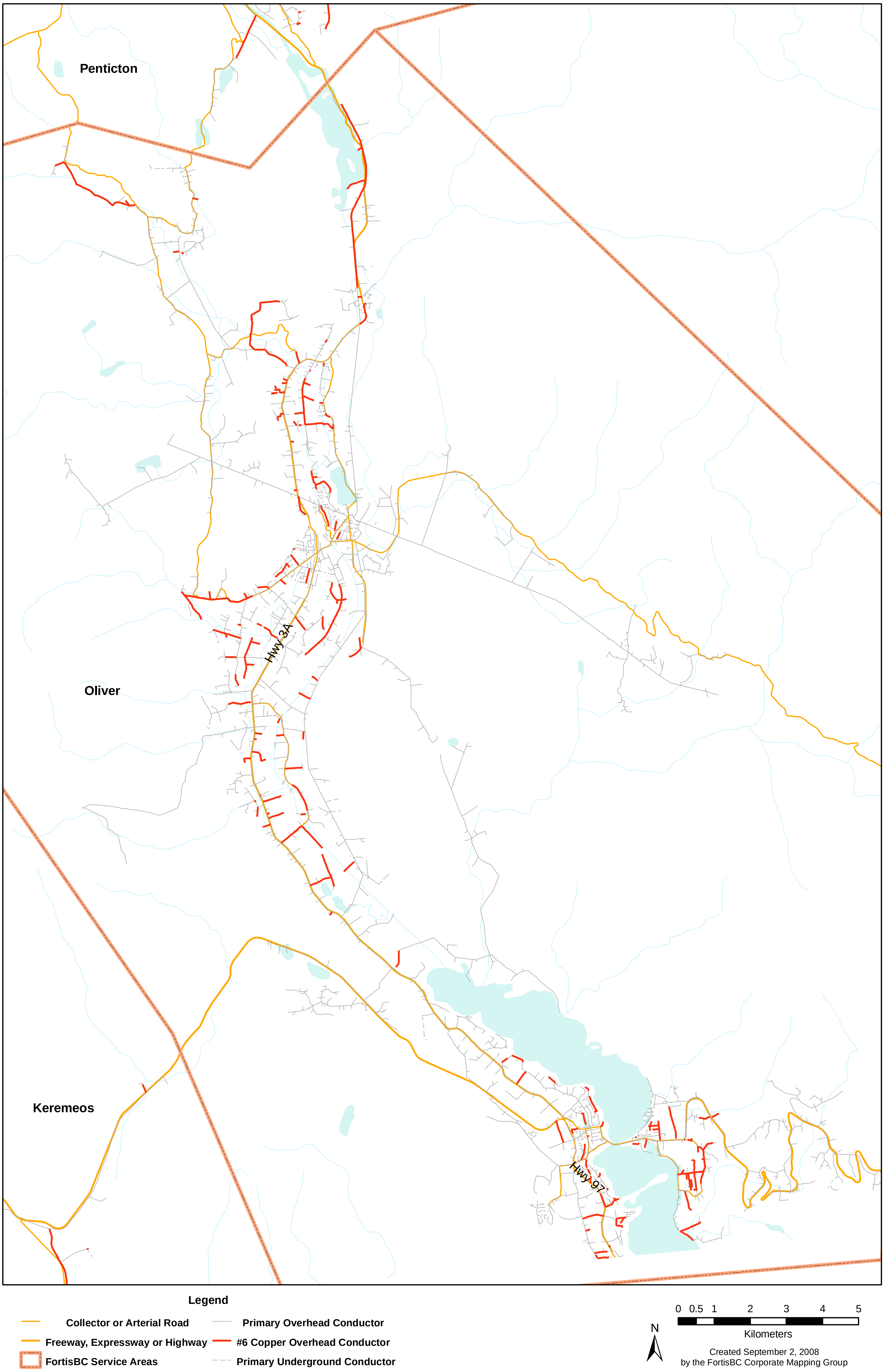
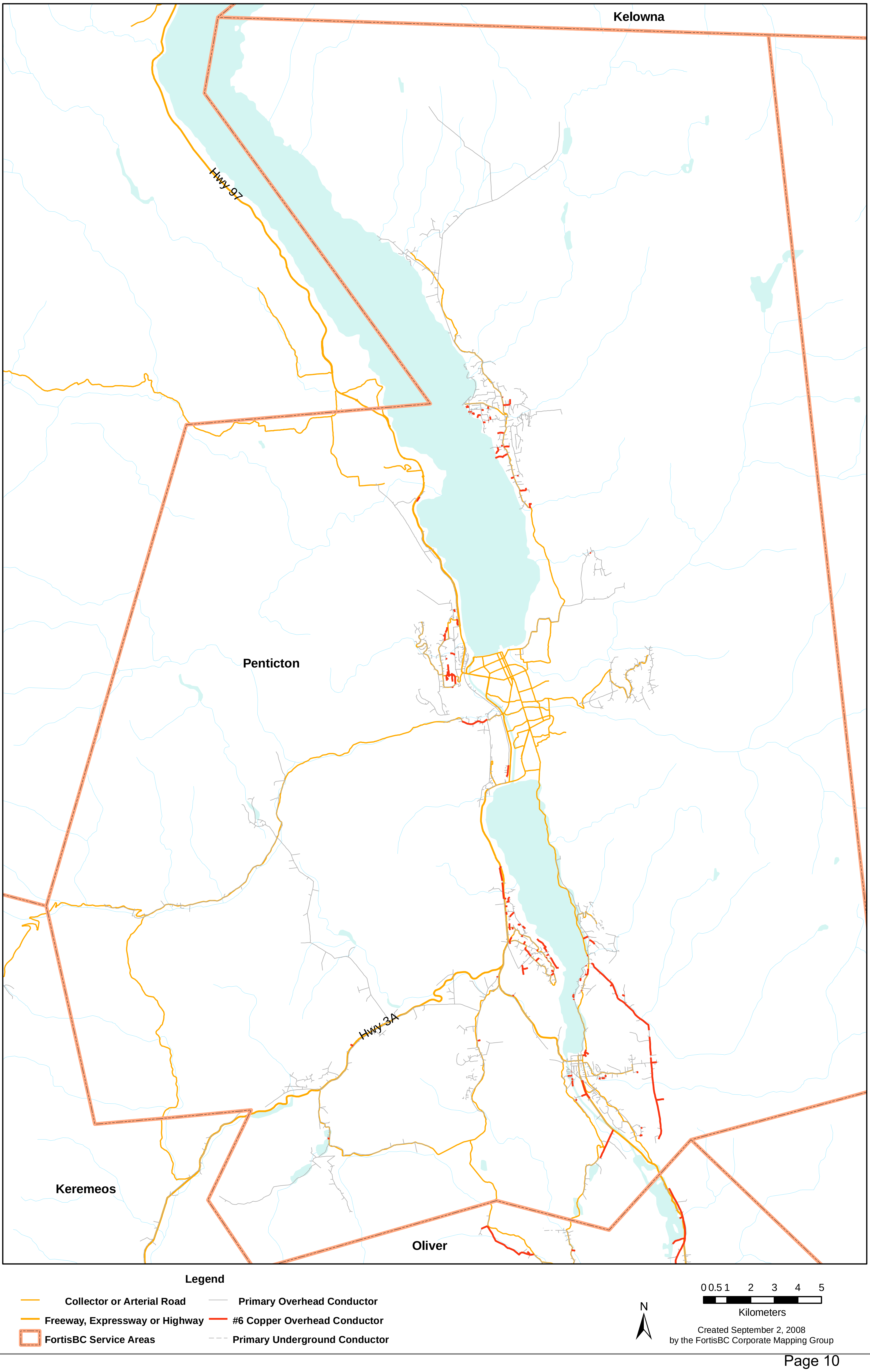
Legend

- Collector or Arterial Road
- Freeway, Expressway or Highway
- FortisBC Service Areas
- Primary Overhead Conductor
- #6 Copper Overhead Conductor
- Primary Underground Conductor

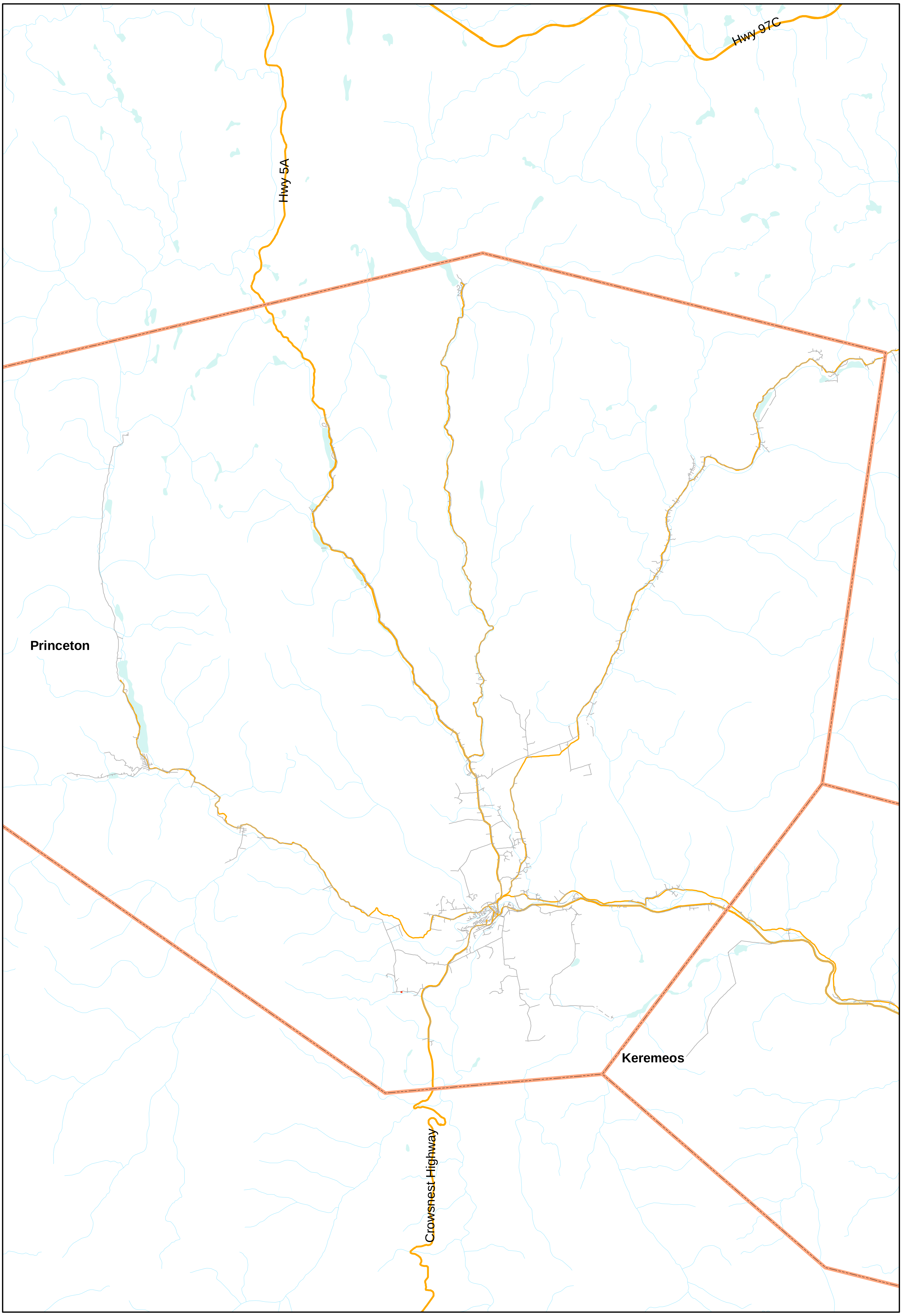
#6 Copper Conductor in the Oliver Area



#6 Copper Conductor in the Penticton Area



#6 Copper Conductor in the Princeton Area



Legend

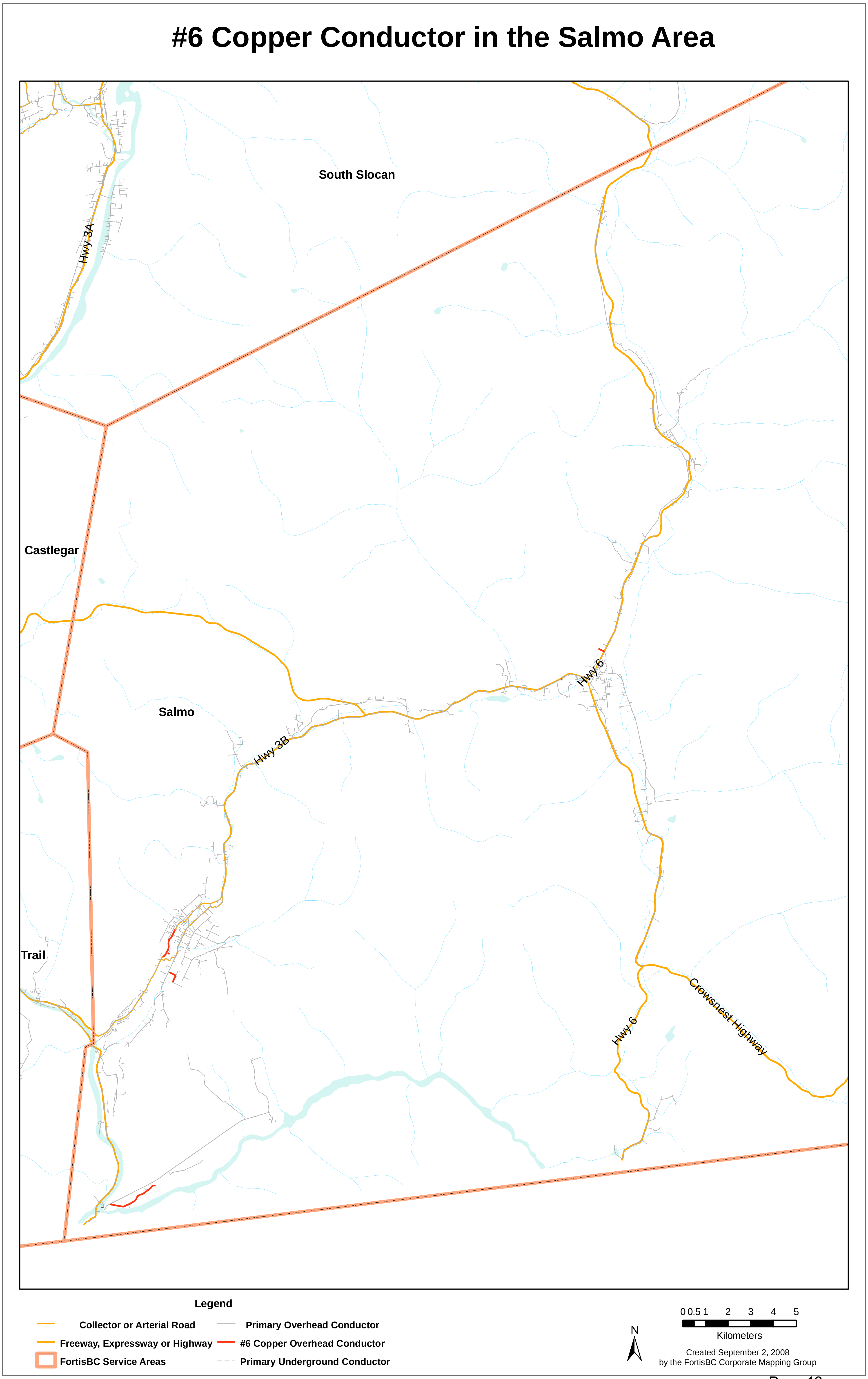
Collector or Arterial Road
Freeway, Expressway or Highway
FortisBC Service Areas
Primary Overhead Conductor
#6 Copper Overhead Conductor
Primary Underground Conductor

N

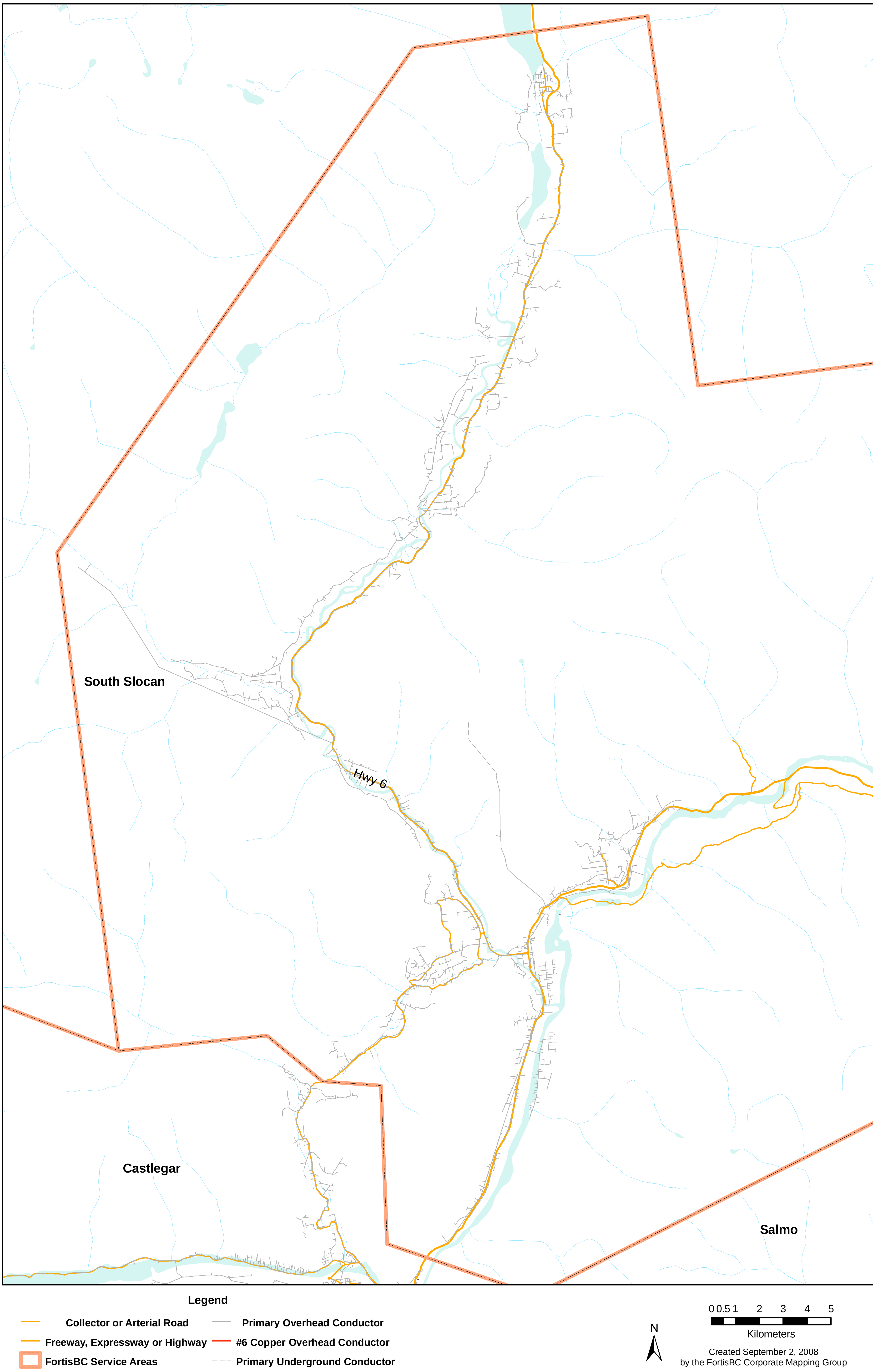
0 0.5 1 2 3 4 5
Kilometers

Created September 2, 2008
by the FortisBC Corporate Mapping Group

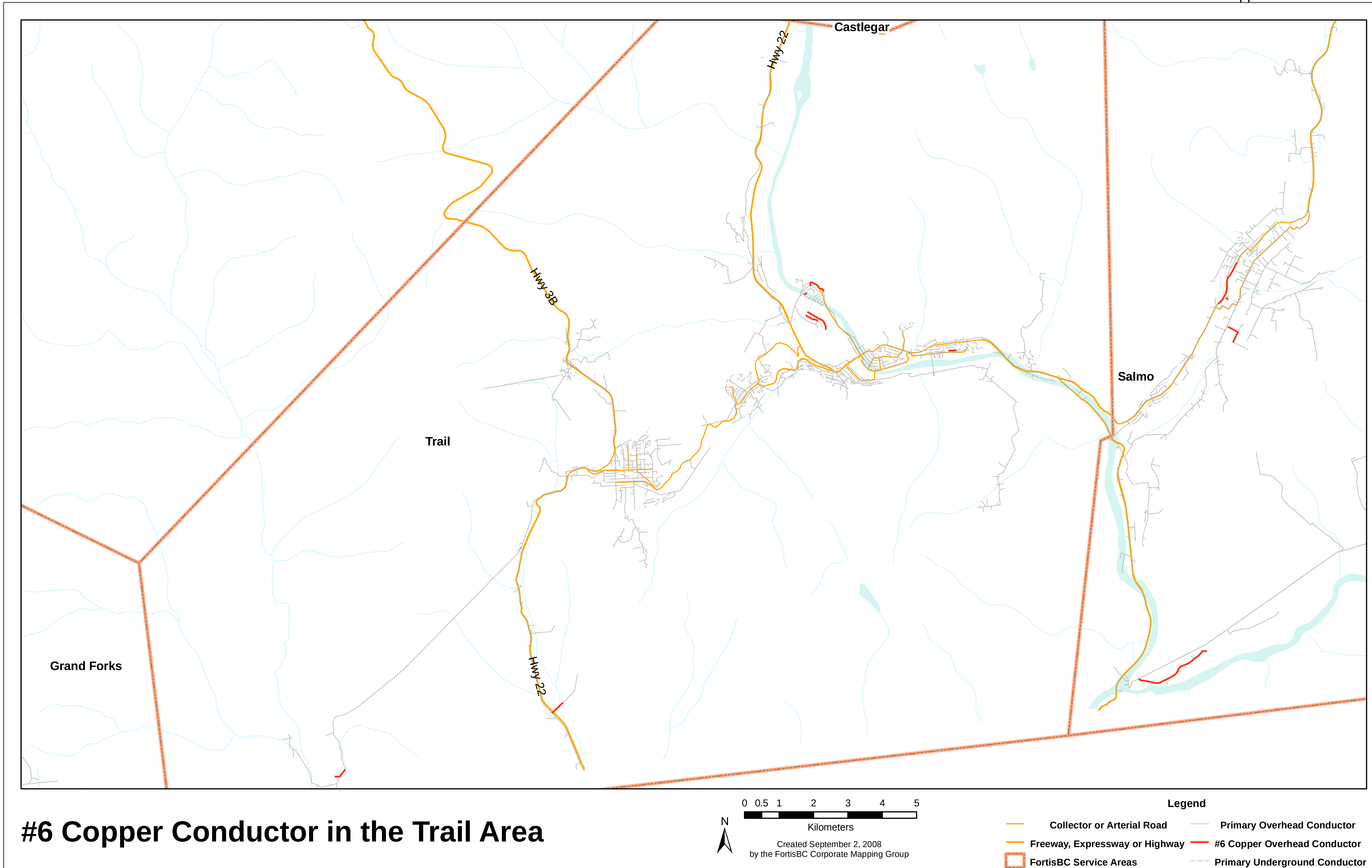
#6 Copper Conductor in the Salmo Area



#6 Copper Conductor in the South Slocan Area

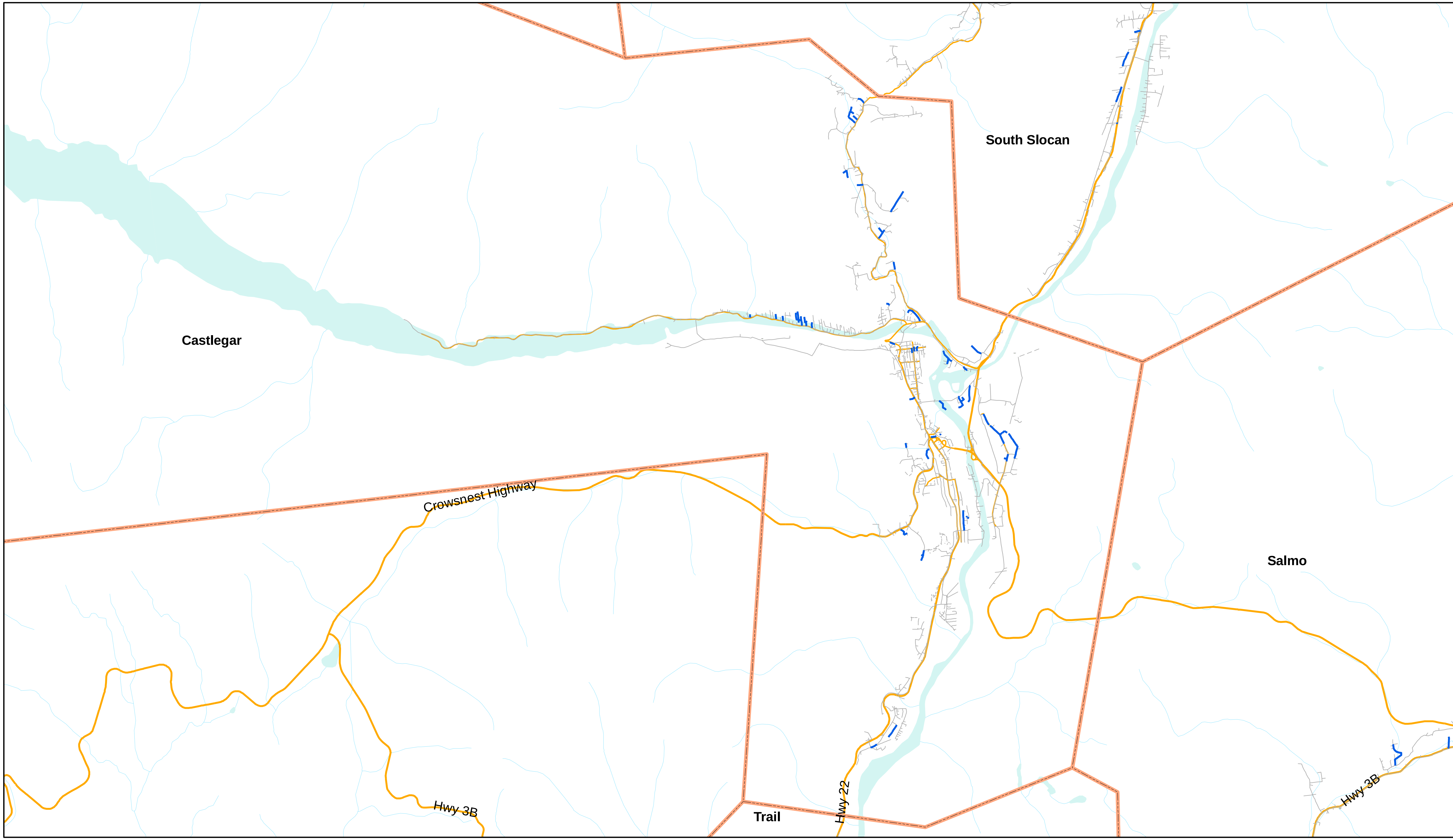


Created September 2, 2008
by the FortisBC Corporate Mapping Group



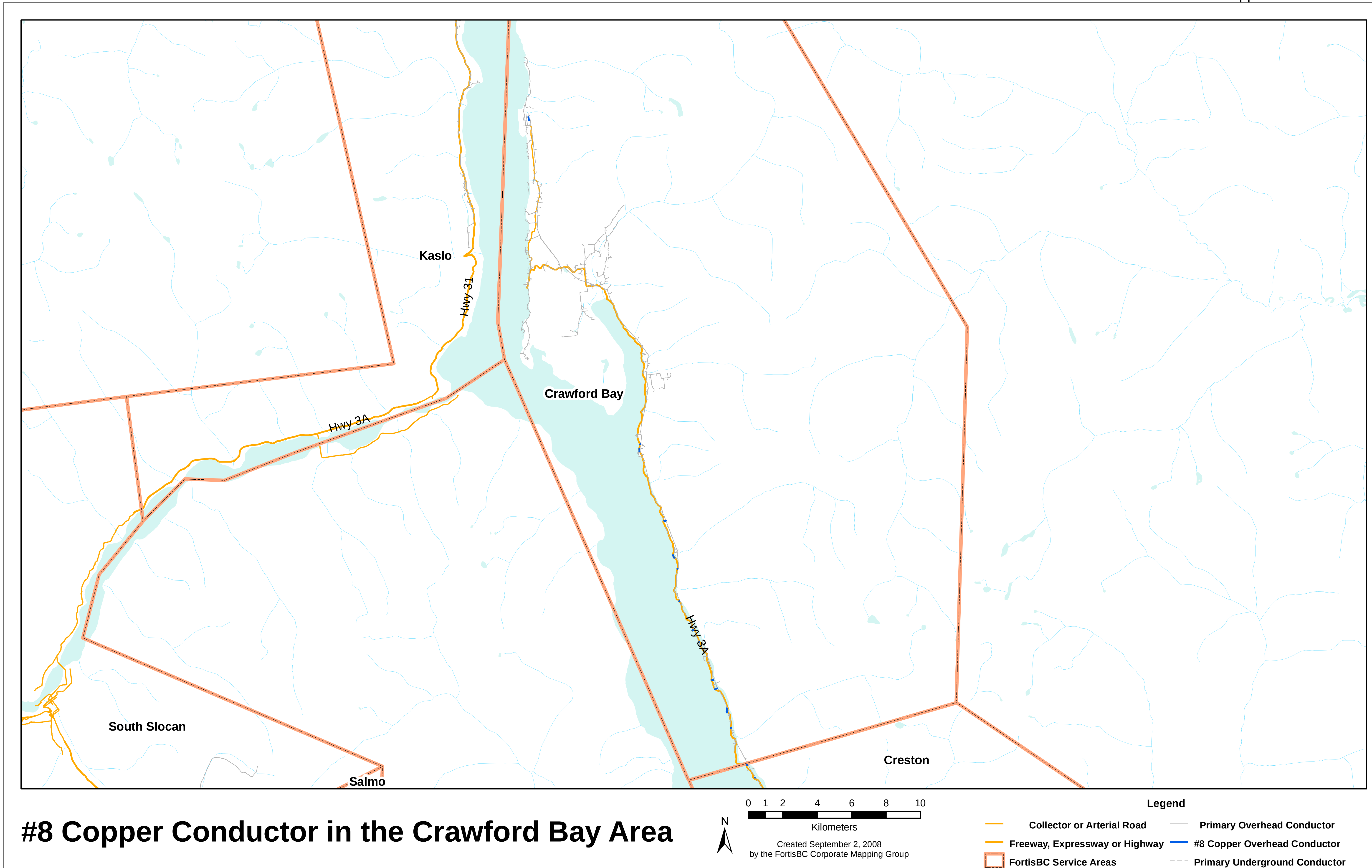
#6 Copper Conductor in the Trail Area

Created September 2, 2008
by the FortisBC Corporate Mapping Group



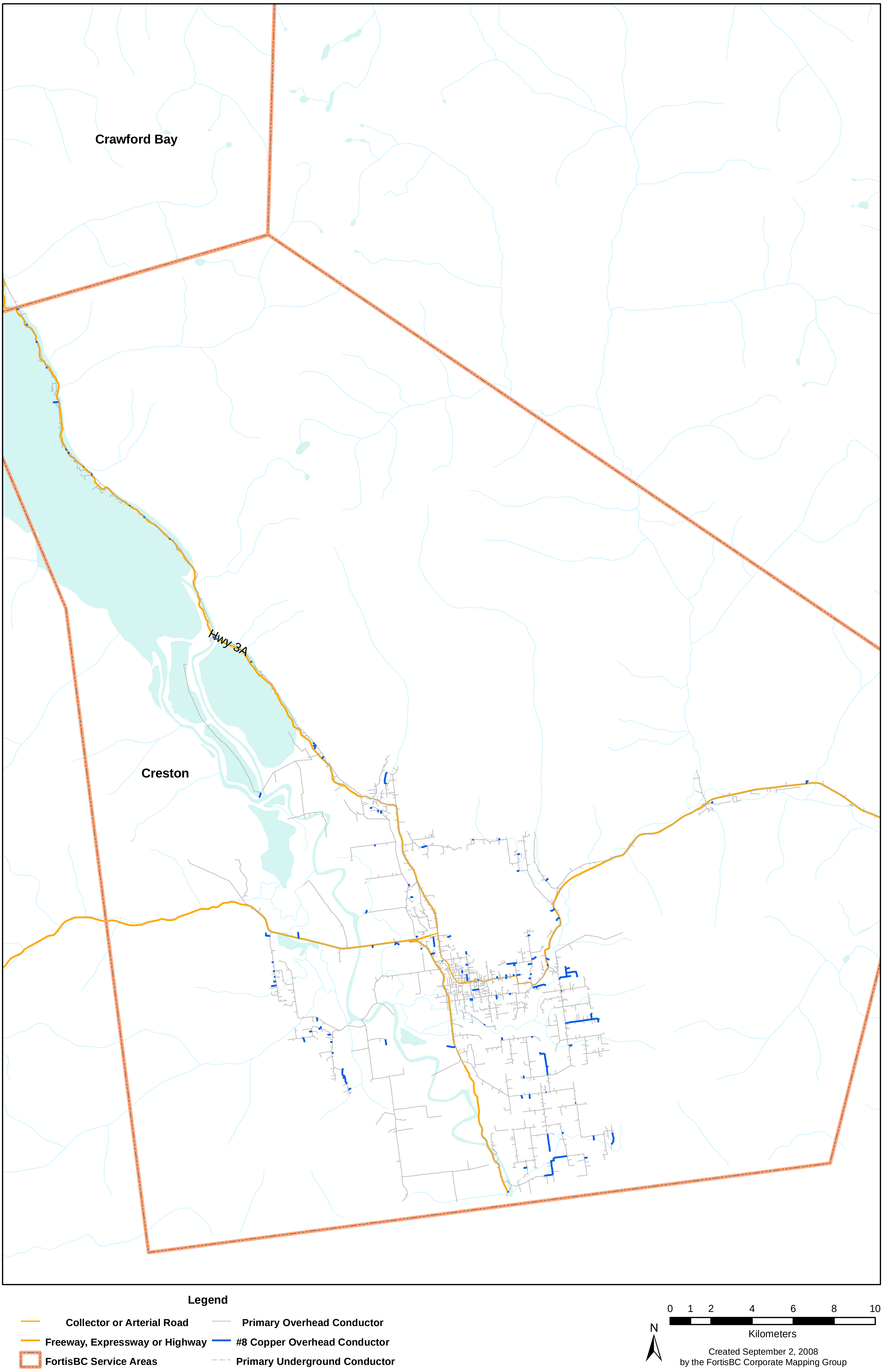
#8 Copper Conductor in the Castlegar Area

Created September 2, 2008
by the FortisBC Corporate Mapping Group



#8 Copper Conductor in the Crawford Bay Area

#8 Copper Conductor in the Creston Area



Created September 2, 2008
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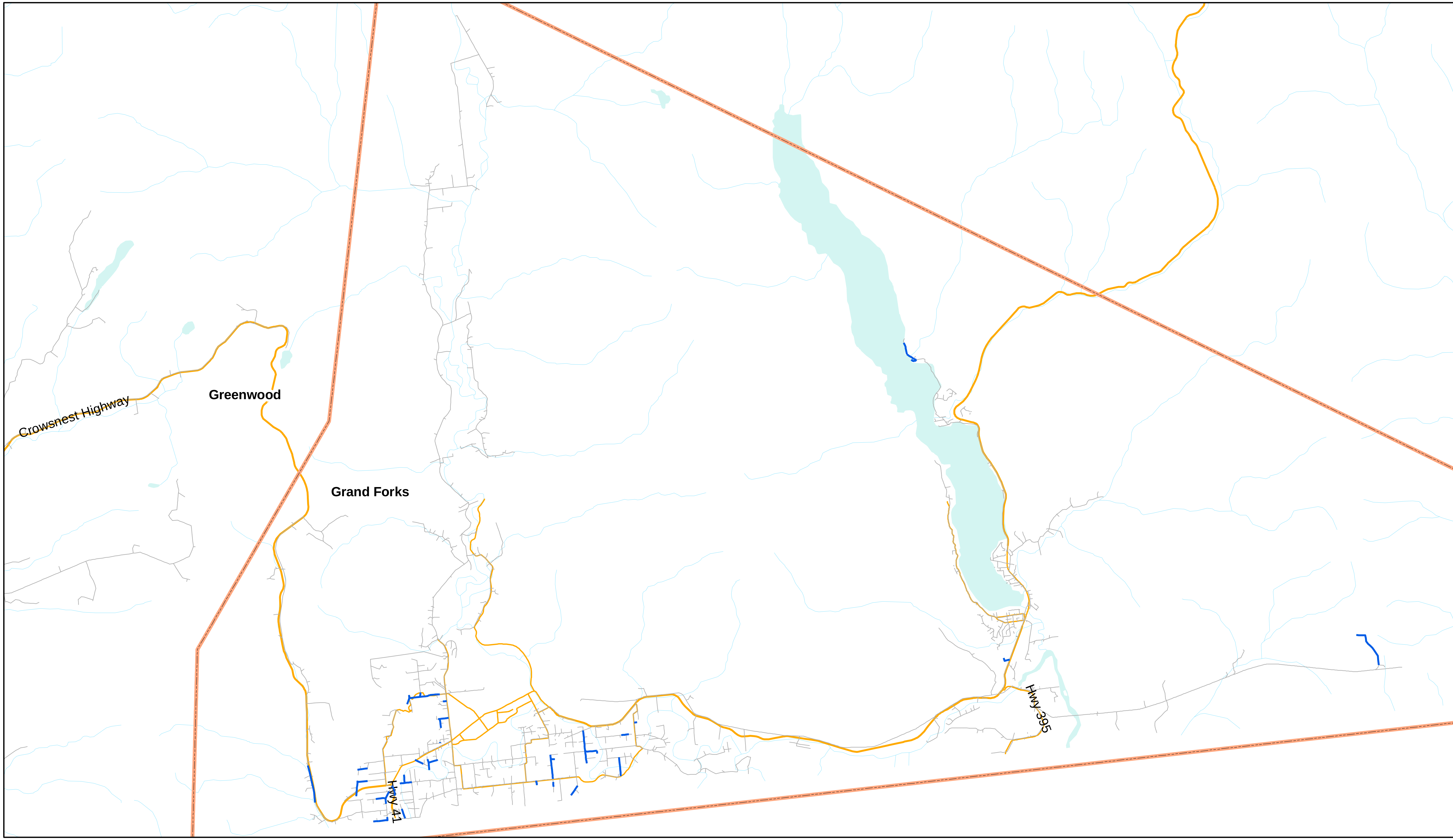


#8 Copper Conductor in the Grand Forks Area

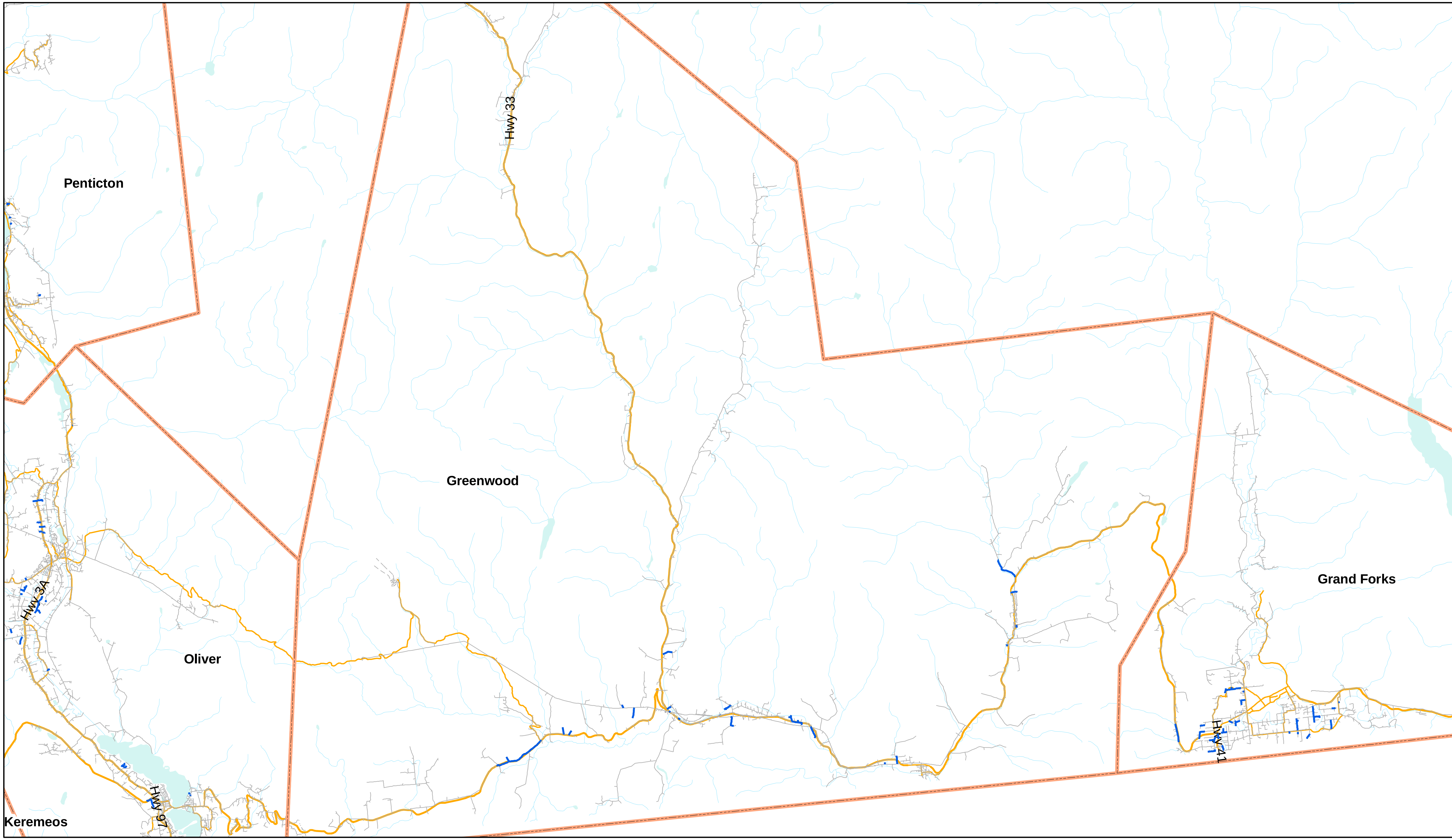
N

0 0.5 1 2 3 4 5
Kilometers

Created September 2, 2008
by the FortisBC Corporate Mapping Group

Legend

- Collector or Arterial Road
- Freeway, Expressway or Highway
- FortisBC Service Areas
- Primary Overhead Conductor
- #8 Copper Overhead Conductor
- Primary Underground Conductor



#8 Copper Conductor in the Greenwood Area

0 1 2 4 6 8 10
Kilometers

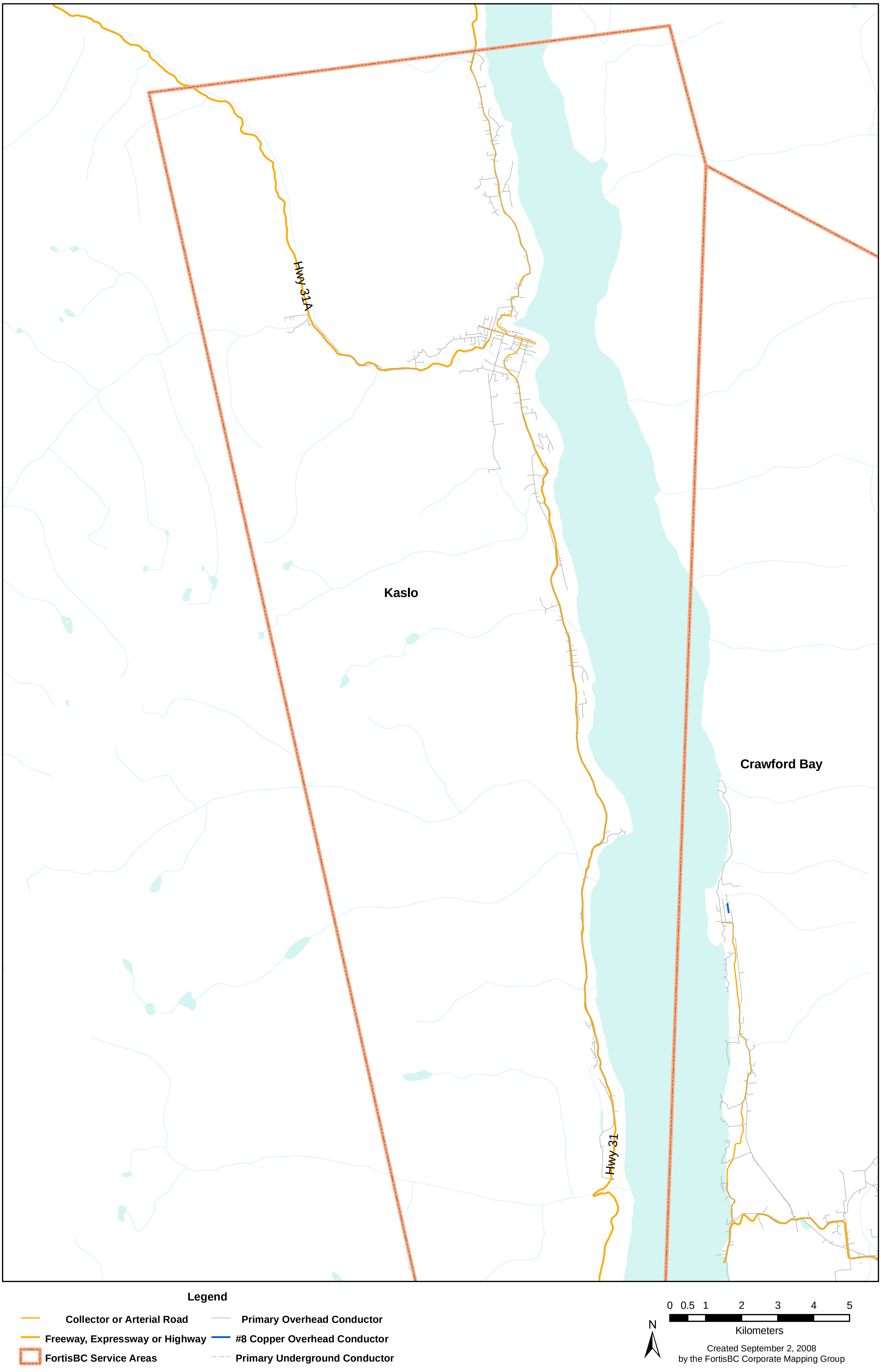
N

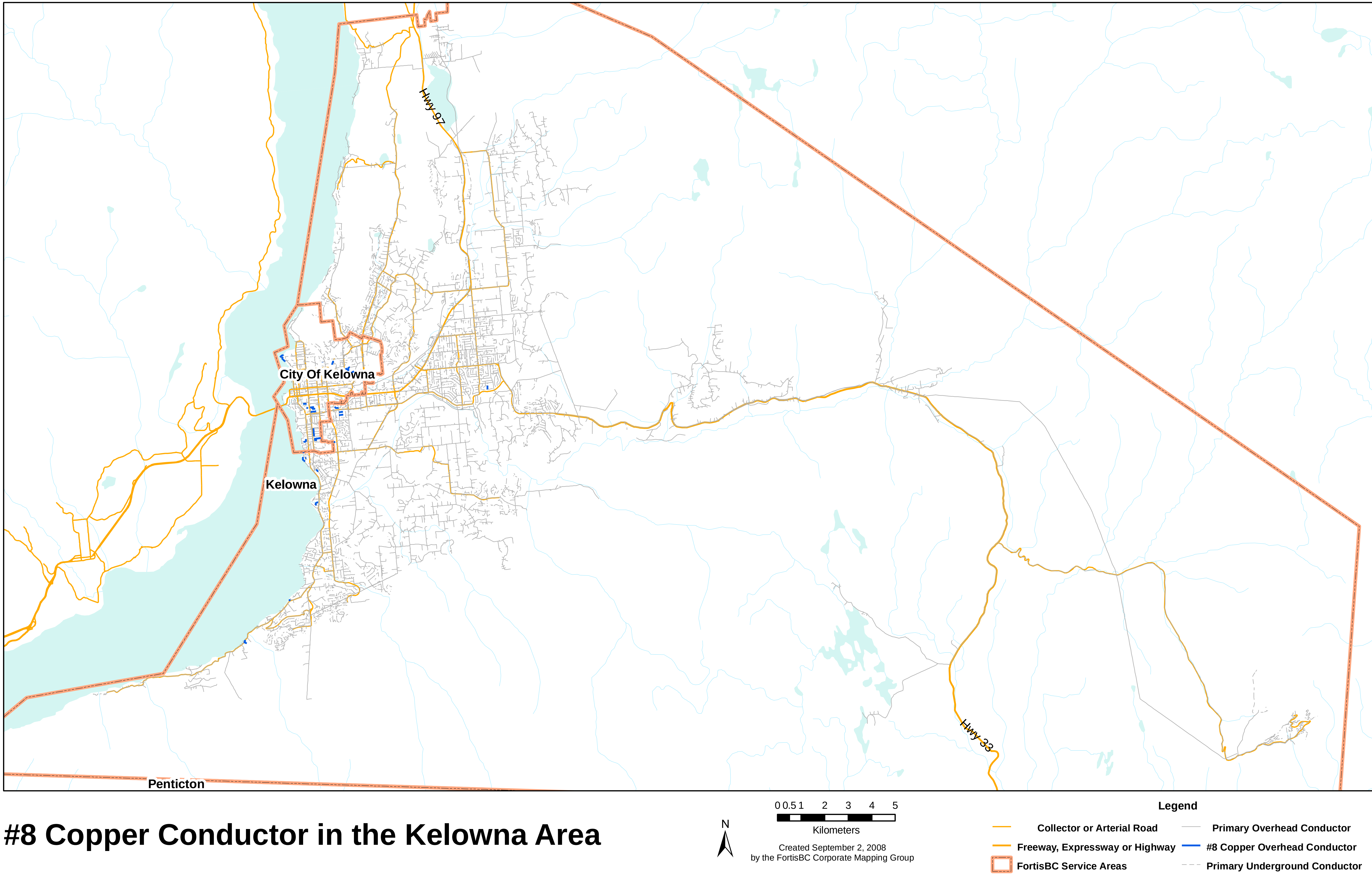
Created September 2, 2008
by the FortisBC Corporate Mapping Group

Legend

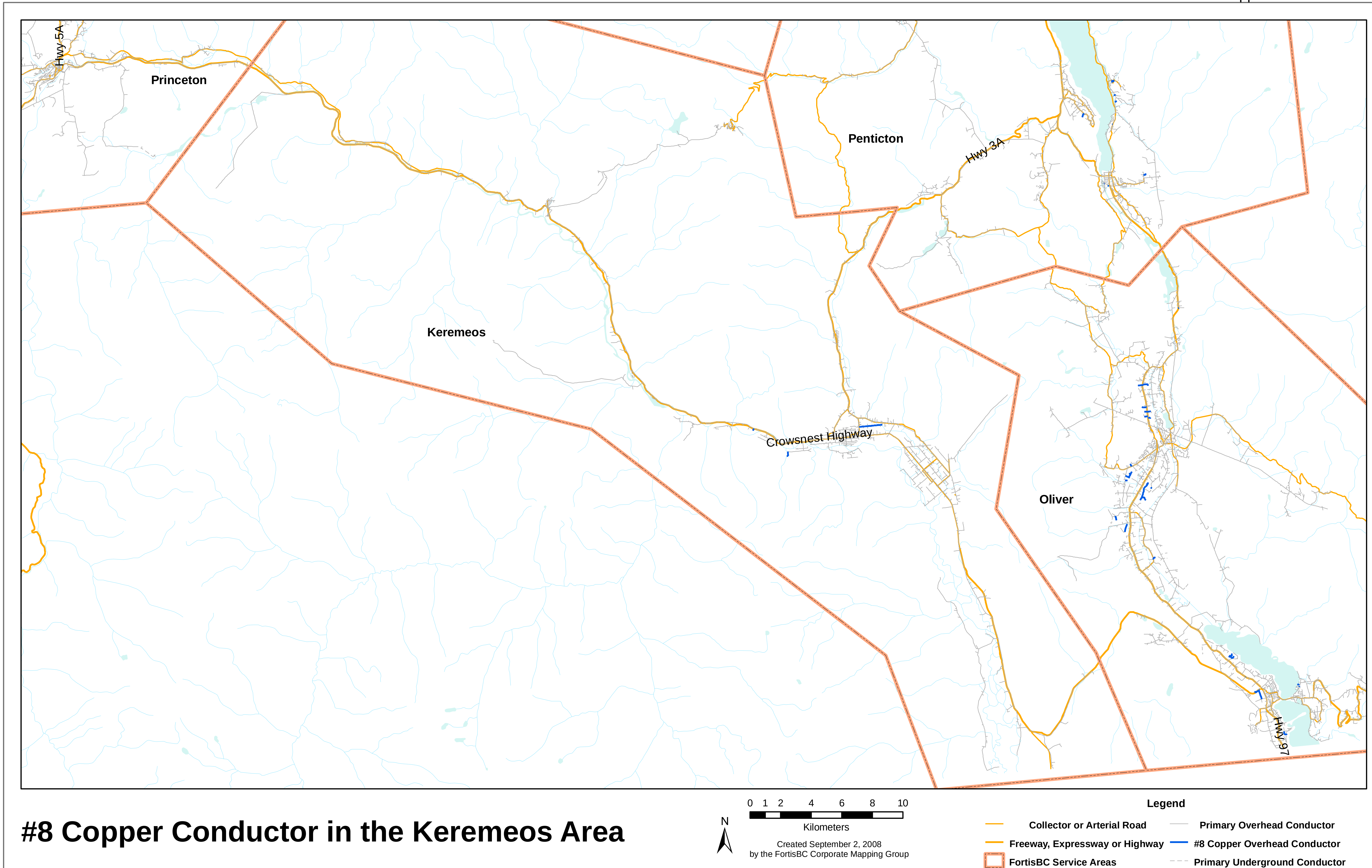
- Collector or Arterial Road
- Freeway, Expressway or Highway
- FortisBC Service Areas
- Primary Overhead Conductor
- #8 Copper Overhead Conductor
- Primary Underground Conductor

#8 Copper Conductor in the Kaslo Area



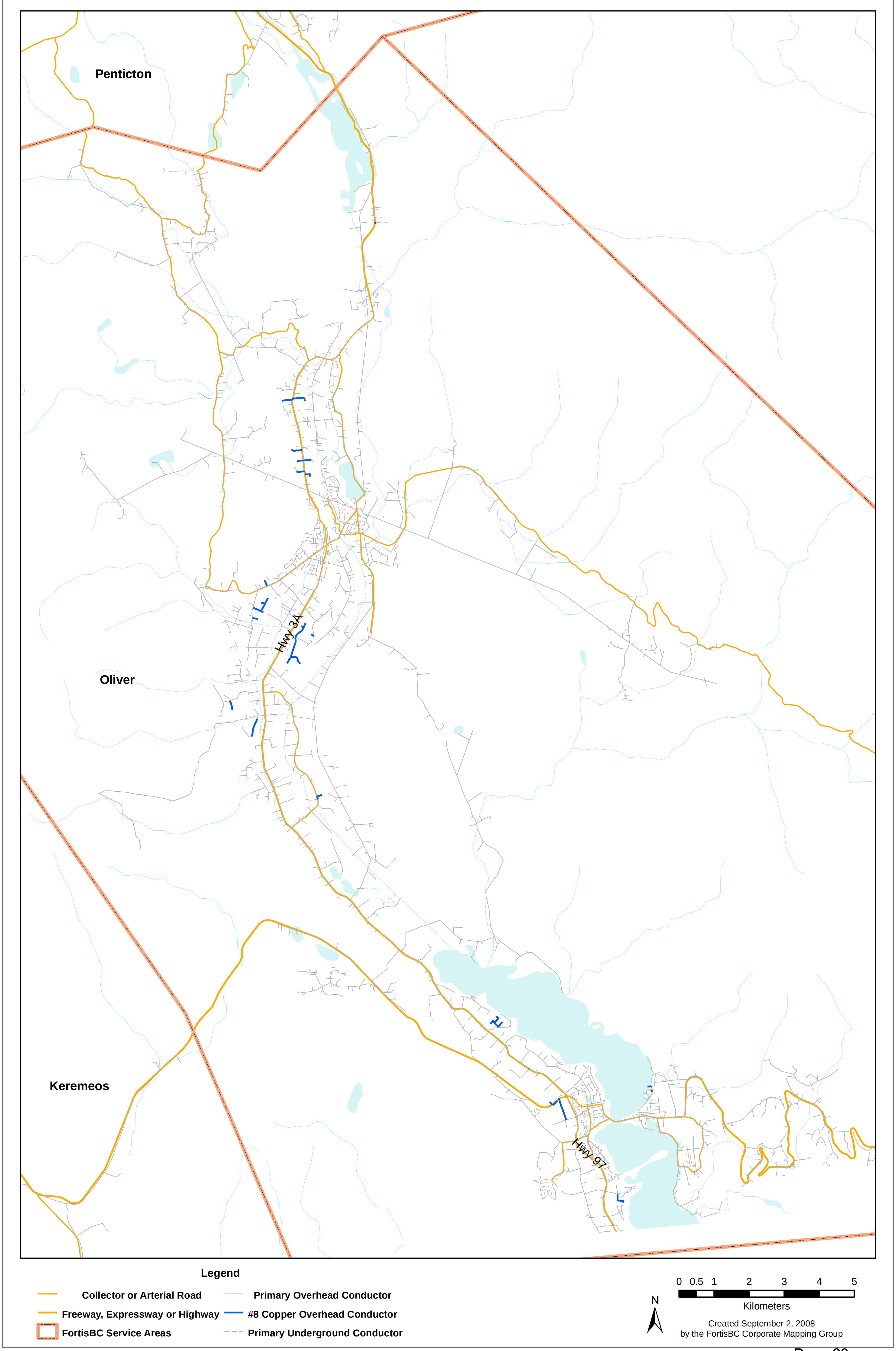


#8 Copper Conductor in the Kelowna Area

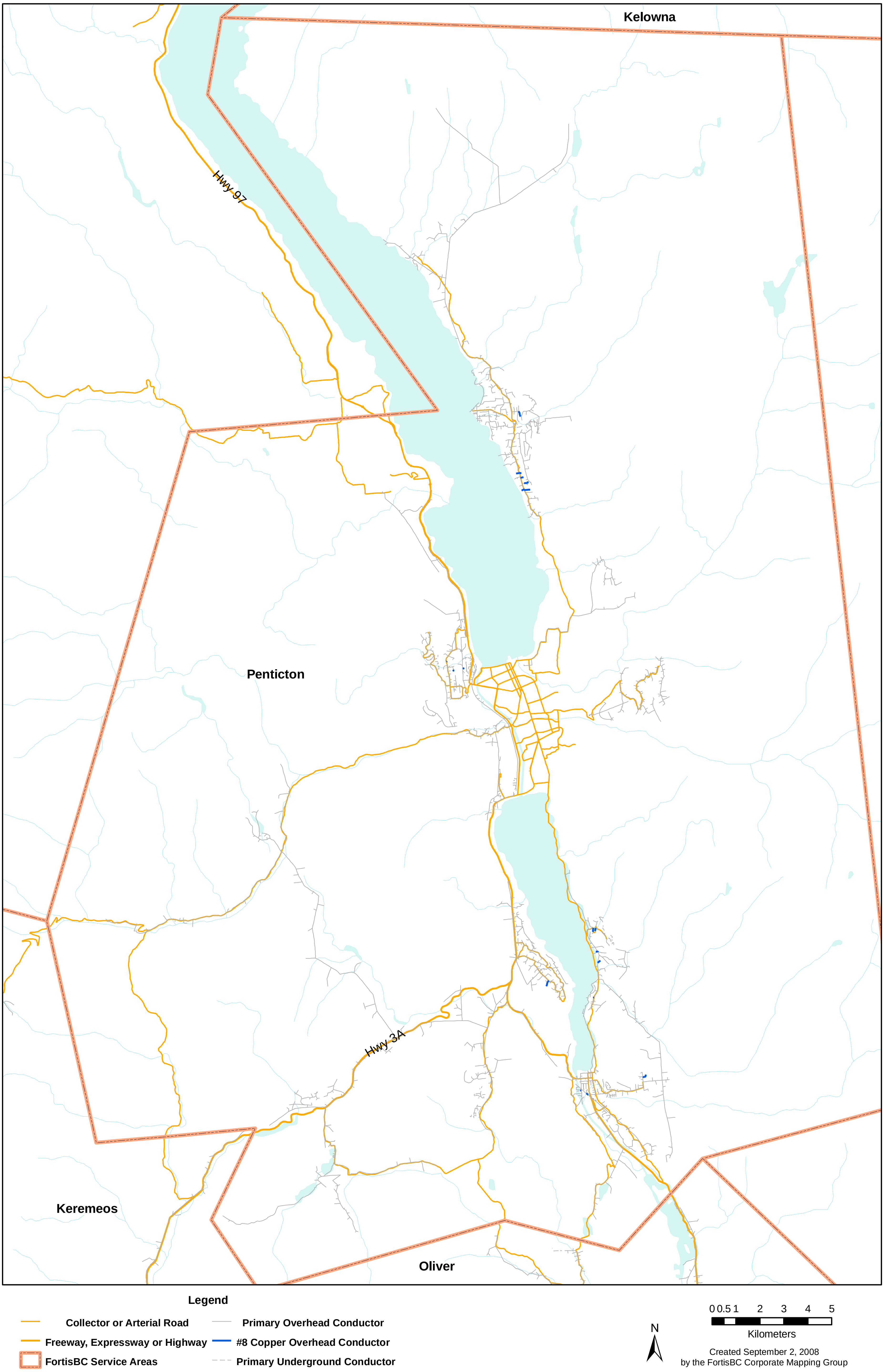


#8 Copper Conductor in the Keremeos Area

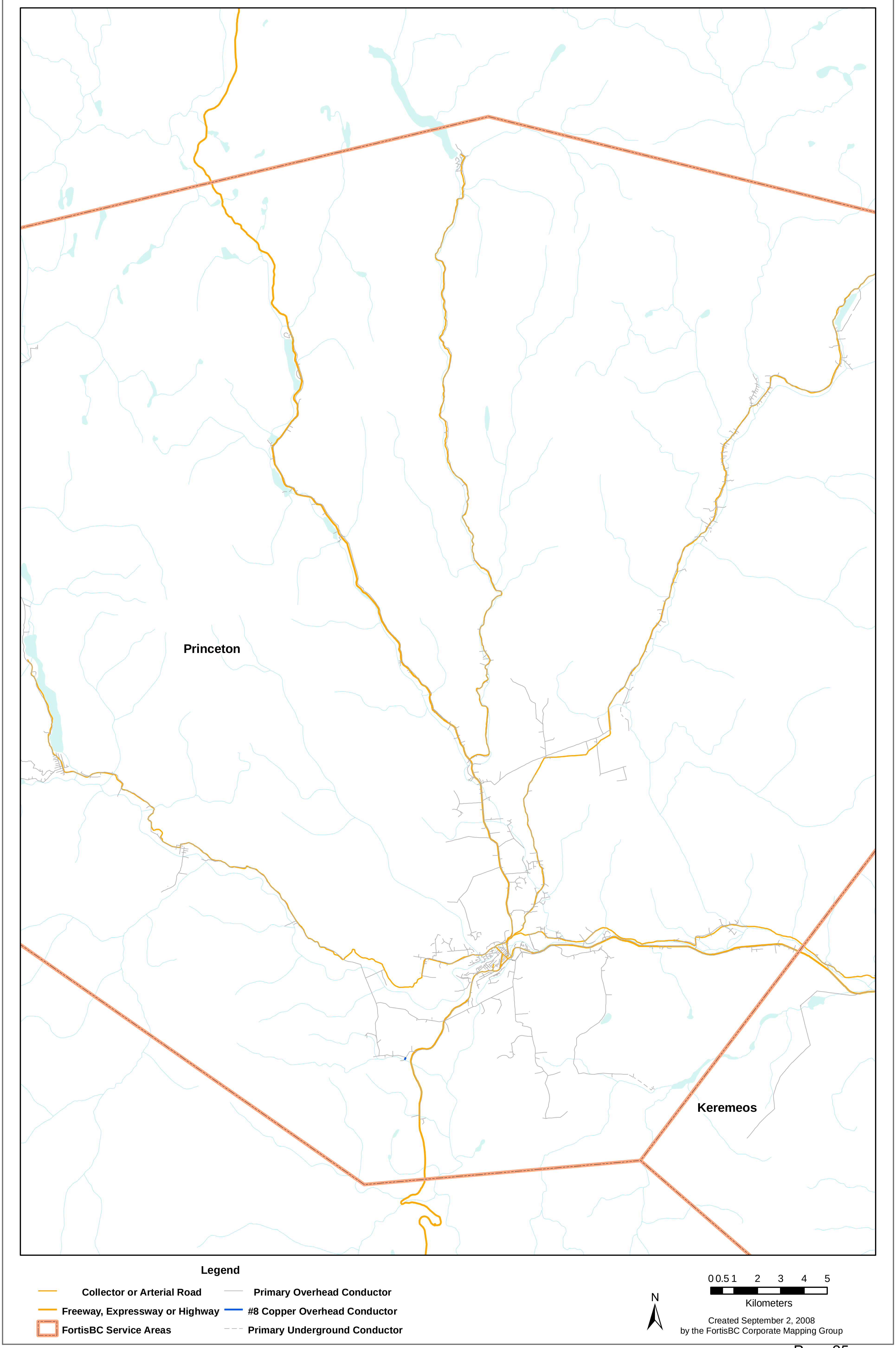
#8 Copper Conductor in the Oliver Area



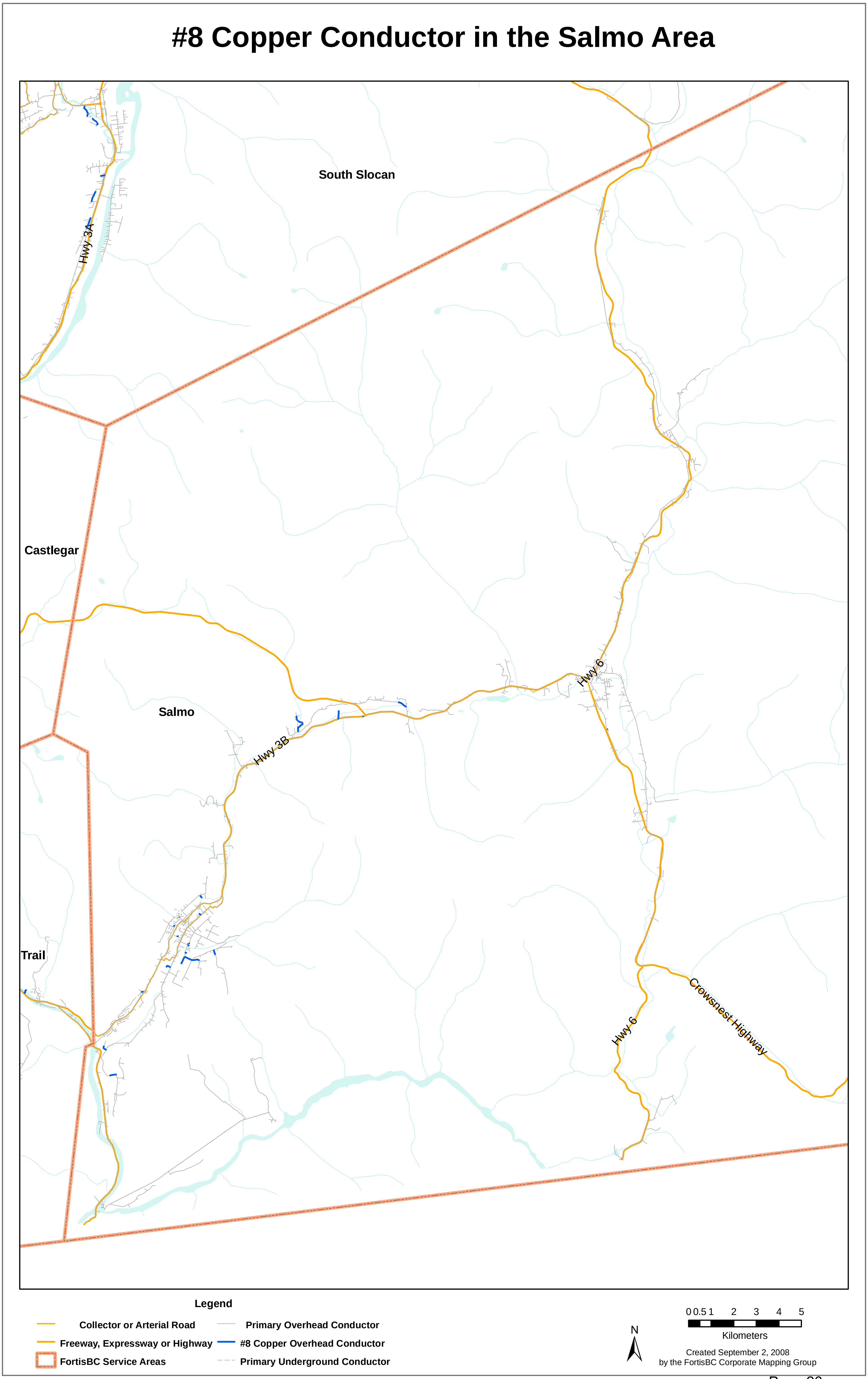
#8 Copper Conductor in the Penticton Area



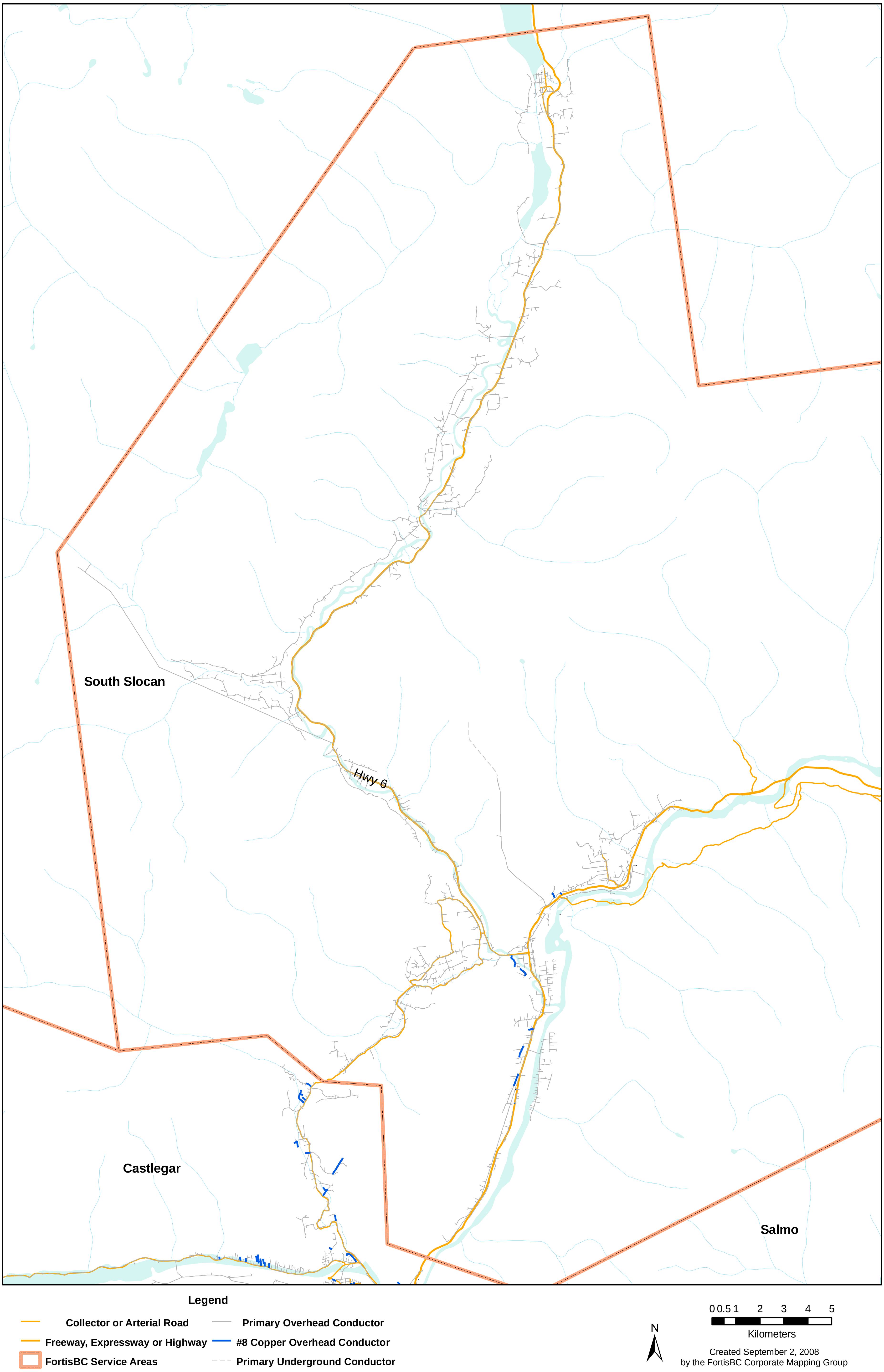
#8 Copper Conductor in the Princeton Area

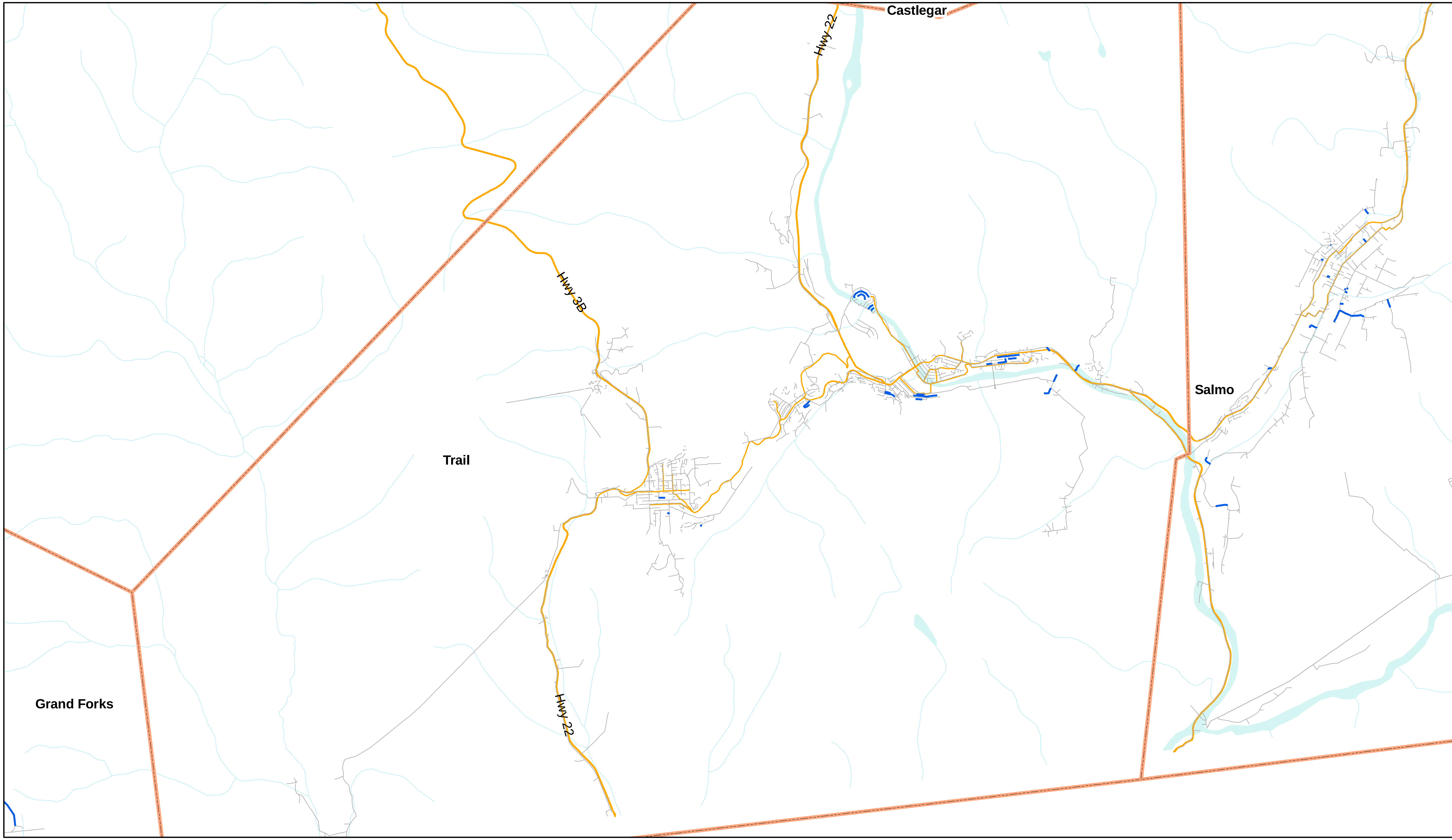


#8 Copper Conductor in the Salmo Area

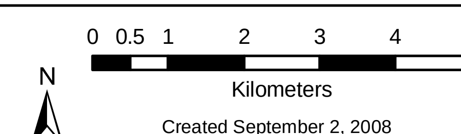


#8 Copper Conductor in the South Slocan Area





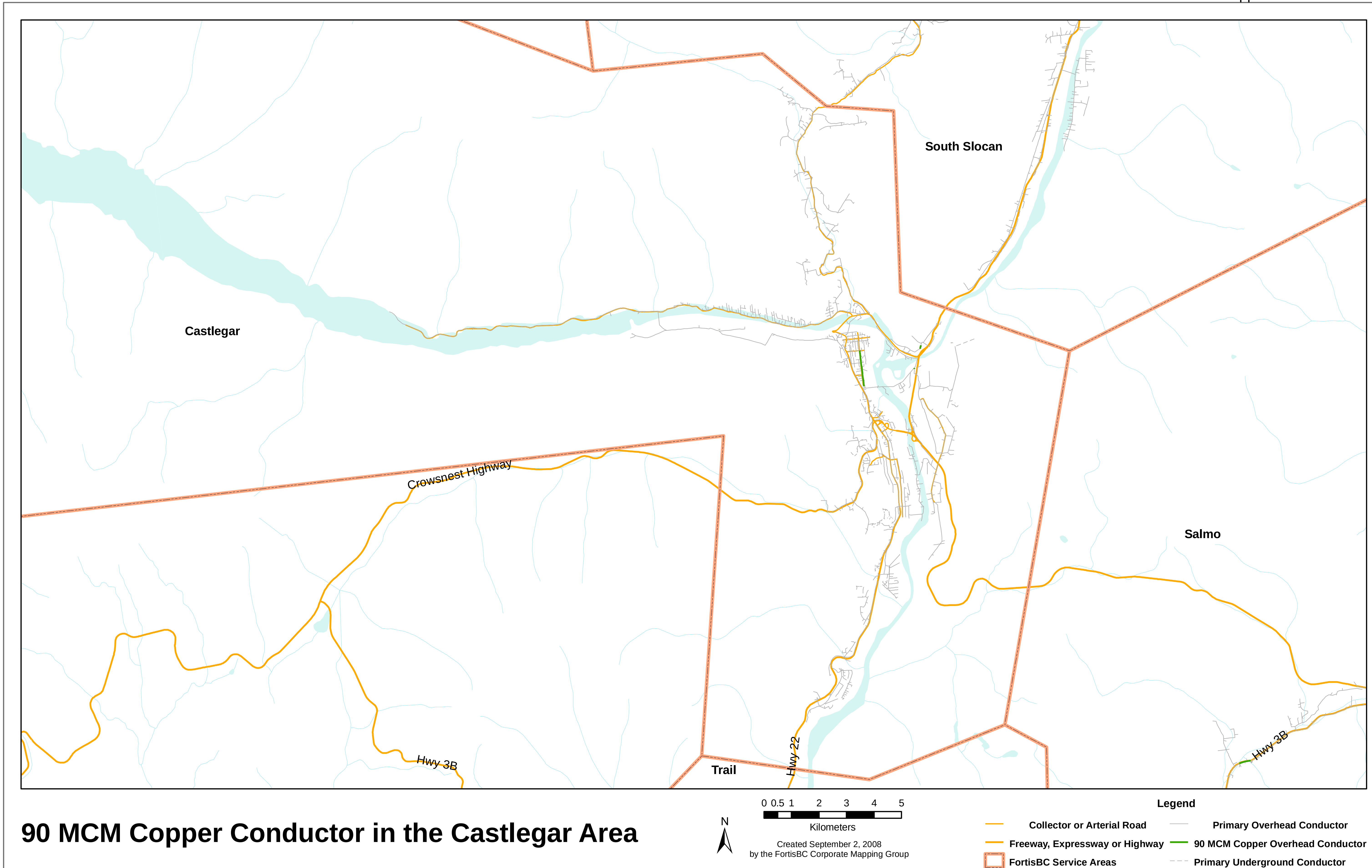
#8 Copper Conductor in the Trail Area



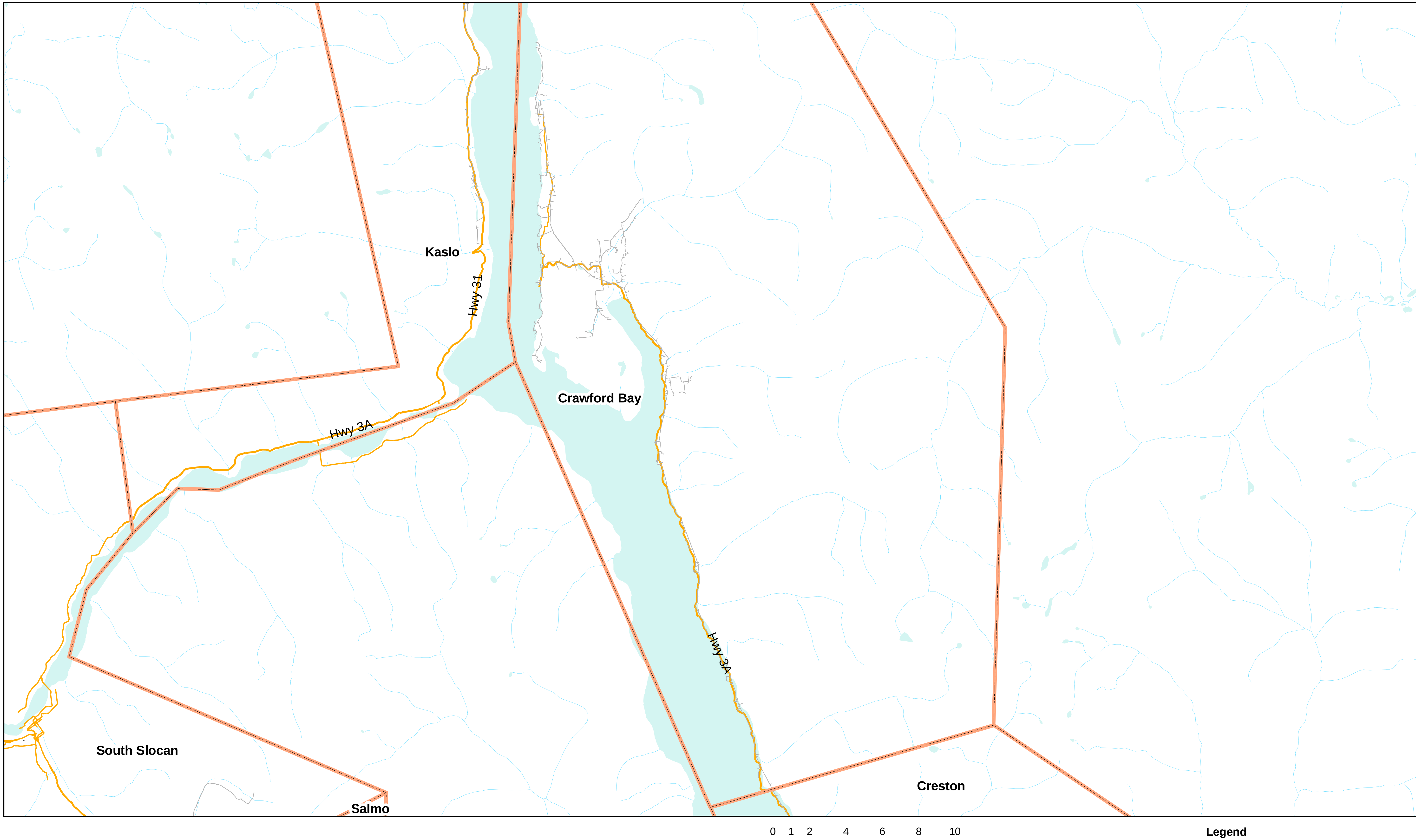
Created September 2, 2008
by the FortisBC Corporate Mapping Group

Legend

Collector or Arterial Road
Freeway, Expressway or Highway
FortisBC Service Areas
Primary Overhead Conductor
#8 Copper Overhead Conductor
Primary Underground Conductor



90 MCM Copper Conductor in the Castlegar Area



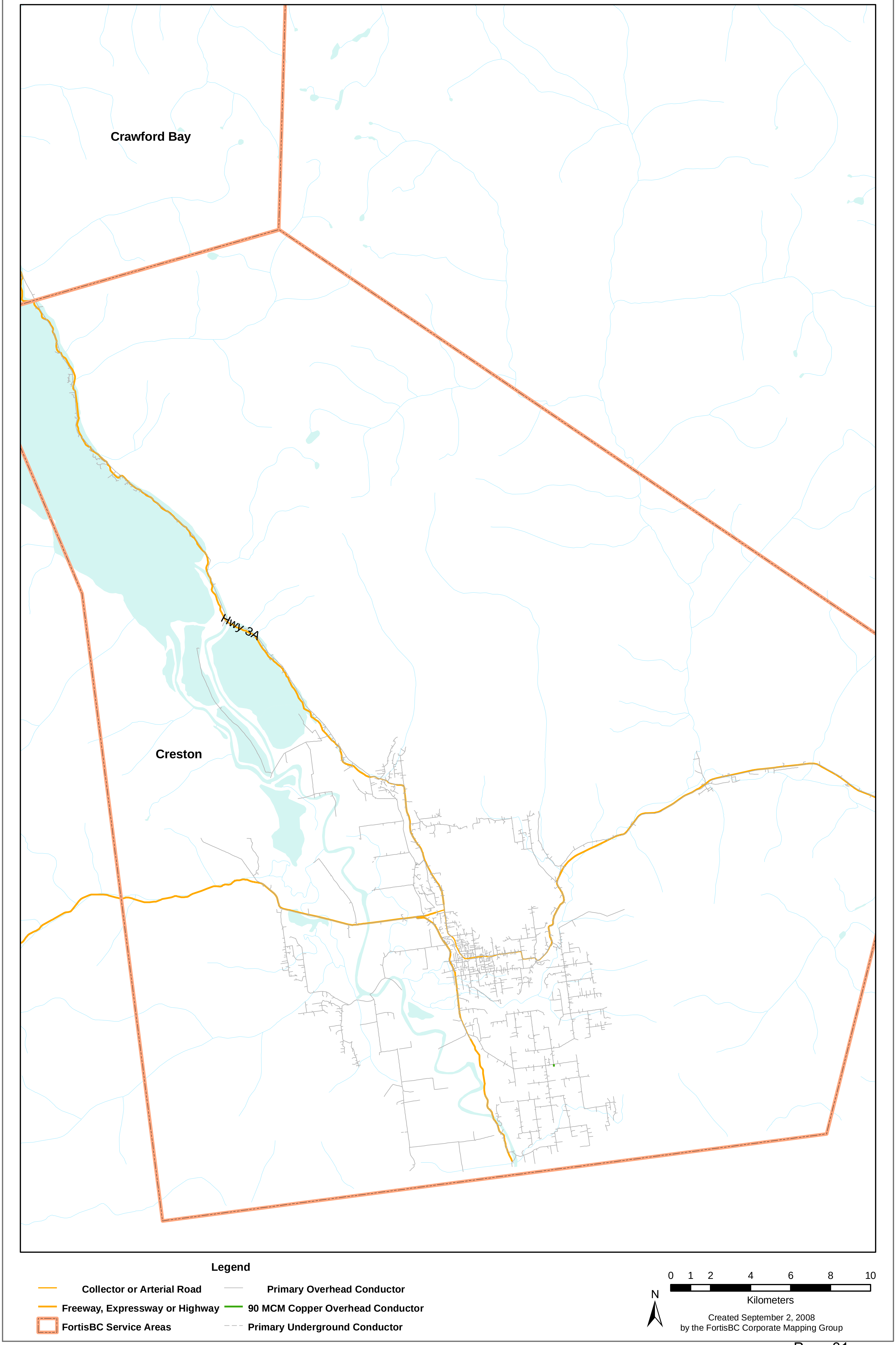
90 MCM Copper Conductor in the Crawford Bay Area

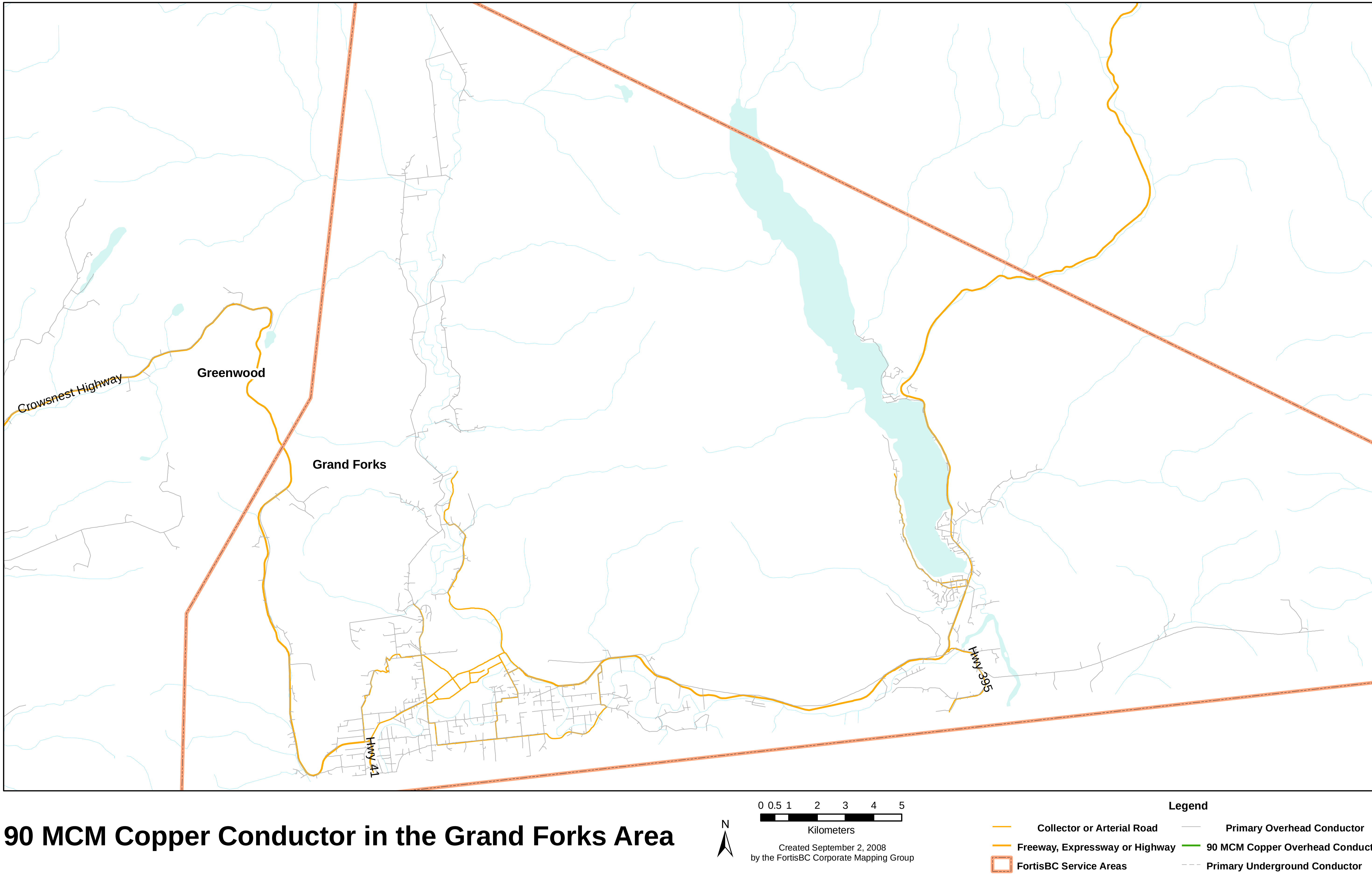
Created September 2, 2008
by the FortisBC Corporate Mapping Group

Legend

- Collector or Arterial Road
- Freeway, Expressway or Highway
- FortisBC Service Areas
- Primary Overhead Conductor
- 90 MCM Copper Overhead Conductor
- Primary Underground Conductor

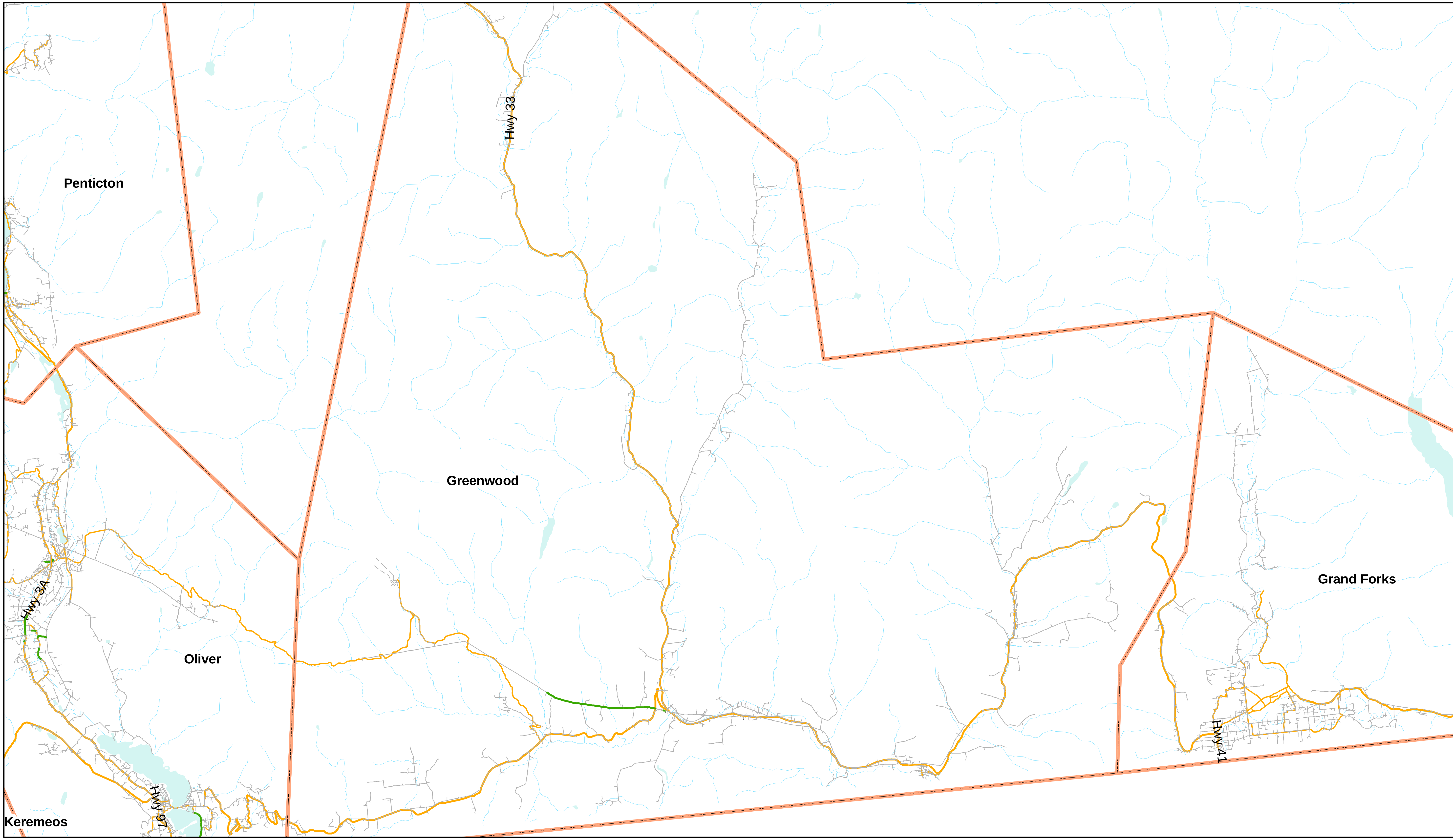
90 MCM Copper Conductor in the Creston Area





90 MCM Copper Conductor in the Grand Forks Area

Created September 2, 2008
by the FortisBC Corporate Mapping Group



90 MCM Copper Conductor in the Greenwood Area

0 1 2 4 6 8 10
Kilometers

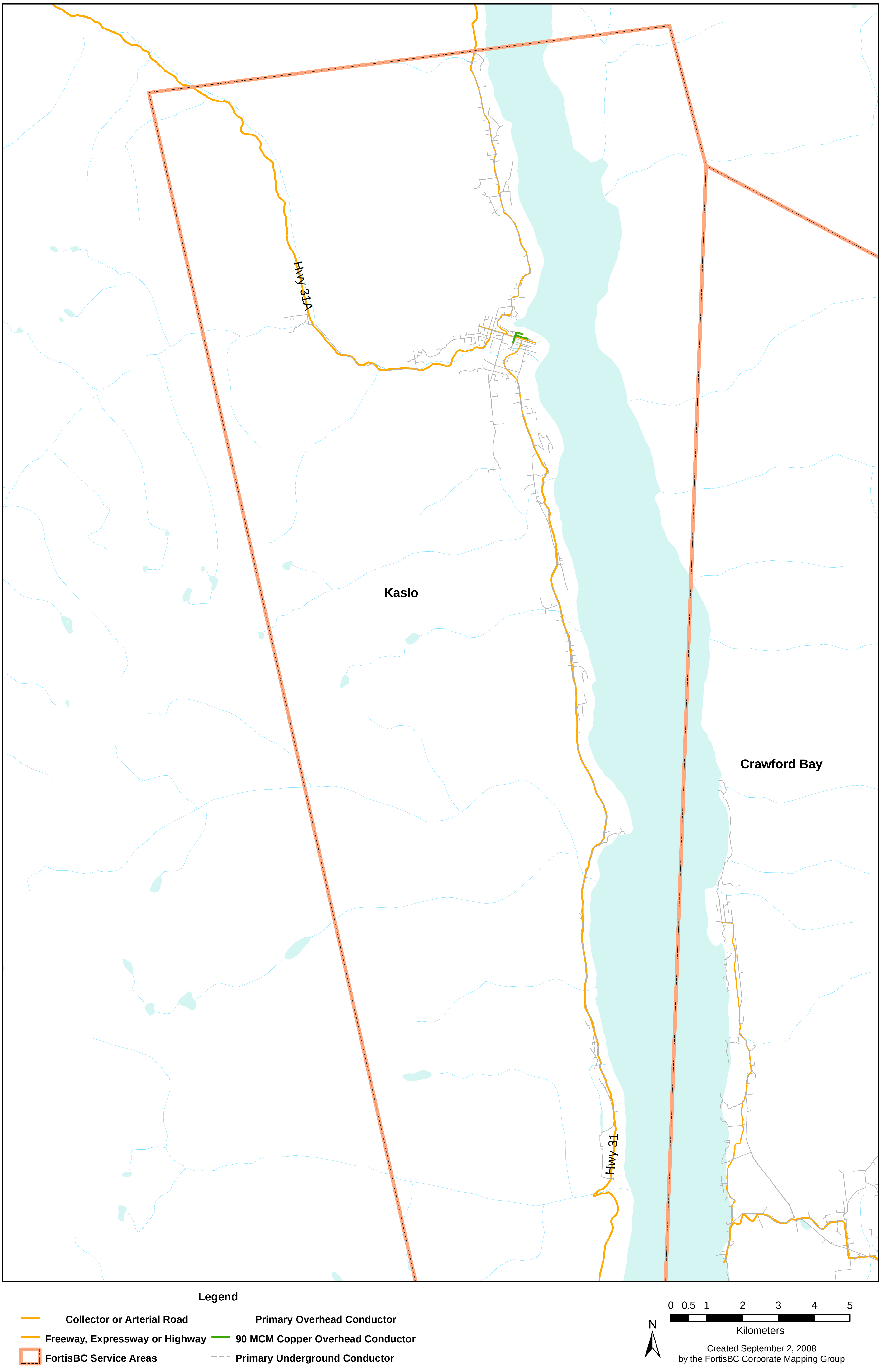
N

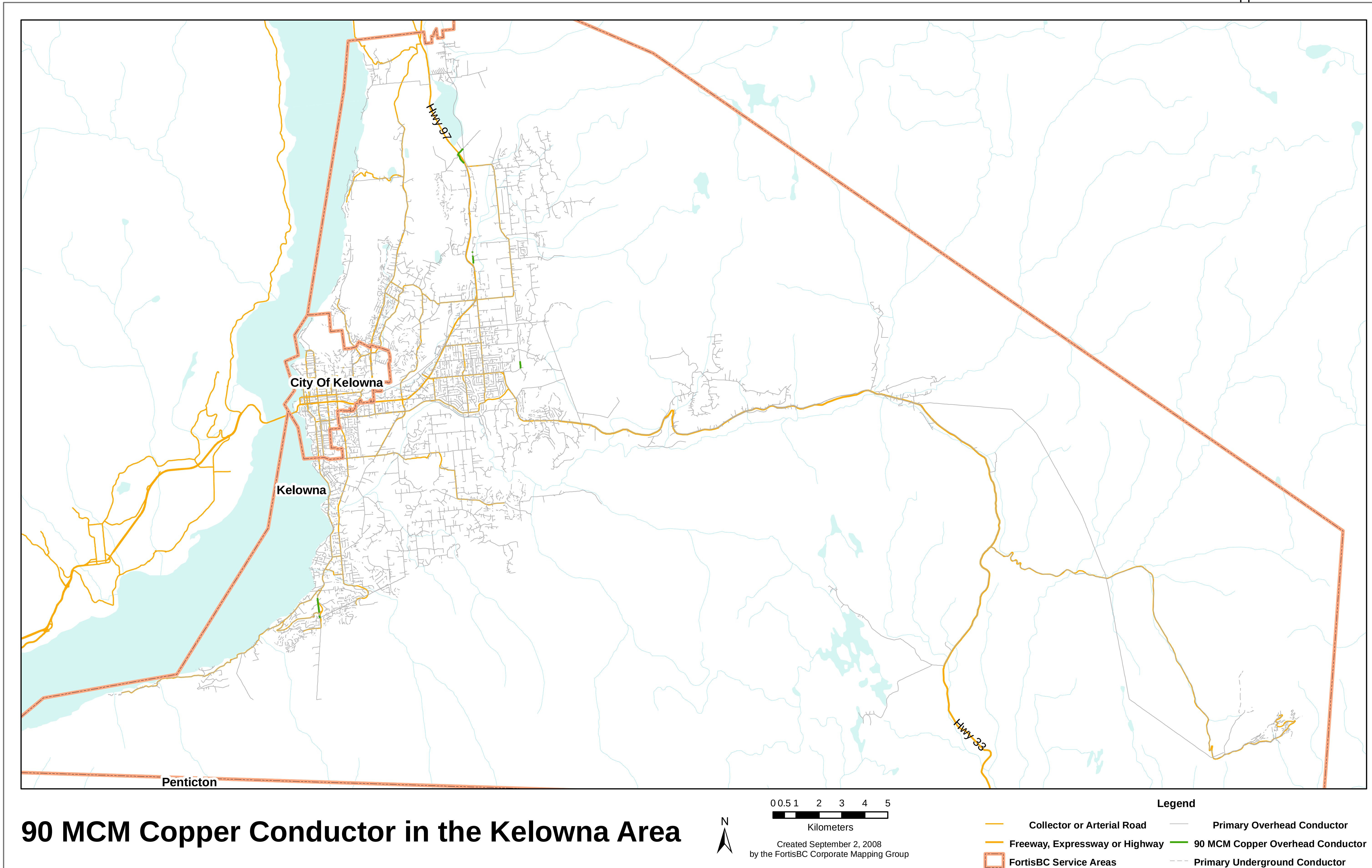
Created September 2, 2008
by the FortisBC Corporate Mapping Group

Legend

- Collector or Arterial Road
- Freeway, Expressway or Highway
- FortisBC Service Areas
- Primary Overhead Conductor
- 90 MCM Copper Overhead Conductor
- Primary Underground Conductor

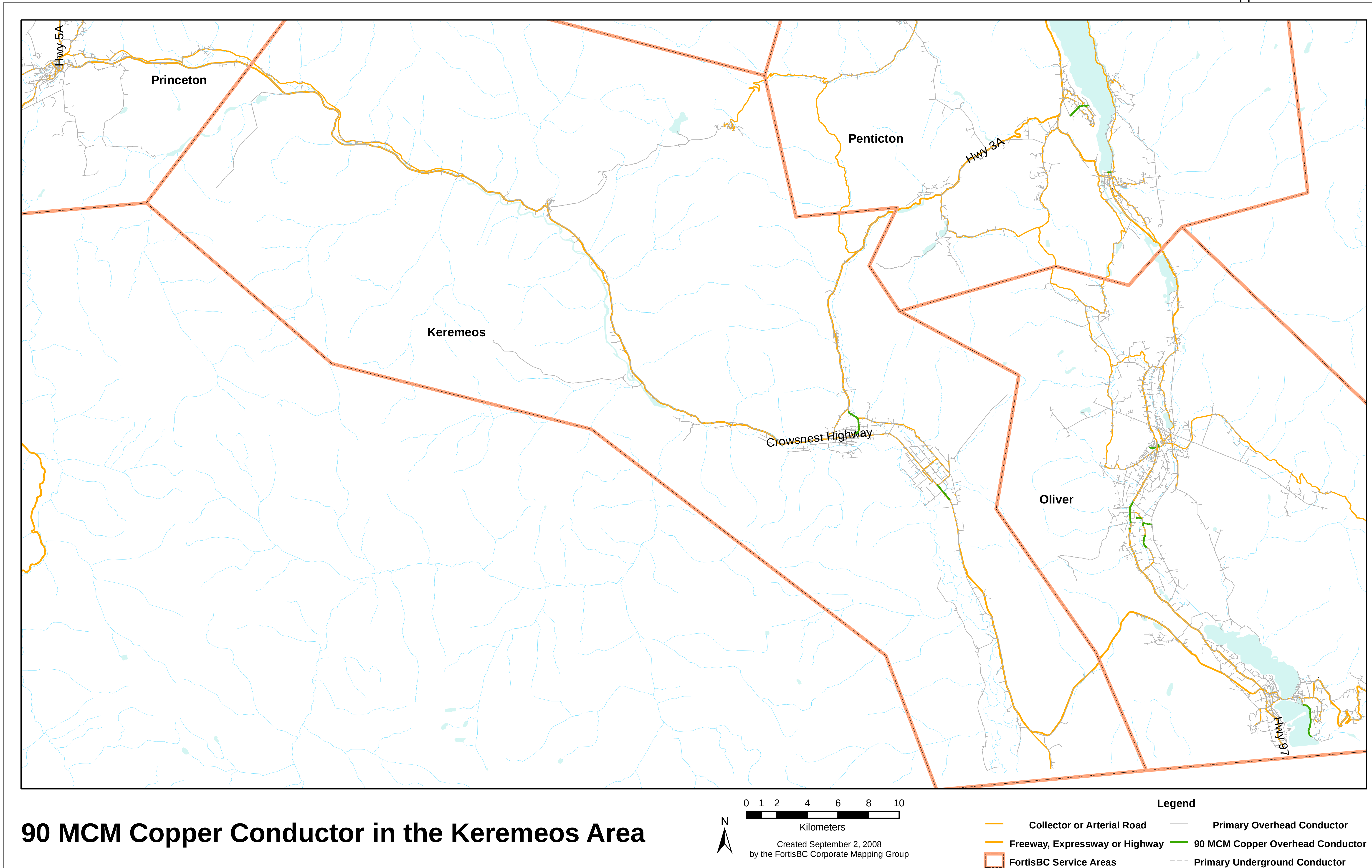
90 MCM Copper Conductor in the Kaslo Area





90 MCM Copper Conductor in the Kelowna Area

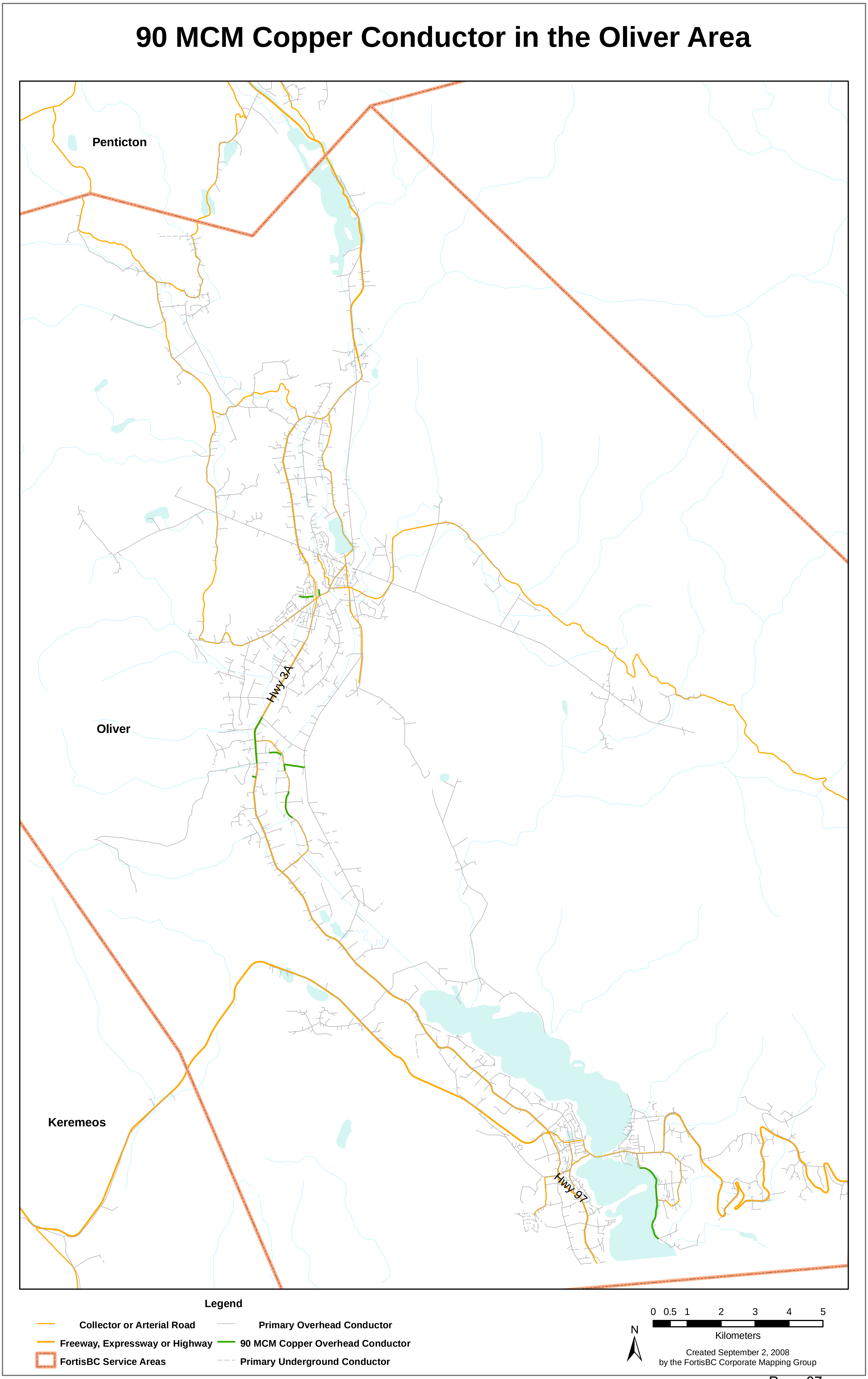
Created September 2, 2008
by the FortisBC Corporate Mapping Group



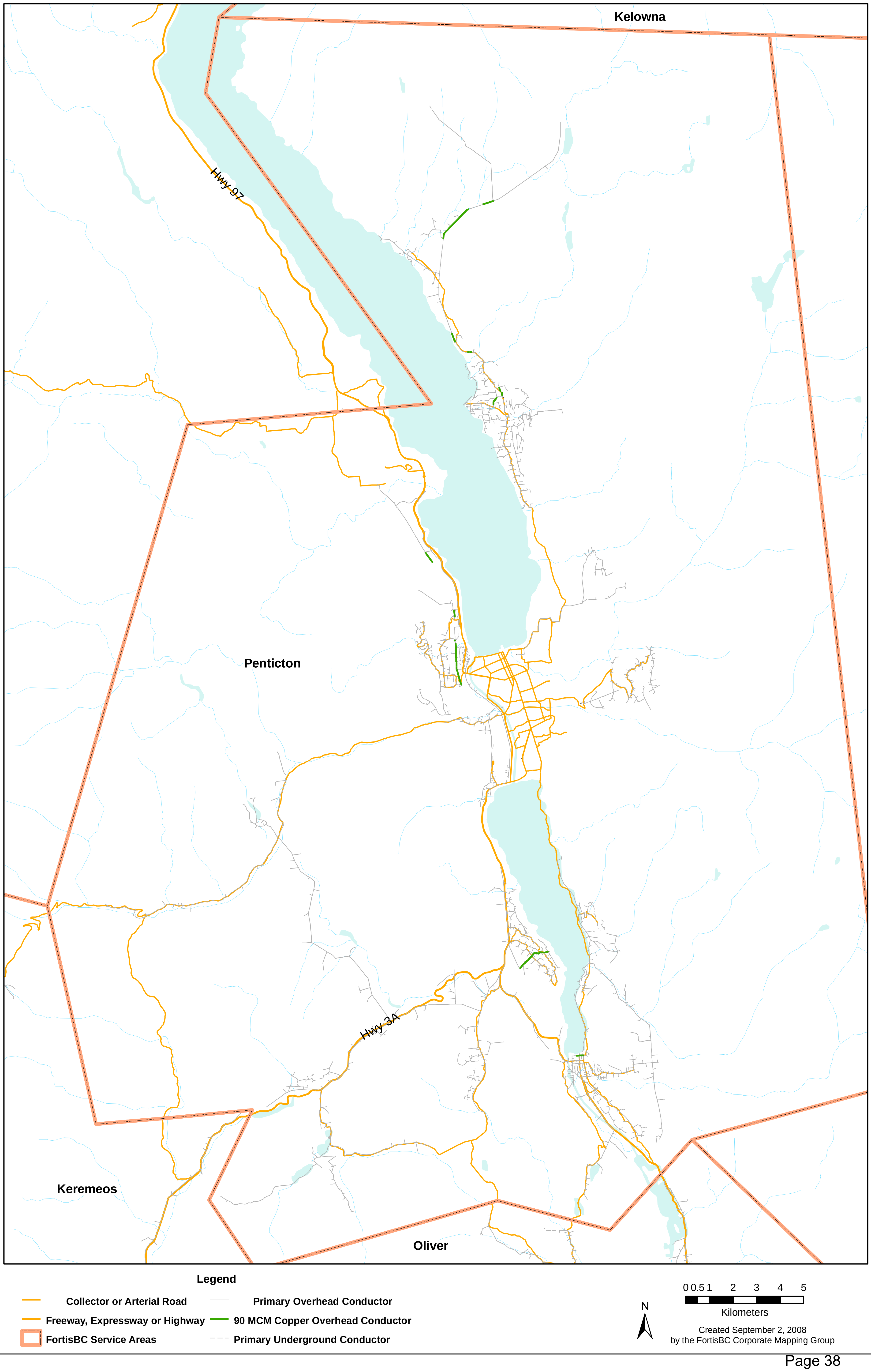
90 MCM Copper Conductor in the Keremeos Area

Created September 2, 2008
by the FortisBC Corporate Mapping Group

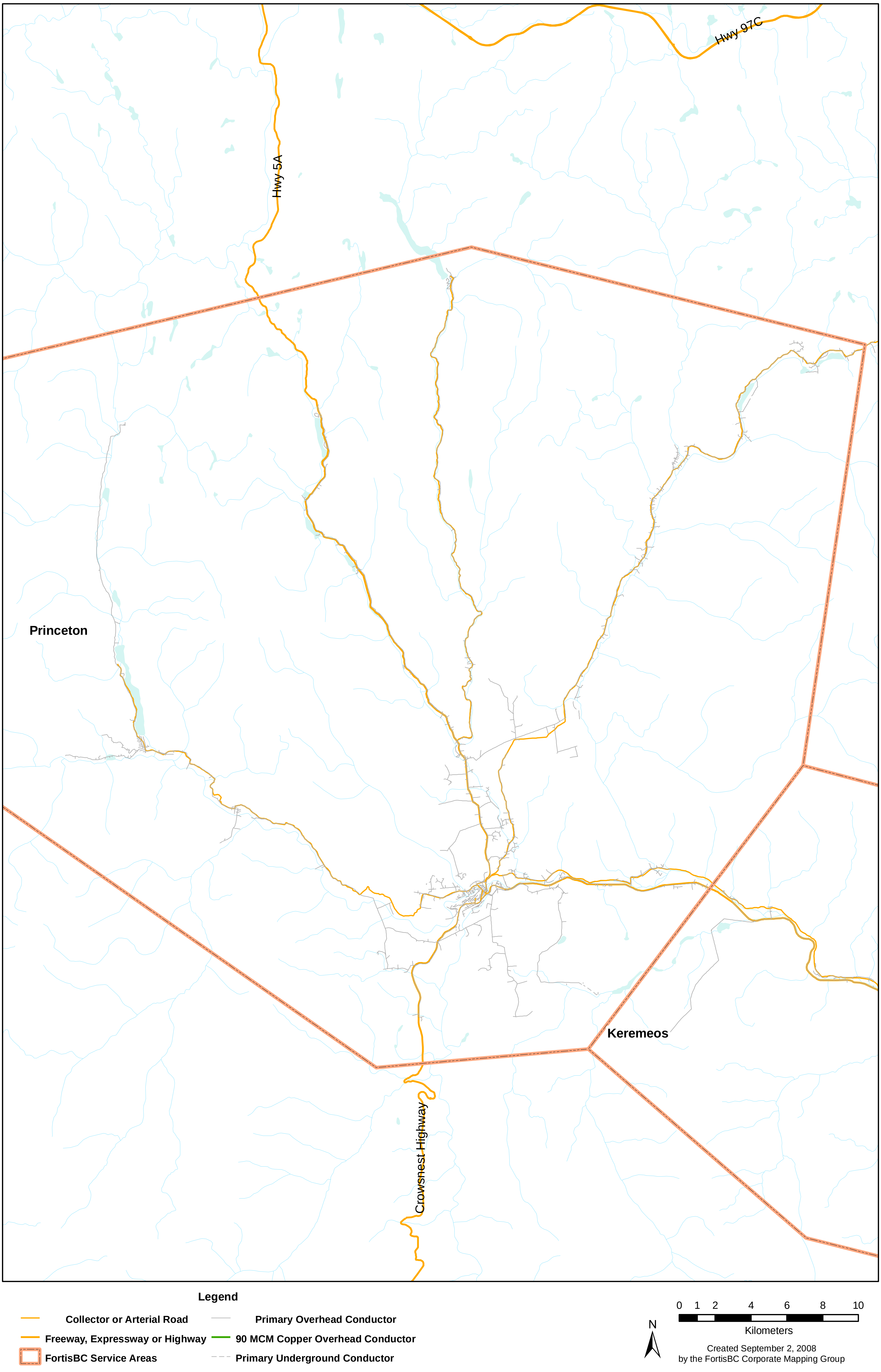
90 MCM Copper Conductor in the Oliver Area



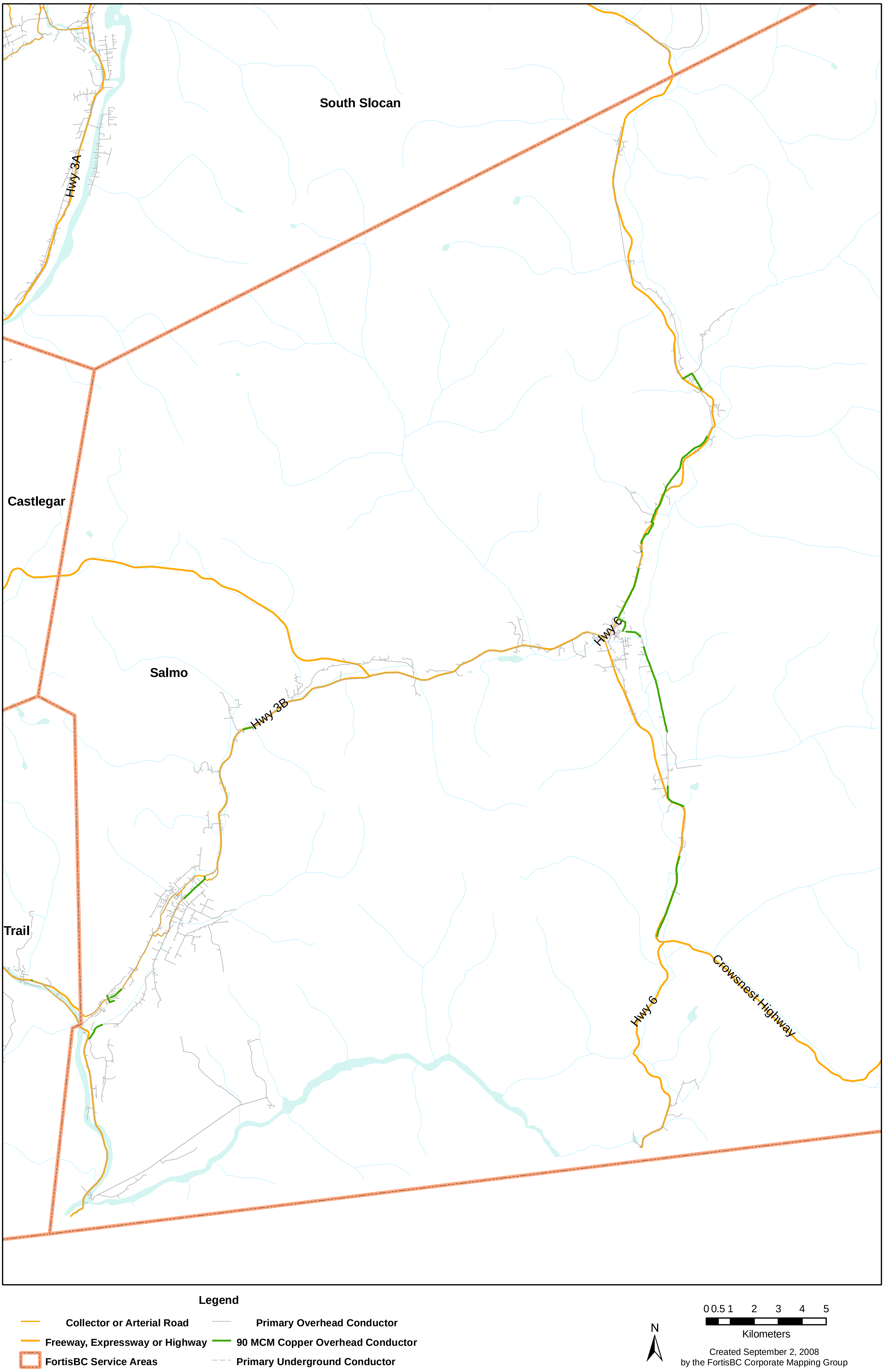
90 MCM Copper Conductor in the Penticton Area



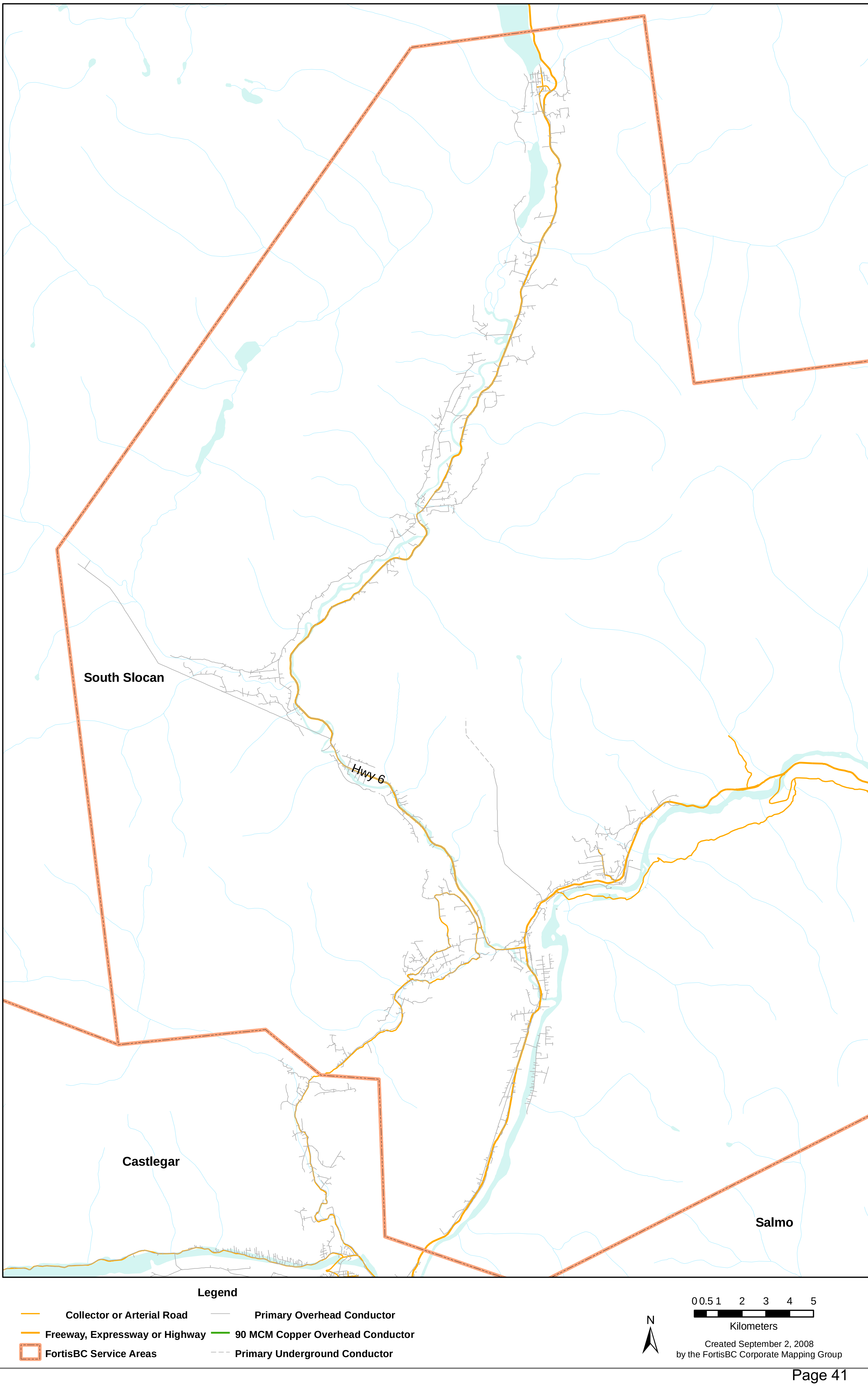
90 MCM Copper Conductor in the Princeton Area



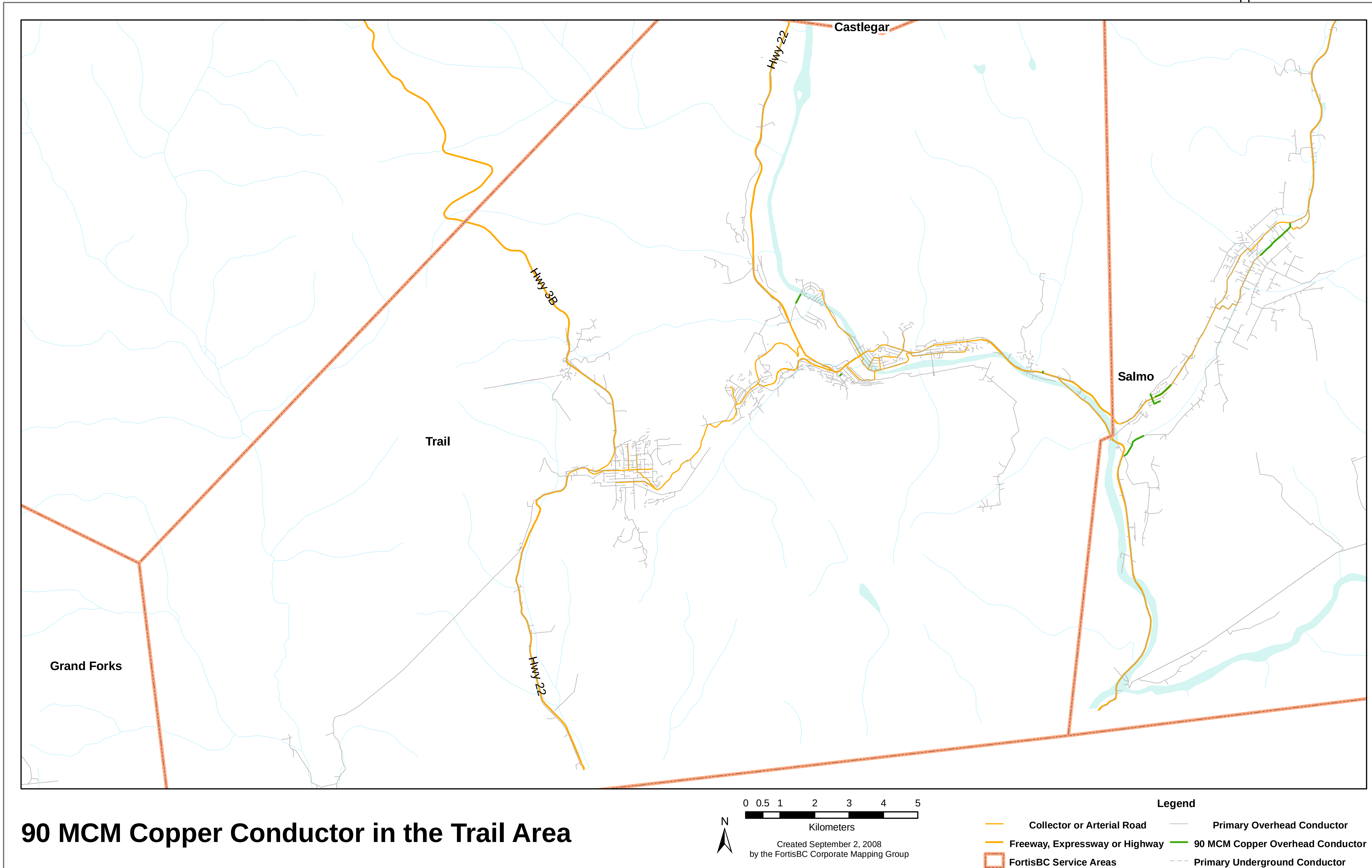
90 MCM Copper Conductor in the Salmo Area



90 MCM Copper Conductor in the South Slocan Area



Created September 2, 2008
by the FortisBC Corporate Mapping Group



90 MCM Copper Conductor in the Trail Area

1.0 Reference: Exhibit B-1, page 4, lines 18-23; page 10, lines 3-8 & page 27, lines 8-15

Q1.1 What other types of conductor account for the other 90% of conductor in service (in terms of material used, type and age) – per page 4?

A1.1 The remaining conductor is No. 2 to No. 477 MCM Aluminum. The maximum age is approximately 40 years.

Q1.2 What is the age and type of the other 160 circuit kilometers of copper conductor – per page 10? Note: The discussion on page 27 only accounts for 92 kilometers of the remaining copper conductor.

A1.2 Please see Table A1.2 below. The 92 kilometres reference on page 27 of the Application (Exhibit B-1) should read 160 kilometres. Please also refer to Errata No. 2, Item 1.

Table A1.2

Conductor type	Age Profile
No. 4	Approx 40 years
No. 3	Approx 40 years or less
No. 2	Approx 40 years or less
No. 1/0	Approx 40 years or less
No. 2/0	Approx 40 years or less
No. 3/0	Approx 40 years or less
No. 4/0	Approx 40 years or less
No. 300MCM	Approx 40 years or less

Q1.3 **The bullet on line 8 (page 27) lists 8 other categories of copper conductor; however the text latter makes reference to 7 categories accounting for 92 kilometers. Please reconcile.**

A1.3 The reference to seven categories is incorrect, and should have read eight categories. Please also refer to Errata 2, Item 1.

2.0 **Reference: Exhibit B-1, page 4, lines 7-8 & page 11, Table 1-1**

Q2.1 **Please clarify what is meant by the term "legacy copper". Does this refer to all No. 6, No. 8 and No. 90 MCM copper conductor or just that portion that exceeds a certain age?**

A2.1 The term "legacy copper" refers to all No. 6, No. 8, and No. 90 MCM copper conductor.

Q2.2 **Are there other types of conductor on FortisBC's system that are over 50 years old? If so, please describe and explain why these other types are not targeted for replacement.**

A2.2 The Company has no records of any other conductor in its distribution system that is over 50 years old.

3.0 Reference: Exhibit B-1, page 5

Q3.1 Is the problem with the legacy copper attributable to its age or the specific type of conductor used (in terms of material used and size)?

A3.1 As noted in the CPCN Application (Exhibit B-1), Appendix A, the problem with legacy copper is attributable to both the age and type of conductor used (in terms of material). As noted in the Application, larger diameter conductor is not within the scope of the Project as its condition is generally fair, however, it was installed more recently.

4.0 Reference: Exhibit B-1, page 22, lines 10-19 and BCUC IR#1.5.1

Q4.1 What types of conductor did BC Hydro, Fortis Alberta and Newfoundland Power use to replace their legacy copper?

A4.1 FortisBC does not have the details of the conductors used by other utilities. The copper would have been replaced with aluminum conductor, sized to meet the anticipated loads, using each individual utility's standard.

Q4.2 Please confirm that No. 90 (per BCUC IR#1.5.1) is the No. 90 MCM legacy copper conductor.

A4.2 Confirmed.

5.0 Reference: Exhibit B-1, page 10, lines 6-16; page 26, lines 13-18 and BCUC IR#1.5.1

Q5.1 Please reconcile the response to BCUC IR#1.5.1, which suggests that there are roughly 14 poles per circuit kilometer, with the text on page 10 which suggests there are 16 poles per circuit kilometer of legacy conductor.

A5.1 The text on page 10 of the Application (Exhibit B-1) indicates that the 500 circuit kilometres are supported by 8,100 poles. This information was taken from the AM/FM mapping system. The response to BCUC IR No. 1 Q5.1 uses a generic estimating assumption of one pole per 70 metres or 14 poles per kilometre.

Q5.2 Please reconcile the 65% used to determine the number of poles to be replaced (BCUC IR#1.5.1) with the fact that:

- **Only 55% of the poles are in excess of 50 years in age (i.e., 4450 of 8100 poles) – per page 10.**
- **The total number of poles to be replaced (3900) represents about 57% of the poles supporting the 820 kilometres of conductor (i.e., 3900 / {8100*0.85}) – per page 26.**

A5.2 As noted in the response to BCUC IR No. 1 Q5.1, the number of poles to be replaced is based on an estimated of 9 poles per kilometre. This is approximately 56 percent of the poles taking into consideration that on the particular lines in question there are approximately 16 poles per kilometre.

6.0 Reference: Exhibit B-1, pages 43-44 and BCUC IR#1.11.4

Preamble: The following is an extract from the 2007 Distribution Rate Application by Great Lakes Power Ltd. (an electricity distributor in Ontario). The full application can be found at:

> http://www.rds.oeb.gov.on.ca/webdrawer/webdrawer.dll/webdrawer/rec/13031/view/GreatLakes_APPL_20070831.PDF

> "It is general industry knowledge that all types of aluminum conductor steel re-enforced ("ACSR) experience corrosion to the steel core and experience loss of mechanical strength over time. Because ACSR relies on the steel core for mechanical strength, corrosion of the steel core causes it to be susceptible to breaking. Smaller diameter conductor types of ACSR, such as ACSR **#4** and **#6,** do not have the same strength as larger diameter ACSR conductor sizes. ACSR core corrosion together with the inherently weaker mechanical strength of the **#4** and **#6** sizes, results in a significant safety risk to line workers and the public arising from the higher probability of line breaks. As a result, efforts have been made throughout the industry to remove ACSR **#4** and **#6** from service. Because internal corrosion can not be detected by visual inspection of conductor while in operation, the only way to assess the state of corrosion on a segment of ACSR **#4** and **#6** is to remove physical segments and inspect those segments". (Exhibit 2, Tab 1, Schedule 1, page 4)

Q6.1 Is FortisBC aware of (and does it concur with) the above stated problem for small diameter ACSR conductor?

A6.1 FortisBC is aware of the problem of corrosion of the steel core of ACSR conductor, however FortisBC does not use either No. 4 or No. 6 ACSR conductor.

Q6.2 Please comment on the extent to which the identified problem is limited to the smaller conductor sizes as opposed to the larger conductor sizes that FortisBC is proposing to use.

A6.2 FortisBC has not experienced any corrosion on the larger diameter ACSR conductor that has been in service in its service territory for decades. As noted in the excerpt provided, the problem is largely confined to smaller diameter ACSR conductor.

Q6.3 Does the estimated 50 year life for ACSR conductor (per BCUC IR#1.11.4) take into account the above referenced corrosion issue?

A6.3 As noted in the response to BCOAPO IR No. 1 Q6.2, FortisBC has not experienced any corrosion on the ACSR conductors in the service territory.

7.0 Reference: Exhibit B-1, page 48, lines 16-17 and BCUC IR#1.5.1

Q7.1 Please reconcile the 65% replacement factor for poles referenced in BCUC IR#1.5.1 with the 85% factor referenced on page 48.

A7.1 The estimates are based on replacing 9 poles per kilometre. The 65 percent referenced in response to BCUC IR No. 1 Q5.1 uses a generic estimating assumption of one pole per 70 meters or 14 poles per kilometres. Nine poles out of 14 poles is approximately 65 percent. Please refer to Errata 2, Item 2.

8.0 Reference: Exhibit B-1, Appendix B and pages 55-57

Q8.1 Please explain why the annual capital costs are lower in 2009, 2010 and 2011 under Plan 1 (Appendix B, page 2) than for Plans 2 or 3 (Appendix B, pages 5 and 8) when Plans 1 and 2 have the same removal rate for the first three years (i.e., 39 circuit kilometres) and the removal rate for Plan 3 is even slower.

A8.1 Based on Table A8.1 below (which is derived from data in Appendix B, Exhibit B-1), please note that the cumulative annual capital costs for Plan 1 during 2009-11 period is not lower than that of Plan 2 and Plan 3, but is in fact higher. However, it is lower in 2009 and 2010 since Plan 1 involves the replacement of smaller amounts of lines during those periods compared to 2011 as shown in Table A8.1 below.

Table A8.1
Cumulative Annual Costs by Plan

Years	Plan 1 ($000s)	Circuit km	Plan 2 ($000s)	Circuit km	Plan 3 ($000s)	Circuit km
2008	300	0	300	0	300	0
2009	4,798	22	7,445	39	6,260	29
2010	6,585	28	7,895	39	6,639	29
2011	15,788	66	8,242	39	6,930	29
Total	**27,471**	**117**	**23,882**	**117**	**20,129**	**87**