

Table 5 - Alternative 2 Voltage Summary

Location	Va	Vb	Vc
McRae Sub (35kV)	0.984	0.985	0.984
5L649 EOL	1.033	1.032	1.032
5L631 EOL	-	-	0.964
South McLintock Sub (35kV)	1.016	1.016	1.015
5L611 EOL	-	-	1.001
Marsh Lake Sub (35kV)	0.994	1.000	1.001
5L612 EOL	0.993	-	-
New Constabulary Sub (35kV)	0.989	0.993	0.997
5L615 EOL	0.949	-	-
Johnson Crossing Sub (35kV)	0.979	0.972	0.986
Teslin Lake Sub (35kV)	0.970	0.957	0.978
4L301 EOL	-	0.958	-
Teslin Sub (35kV)	0.968	0.954	0.975
5L613 EOL	1.027	-	-
5L614 EOL	-	1.025	-
Worst Customer Voltage on 6L19	0.968	0.954	0.975

Table 6 - Alternative 2 Voltage Summary 2028

Location	Va	Vb	Vc
McRae Sub (35kV)	0.978	0.980	0.979
5L649 EOL	1.029	1.027	1.027
5L631 EOL	-	-	0.946
South McLintock Sub (35kV)	1.015	1.013	1.012
5L611 EOL	-	-	0.995
Marsh Lake Sub (35kV)	0.991	0.993	0.994
5L612 EOL	0.992	-	-
New Constabulary Sub (35kV)	0.985	0.986	0.989
5L615 EOL	0.934	-	-
Johnson Crossing Sub (35kV)	0.971	0.958	0.974
Teslin Lake Sub (35kV)	0.959	0.939	0.963
4L301 EOL	-	0.940	-
Teslin Sub (35kV)	0.957	0.935	0.960
5L613 EOL	1.027	-	-
5L614 EOL	-	1.025	-
Worst Customer Voltage on 6L19	0.957	0.935	0.960

Alternative 3 - Reconductor 6L11 and install a new regulator on 6L19

This alternative explores reconductoring all of 6L11 with 296 ACSR and installing a new regulator on 6L19 to boost the end of line voltage.

The location for the regulator was chosen to be where the voltage is below 0.97 but is still above 0.95 after the reconductor.

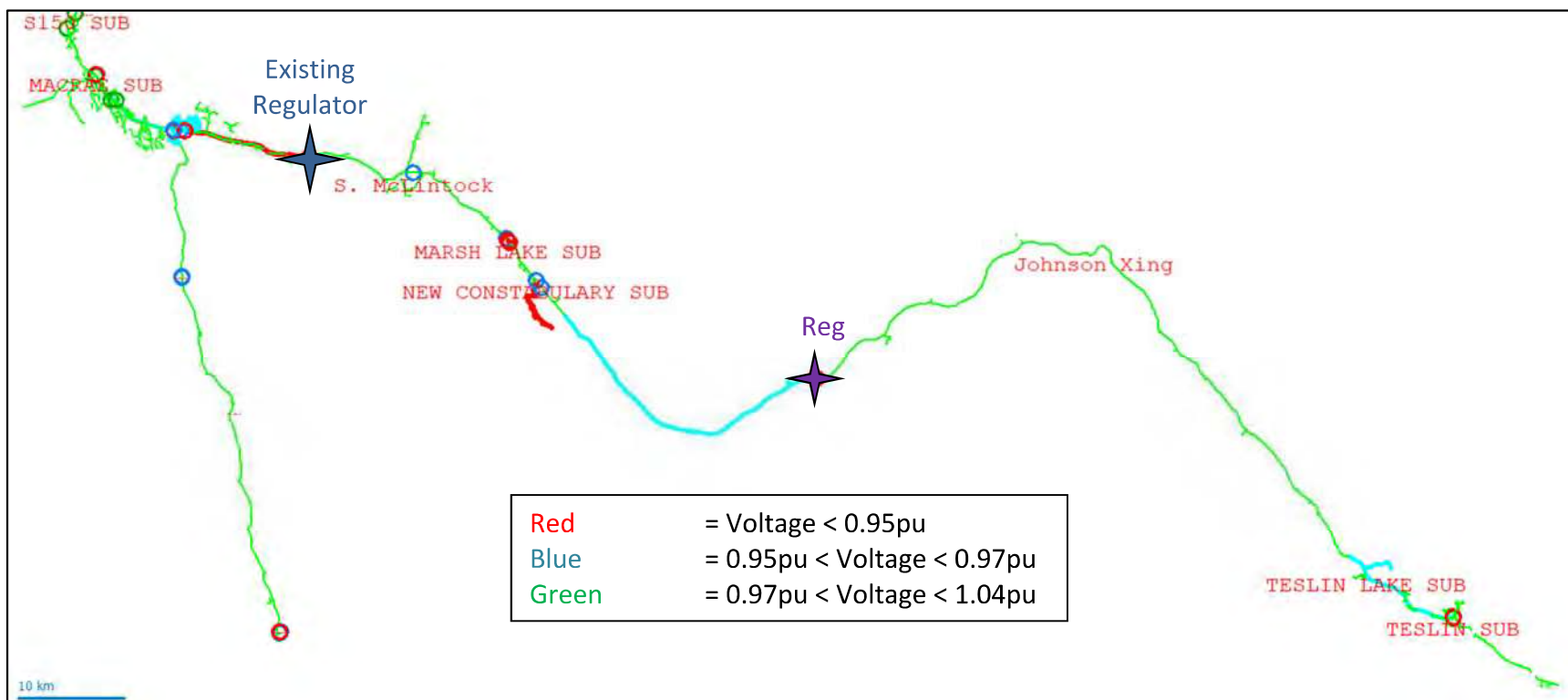


Figure 8 - Alternative 3 Voltage Conditions

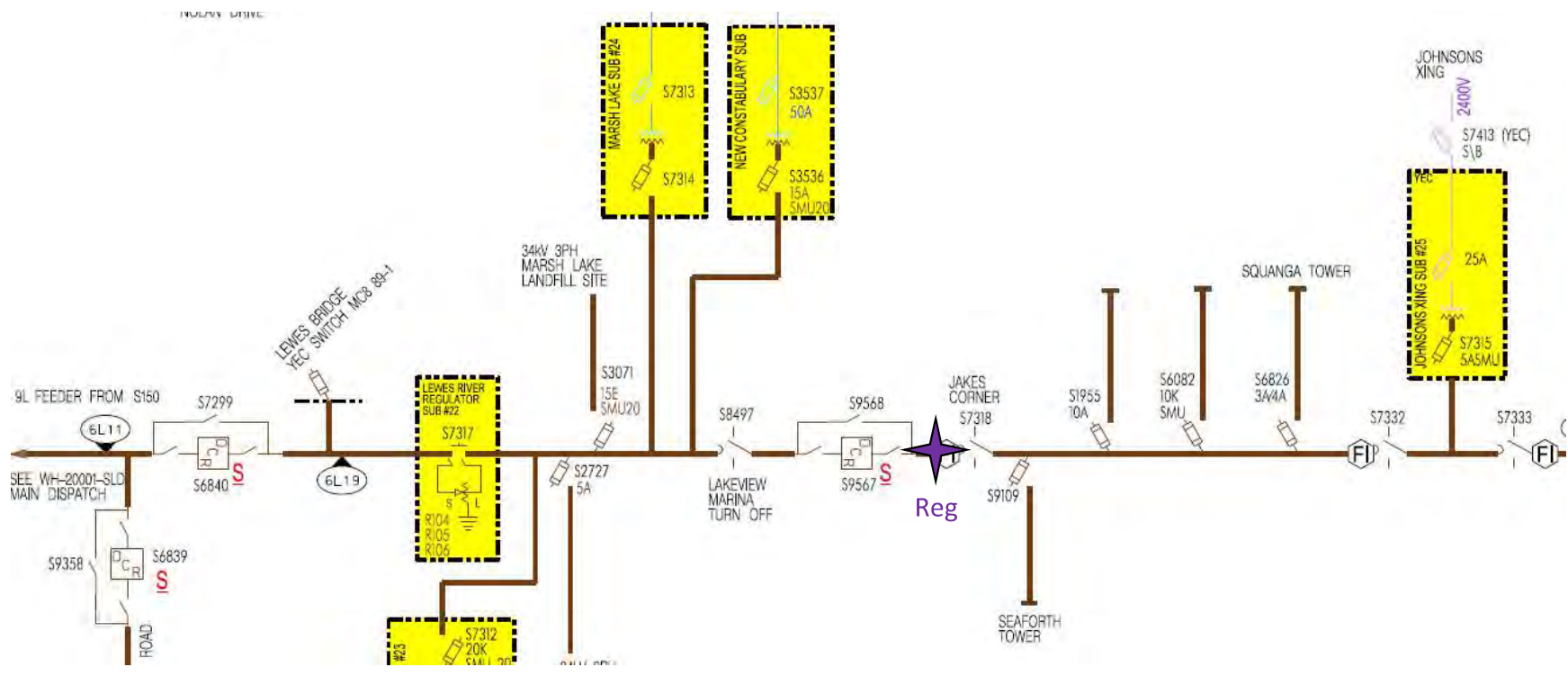


Figure 9 - Alternative 3 Regulator Location SLD

Table 7 - Alternative 3 Voltage Summary

Location	Va	Vb	Vc
McRae Sub (35kV)	0.977	0.978	0.977
5L649 EOL	1.031	1.030	1.029
5L631 EOL	-	-	0.959
South McLintock Sub (35kV)	0.999	1.011	1.024
5L611 EOL	-	-	0.993
Marsh Lake Sub (35kV)	0.979	0.994	0.988
5L612 EOL	0.992	-	-
New Constabulary Sub (35kV)	0.973	0.987	0.983
5L615 EOL	0.931	-	-
Johnson Crossing Sub (35kV)	1.020	1.007	1.019
Teslin Lake Sub (35kV)	0.994	0.968	0.993
4L301 EOL	-	0.972	-
Teslin Sub (35kV)	0.988	0.961	0.987
5L613 EOL	1.033	-	-
5L614 EOL	-	1.026	-
Worst Customer Voltage on 6L19	0.927	0.939	0.929

Table 8 - Alternative 3 Voltage Summary 2028

Location	Va	Vb	Vc
McRae Sub (35kV)	0.971	0.972	0.971
5L649 EOL	1.029	1.025	1.030
5L631 EOL	-	-	0.946
South McLintock Sub (35kV)	0.972	0.986	0.975
5L611 EOL	-	-	0.963
Marsh Lake Sub (35kV)	0.946	0.963	0.955
5L612 EOL	0.992	-	-
New Constabulary Sub (35kV)	0.938	0.954	0.949
5L615 EOL	0.884	-	-
Johnson Crossing Sub (35kV)	0.974	0.963	0.986
Teslin Lake Sub (35kV)	0.940	0.914	0.952
4L301 EOL	-	0.923	-
Teslin Sub (35kV)	0.933	0.905	0.945
5L613 EOL	1.011	-	-
5L614 EOL	-	0.998	-
Worst Customer Voltage on 6L19	0.907	0.921	0.909

Alternative 4 - Boost S150 Voltage, Reconductor 6L11, Install Regulator on 6L19

This alternative explores increasing the S150 voltage to 1.04pu, reconductoring 6L11 using 477 ACSR and installing a new regulator along 6L19. This is a similar approach to Alternative 1, but instead of using a regulator to increase 6L11 voltage, the voltage will be increased at substation S150. The regulator was placed in the same methodology as in Alternative 1.

This alternative would immediately address the voltage issue all along 6L11 and 6L19 with issues arising at McRae and New Constabulary after 5 years. The issue after 5 years at MacRae can easily be addressed by relocating the single-phase regulator further upstream, and the issues at New Constabulary can be fixed by installing a single-phase regulator at the substation.

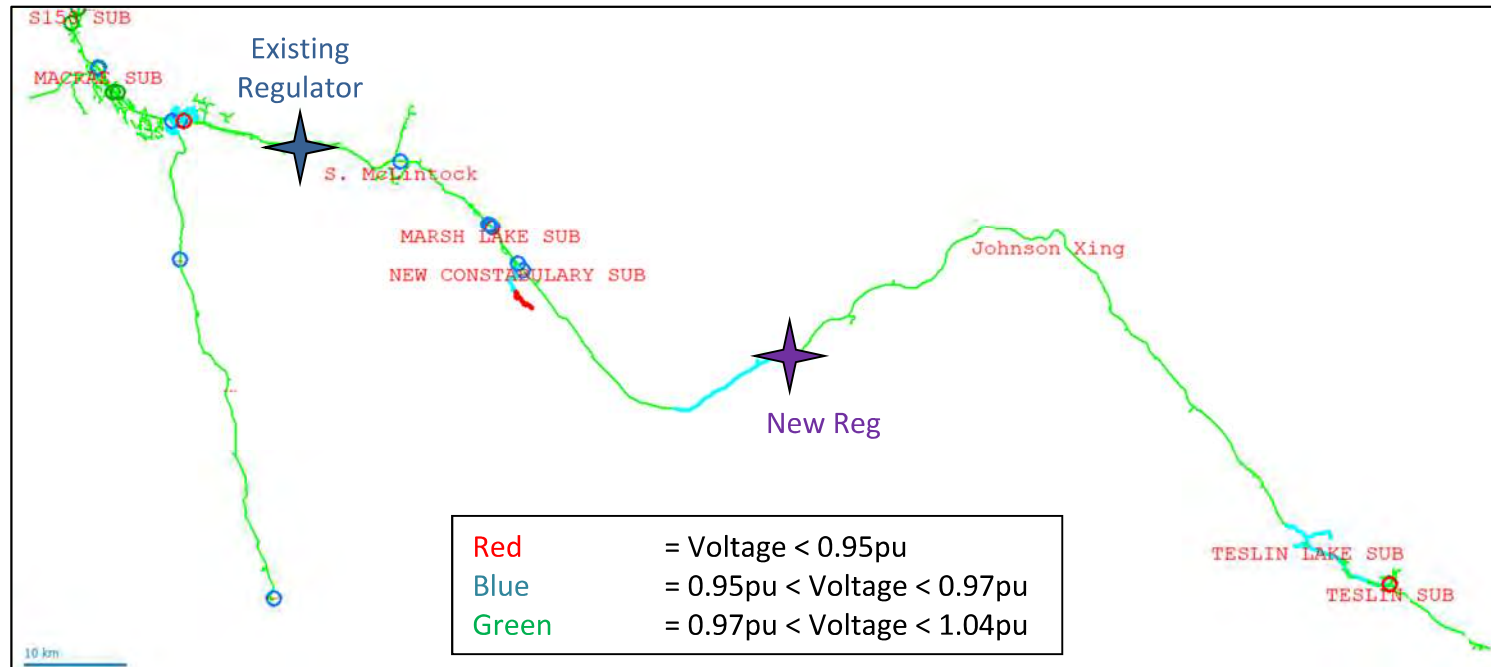


Figure 10 - Alternative 4 Voltage Conditions

Table 9 - Alternative 4 Voltage Summary

Location	Va	Vb	Vc
McRae Sub (35kV)	1.018	1.019	1.019
5L649 EOL	1.032	1.031	1.031
5L631 EOL	-	-	0.961
South McLintock Sub (35kV)	1.018	1.016	1.015
5L611 EOL	-	-	1.002
Marsh Lake Sub (35kV)	0.998	0.999	1.001
5L612 EOL	0.992	-	-
New Constabulary Sub (35kV)	0.992	0.992	0.997
5L615 EOL	0.948	-	-
Johnson Crossing Sub (35kV)	1.017	1.007	1.016
Teslin Lake Sub (35kV)	0.991	0.968	0.990
4L301 EOL	-	0.969	-
Teslin Sub (35kV)	0.985	0.960	0.984
5L613 EOL	1.030	-	-
5L614 EOL	-	1.024	-
Worst Customer Voltage on 6L19	0.988	0.963	0.986

Table 10 - Alternative 4 Voltage Summary 2028

Location	Va	Vb	Vc
McRae Sub (35kV)	1.013	1.014	1.013
5L649 EOL	1.029	1.027	1.027
5L631 EOL	-	-	0.943
South McLintock Sub (35kV)	1.012	1.007	1.009
5L611 EOL	-	-	1.002
Marsh Lake Sub (35kV)	0.987	0.985	0.992
5L612 EOL	0.991	-	-
New Constabulary Sub (35kV)	0.980	0.976	0.986
5L615 EOL	0.927	-	-
Johnson Crossing Sub (35kV)	1.011	0.991	1.011
Teslin Lake Sub (35kV)	0.979	0.943	0.979
4L301 EOL	-	0.950	-
Teslin Sub (35kV)	0.972	0.934	0.972
5L613 EOL	1.031	-	-
5L614 EOL	-	1.019	-
Worst Customer Voltage on 6L19	0.954	0.937	0.961

Alternative 5 - Boost S150, Relocate Two Reg Banks, and Install Regulator on 6L11

This alternative relocates existing regulators on the system to better align with system demand, while lowering costs by reusing assets versus buying new ones. Two reg banks will be relocated to within the 6L19 line, while a new 200A reg bank will be installed on 6L11.

The location for the new 200A regulator will be on 6L11 upstream of Macrae where voltage begins to dip below 0.95pu (between Fireweed Dr and Salmon Tr). The 100A Lewes River regulator bank will be relocated approximately 11km downstream, just before South McLintock substation. Lastly, the 6L18 Carcross Cutoff 100A reg bank will be relocated to the Summit Lake area (approx. 5km West of Squanga Lake Campground).

The three load shed events that have the risk for the highest voltage are the loss of Teslin sub, the opening of the Judas Creek recloser, and the opening of the 6L18 Carcross Cutoff recloser. During the loss of Teslin sub, the maximum voltage at the new 6L19 regulator is 1.152pu. This is below the long line rural maximum voltage of 1.167pu. During the opening of the Judas Creek recloser and the Carcross Cutoff recloser the worst-case voltage will occur on 5L613 in Teslin with a voltage of 1.095pu and 1.094pu respectively. This is also within the acceptable range for over voltage.

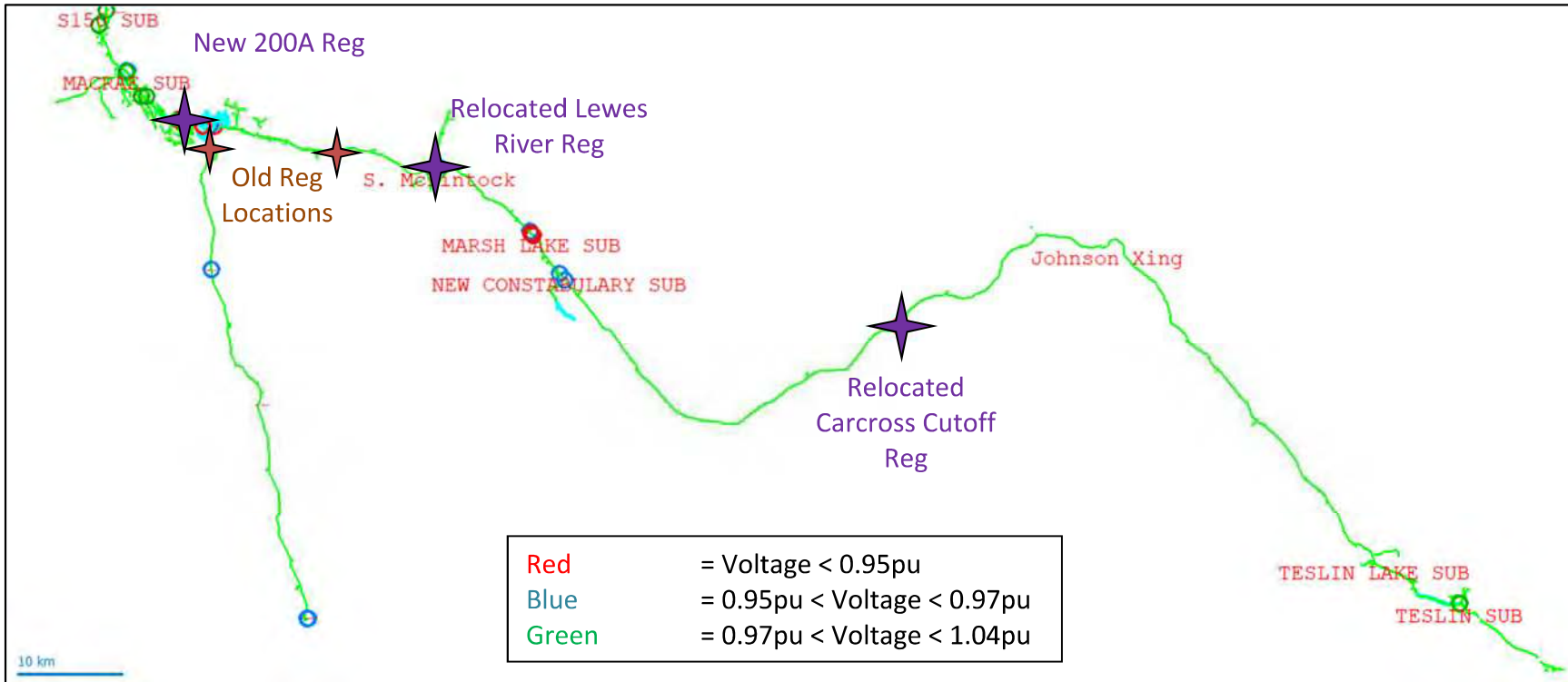
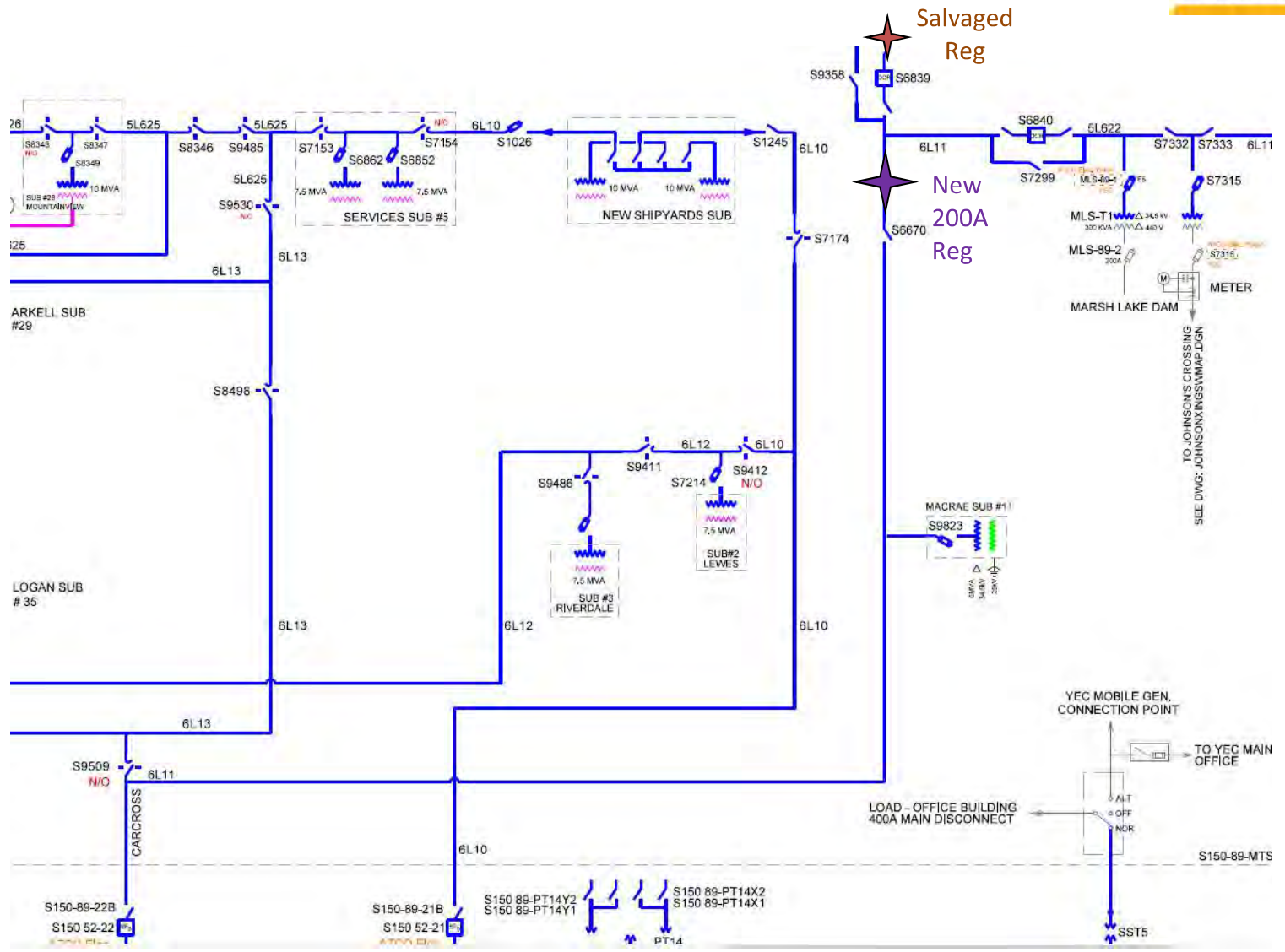


Figure 11 - Alternative 5 Voltage Conditions



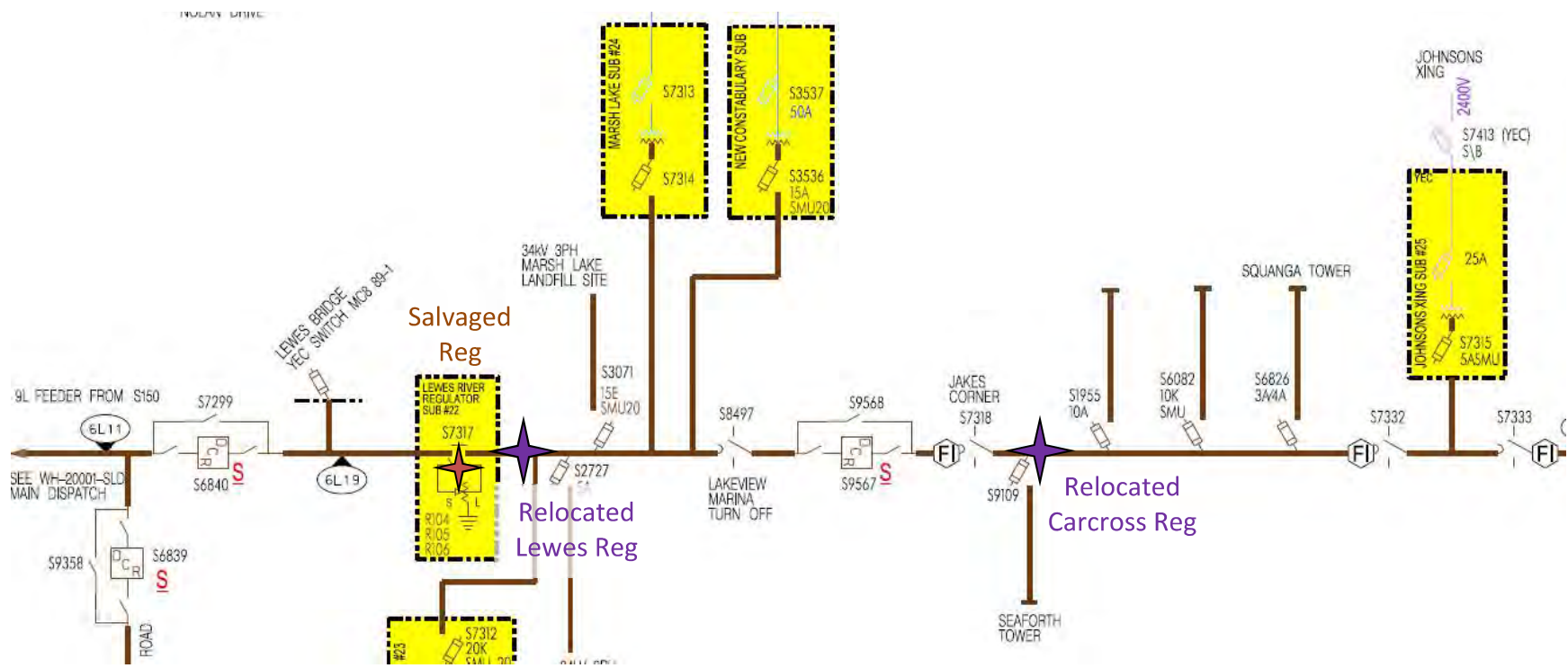


Table 11 - Alternative 5 Voltage Summary

Location	Va	Vb	Vc
McRae Sub (35kV)	0.987	0.989	0.987
5L649 EOL	1.030	1.029	1.029
5L631 EOL	-	-	0.958
South McLintock Sub (35kV)	1.038	1.039	1.035
5L611 EOL	-	-	1.024
Marsh Lake Sub (35kV)	1.018	1.022	1.021
5L612 EOL	0.994	-	-
New Constabulary Sub (35kV)	1.012	1.015	1.017
5L615 EOL	0.968	-	-
Johnson Crossing Sub (35kV)	1.020	1.013	1.019
Teslin Lake Sub (35kV)	0.994	0.974	0.993
4L301 EOL	-	0.975	-
Teslin Sub (35kV)	0.988	0.967	0.987
5L613 EOL	1.033	-	-
5L614 EOL	-	1.030	-
Worst Customer Voltage on 6L19	0.991	0.970	0.989

Table 12 - Alternative 5 Voltage Summary 2028

Location	Va	Vb	Vc
McRae Sub (35kV)	0.975	0.976	0.974
5L649 EOL	1.030	1.030	1.028
5L631 EOL	-	-	0.944
South McLintock Sub (35kV)	1.036	1.034	1.035
5L611 EOL	-	-	1.019
Marsh Lake Sub (35kV)	1.013	1.022	1.017
5L612 EOL	0.993	-	-
New Constabulary Sub (35kV)	1.005	1.005	1.012
5L615 EOL	0.952	-	-
Johnson Crossing Sub (35kV)	1.020	1.011	1.016
Teslin Lake Sub (35kV)	0.988	0.964	0.984
4L301 EOL	-	0.963	-
Teslin Sub (35kV)	0.981	0.955	0.977
5L613 EOL	1.032	-	-
5L614 EOL	-	1.031	-
Worst Customer Voltage on 6L19	0.984	0.959	0.980

Alternative 6 - Scenario 4 THELP: Install Regulator on 6L11, Install Regulator on 6L19

This alternative is the exact same as Alternative 1; however, the regulators will be installed at the locations specified by the THELP project.

The two load shed events that have the risk for the highest voltage are the loss of Teslin sub and the opening of the Judas Creek recloser. During the loss of Teslin sub, the maximum voltage at the new 6L19 regulator is 1.121pu. This is below the long line rural maximum voltage of 1.167pu. During the opening of the Judas Creek recloser, the worst-case voltage will occur on 5L613 in Teslin with a voltage of 1.091pu. This is also within the acceptable range for over voltage.

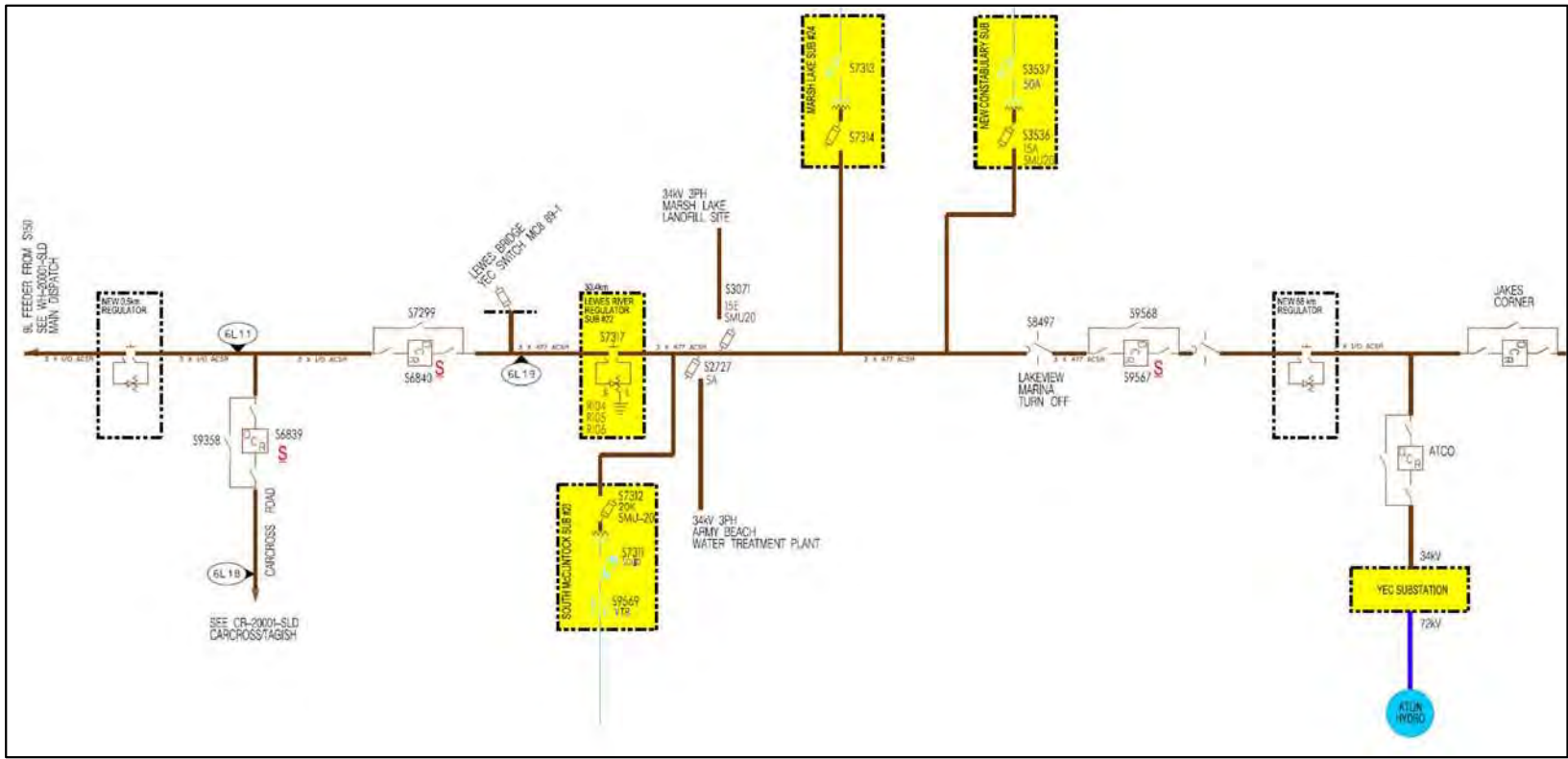


Figure 12 - THELP Regulator Placement SLD

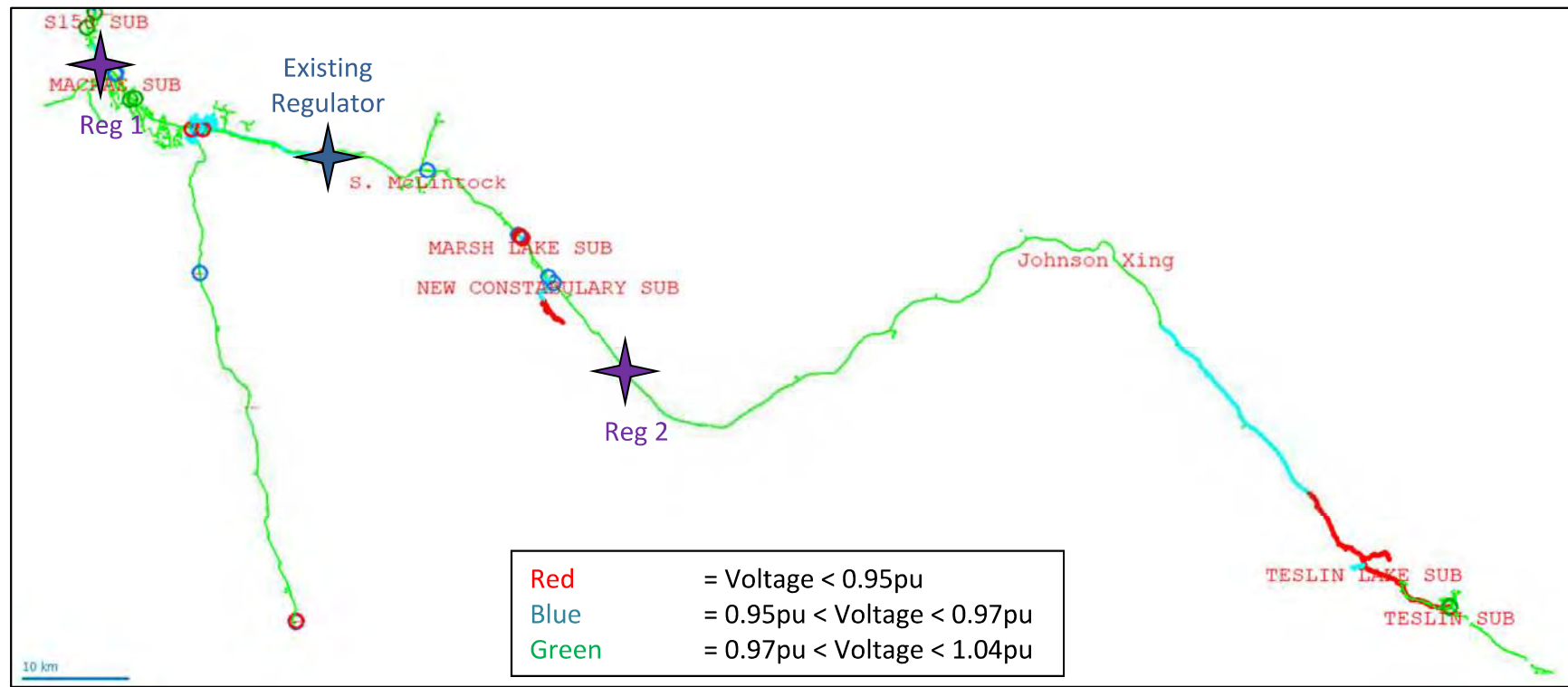


Figure 13 - Alternative 6 Voltage Conditions



Table 13 - Alternative 6 Voltage Summary

Location	Va	Vb	Vc
McRae Sub (35kV)	1.023	1.025	1.028
5L649 EOL	1.033	1.030	1.033
5L631 EOL	-	-	0.963
South McLintock Sub (35kV)	1.017	1.014	1.015
5L611 EOL	-	-	1.001
Marsh Lake Sub (35kV)	0.997	0.997	1.000
5L612 EOL	0.990	-	-
New Constabulary Sub (35kV)	0.991	0.990	0.996
5L615 EOL	0.946	-	-
Johnson Crossing Sub (35kV)	1.005	0.982	1.004
Teslin Lake Sub (35kV)	0.979	0.942	0.977
4L301 EOL	-	0.951	-
Teslin Sub (35kV)	0.973	0.935	0.971
5L613 EOL	1.028	-	-
5L614 EOL	-	1.016	-
Worst Customer Voltage on 6L19	0.975	0.944	0.973

Table 14 - Alternative 6 Voltage Summary 2028

Location	Va	Vb	Vc
McRae Sub (35kV)	1.022	1.023	1.021
5L649 EOL	1.031	1.025	1.029
5L631 EOL	-	-	0.946
South McLintock Sub (35kV)	1.004	1.010	1.006
5L611 EOL	-	-	0.992
Marsh Lake Sub (35kV)	0.979	0.988	0.988
5L612 EOL	0.994	-	-
New Constabulary Sub (35kV)	0.972	0.980	0.982
5L615 EOL	0.919	-	-
Johnson Crossing Sub (35kV)	0.992	0.975	0.997
Teslin Lake Sub (35kV)	0.960	0.926	0.964
4L301 EOL	-	0.935	-
Teslin Sub (35kV)	0.952	0.917	0.957
5L613 EOL	1.028	-	-
5L614 EOL	-	1.017	-
Worst Customer Voltage on 6L19	0.955	0.921	0.960



Conclusions

Reconductoring costs for Alternatives 2, 3, and 4 are all substantially greater in cost than to install regulators or boost S150 output voltage; therefore, the previously listed alternatives weren't as heavily considered as the remaining alternatives.

Alternative 5 is the recommended alternative as it immediately solves the 35kV low voltage issues for the entire 6L11 and 6L19 line without any need for reconductoring and can benefit from cost savings through relocating two 100A regulators versus buying new ones. This alternative also performs the best in the year 2028 and is the only alternative that addresses the low voltage conditions on the 25kV New Constabulary distribution system.

- New 200A regulator on 6L11 upstream of Macrae (between Fireweed Dr and Salmon Tr)
- Relocate 100A Lewes River regulator bank approximately 11km downstream, just before South McLintock substation
- Relocate 6L18 Carcross Cutoff 100A regulator bank to the Summit Lake area (approx. 5km West of Squanga Lake Campground)



Appendix (Overview of Voltage Conditions per Alternative)

Existing			
Location	Va	Vb	Vc
McRae Sub (35kV)	0.945	0.946	0.944
5L649 EOL	1.019	1.019	1.018
5L631 EOL	-	-	0.949
South McLintock Sub (35kV)	0.932	0.946	0.934
5L611 EOL	-	-	0.926
Marsh Lake Sub (35kV)	0.909	0.927	0.917
5L612 EOL	0.958	-	-
New Constabulary Sub (35kV)	0.902	0.919	0.912
5L615 EOL	0.855	-	-
Johnson Crossing Sub (35kV)	0.851	0.843	0.861
Teslin Lake Sub (35kV)	0.819	0.796	0.828
4L301 EOL	-	0.802	-
Teslin Sub (35kV)	0.812	0.787	0.821
5L613 EOL	0.879	-	-
5L614 EOL	-	0.868	-
Worst Voltage on 6L19	0.815	0.791	0.824

Alternative 1			Alternative 2			Alternative 3			Alternative 4			Alternative 5			Alternative 6		
Va	Vb	Vc	Va	Vb	Vc	Va	Vb	Vc	Va	Vb	Vc	Va	Vb	Vc	Va	Vb	Vc
1.025	1.027	1.025	0.984	0.985	0.984	0.977	0.978	0.977	1.018	1.019	1.019	0.987	0.989	0.987	1.023	1.025	1.028
1.033	1.027	1.032	1.033	1.032	1.032	1.031	1.030	1.029	1.032	1.031	1.031	1.030	1.029	1.029	1.033	1.030	1.033
-	-	0.964	-	-	0.964	-	-	0.959	-	-	0.961	-	-	0.958	-	-	0.963
1.017	1.013	1.020	1.016	1.016	1.015	0.999	1.011	1.024	1.018	1.016	1.015	1.038	1.039	1.035	1.017	1.014	1.015
-	-	1.003	-	-	1.001	-	-	0.993	-	-	1.002	-	-	1.024	-	-	1.001
0.998	0.996	1.007	0.994	1.000	1.001	0.979	0.994	0.988	0.998	0.999	1.001	1.018	1.022	1.021	0.997	0.997	1.000
0.995	-	-	0.993	-	-	0.992	-	-	0.992	-	-	0.994	-	-	0.990	-	-
0.995	0.990	1.003	0.989	0.993	0.997	0.973	0.987	0.983	0.992	0.992	0.997	1.012	1.015	1.017	0.991	0.990	0.996
0.952	-	-	0.949	-	-	0.931	-	-	0.948	-	-	0.968	-	-	0.946	-	-
1.019	1.006	1.018	0.979	0.972	0.986	1.020	1.007	1.019	1.017	1.007	1.016	1.020	1.013	1.019	1.005	0.982	1.004
0.994	0.969	0.993	0.970	0.957	0.978	0.994	0.968	0.993	0.991	0.968	0.990	0.994	0.974	0.993	0.979	0.942	0.977
-	0.972	-	-	0.958	-	-	0.972	-	-	0.969	-	-	0.975	-	-	0.951	-
0.988	0.962	0.987	0.968	0.954	0.975	0.988	0.961	0.987	0.985	0.960	0.984	0.988	0.967	0.987	0.973	0.935	0.971
1.027	-	-	1.027	-	-	1.033	-	-	1.030	-	-	1.033	-	-	1.028	-	-
-	1.021	-	-	1.025	-	-	1.026	-	-	1.024	-	-	1.030	-	-	1.016	-
0.958	0.973	0.960	0.968	0.954	0.975	0.927	0.939	0.929	0.988	0.963	0.986	0.991	0.970	0.989	0.975	0.944	0.973

September 28, 2023

AEY-UCG-093

**ATCO Electric Yukon (AEY)
2023-2024 General Rate Application (GRA)**

**Information Responses Round 1 to:
The Yukon Utilities Consumers' Group (UCG)
Received: September 6, 2023**

AEY-UCG-093

Reference: Whistle Bend Subdivision, BC#31; Costs ? million

Request:

- (a) Are all the costs for the distribution system paid for by YG?
- (b) Provide engineering qualifications streetlight work and the economic analyses identifying the business drivers and cost/benefits, including the preliminary engineering estimate of costs. Provide engineers report.

Response:

- (a) All costs less the Board approved street light investment were paid for by YG.
- (b) Please refer to the response to AEY-UCG-066(a). There was no engineering report done to identify needs and drivers for the project. The developer identified the need and area of development for streetlighting and electrical infrastructure.

September 28, 2023

AEY-UCG-094

**ATCO Electric Yukon (AEY)
2023-2024 General Rate Application (GRA)**

**Information Responses Round 1 to:
The Yukon Utilities Consumers' Group (UCG)
Received: September 6, 2023**

AEY-UCG-094

Reference: Fish Lake 1 Roof Replacement, BC#32; Cost \$511,000

Request:

- (a) Provide all the \$amounts with work completed that AEY spent on Fish Lake improvements/infrastructure in last 10 years or since the start of replacements.
- (b) Provide a cost/benefit analysis demonstrating this was viable. Give alternatives.

Response:

- (a) Please refer to the response to AEY-UCG-101(a).
- (b) Cost benefit was not a driver. Numerous repair attempts were made without success, leaving no alternatives to the replacement.

September 28, 2023

AEY-UCG-095

**ATCO Electric Yukon (AEY)
2023-2024 General Rate Application (GRA)**

**Information Responses Round 1 to:
The Yukon Utilities Consumers' Group (UCG)
Received: September 6, 2023**

AEY-UCG-095

Reference: Louise Lake Auxiliary Structure Replacement, BC #33; Cost \$826,000

Request:

- (a) Provide all the \$amounts with work completed that AEY spent on Fish Lake hydro system improvements/infrastructure in last 10 years or since the start of replacements.
- (b) Provide a cost/benefit analysis demonstrating this was viable. Give alternatives.

Response:

- (a) Please refer to the response to AEY-UCG-101(a).
- (b) Cost-benefit was not a driver. The structure is required to manage flood events. It was recommended to be replaced in 2015 by Northland Earth and Water and in 2019 by Morrison Hershfield. No alternatives are available.

September 28, 2023

AEY-UCG-096

**ATCO Electric Yukon (AEY)
2023-2024 General Rate Application (GRA)**

**Information Responses Round 1 to:
The Yukon Utilities Consumers' Group (UCG)
Received: September 6, 2023**

AEY-UCG-096

Reference: YG Robert Campbell Highway Streetlights, BC #34; Cost \$67,000

Request:

- (a) Is the above the amount AEY is proposing to recoup from ratepayers?
- (b) What are these costs for?

Response:

- (a) Correct. In accordance with Section 1(c) in Schedule B to AEY's Terms and Conditions of Service (T&Cs),¹ the maximum company investment is \$1,240 per light.
- (b) This is the approved portion of the cost of installing new municipal lighting for which AEY is responsible under the T&Cs.

¹ <https://www.atcoelectricityukon.com/content/dam/web/electric-yukon/yecl-yec-terms-of-service-july-2011.pdf>, p. 33.

September 28, 2023

AEY-UCG-097

**ATCO Electric Yukon (AEY)
2023-2024 General Rate Application (GRA)**

**Information Responses Round 1 to:
The Yukon Utilities Consumers' Group (UCG)
Received: September 6, 2023**

AEY-UCG-097

Reference: Artic -Pharm IPP Site, BC #35; Cost \$543,000

Request:

- (a) Why is this infrastructure requirement not paid for by the IPP or YG and not the ratepayer?

Response:

- (a) Please refer to paragraph 3 in Business Base #35, which states that the project is fully contributed by the customer.

September 28, 2023

AEY-UCG-098

**ATCO Electric Yukon (AEY)
2023-2024 General Rate Application (GRA)**

**Information Responses Round 1 to:
The Yukon Utilities Consumers' Group (UCG)
Received: September 6, 2023**

AEY-UCG-098

Reference: Haeckel Hill Customer Connection, BC #36; Cost \$1.454million

Request:

- (a) Why is this infrastructure requirement not paid for by the IPP or YG and not the ratepayer?

Response:

- (a) Please refer to paragraph 3 in Business Case #36, which states that the project is fully contributed by the customer.

September 28, 2023

AEY-UCG-099

**ATCO Electric Yukon (AEY)
2023-2024 General Rate Application (GRA)**

**Information Responses Round 1 to:
The Yukon Utilities Consumers' Group (UCG)
Received: September 6, 2023**

AEY-UCG-099

Reference: Artic -Pharm IPP Site, BC #37; Cost \$4.204million

AEY states:

3. This is a fully contributed customer-driven interconnection project/

Request:

(a) Is all this infrastructure paid for by the IPP without any costs to the ratepayer?

Response:

(a) Please refer to paragraph 3 in Business Case #37, which states that the project is fully contributed by the customer.

September 28, 2023

AEY-UCG-100

**ATCO Electric Yukon (AEY)
2023-2024 General Rate Application (GRA)**

**Information Responses Round 1 to:
The Yukon Utilities Consumers' Group (UCG)
Received: September 6, 2023**

AEY-UCG-100

Reference: Beaver Creek Photovoltaic Project, BC38; Cost \$8.017million

AEY states:

3. This is a fully contributed customer-driven interconnection project/

Request:

(a) Is all this infrastructure paid for by the IPP without any costs to the ratepayer?

Response:

(a) Confirmed.

September 28, 2023

AEY-UCG-101

**ATCO Electric Yukon (AEY)
2023-2024 General Rate Application (GRA)**

**Information Responses Round 1 to:
The Yukon Utilities Consumers' Group (UCG)
Received: September 6, 2023**

AEY-UCG-101

Reference: Fish Lake 2 Power Station Design, BC#39; Cost \$912,000

Request:

- (a) Provide all the \$amounts with work completed that AEY spent on Fish Lake improvements/infrastructure in last 10 years or since the start of replacements.
- (b) Provide a cost/benefit analysis demonstrating this was/is viable. Give alternatives.

Response:

- (a) Refer to AEY-UCG-101(a) Attachment 1, and the summary below of expenses attributed to Generation or Waterway category assets at Fish Lake. AEY notes that projects and costs in 2013-2017 were reviewed and approved by the Board in Board Orders 2014-06 and 2017-01. In the below breakdown, Waterway is defined as infrastructure hypothetically required for water management, irrespective of the existence of Generation equipment.

**Table 1: Generation or Waterway Category Assets - Fish Lake
(\$000)**

Category	2013-2017	2018-2022	2023-2024	Total
	Actuals		Test Period	
Waterway	6,419	1,474	1,351	9,394
Generation	2,238	231	1,752	4,221

- (b) It is important to understand that water control structures, spillways, ditches, dams and associated infrastructure used to direct, control and monitor water are, and will continue to be in perpetuity, required to safely convey water throughout the Fish Lake drainage system, regardless of whether electricity is made through

September 28, 2023

AEY-UCG-101

hydro-generating plants. This is a hydro system with an accompanying Type A Water Licence (HY12-065 expires 2038) that directs “all works associated with this licence shall be maintained by the Licensee in good order, consistent with sound engineering and environmental practices”. Fish Lake 1 plant failed in 2010, at its end of life (i.e., 50+ years) and Fish Lake 2 plant is nearing 70-years of age. These generating facilities, and the associated waterway infrastructure, are legacy assets that require capital investment due to the deterioration of condition, modernization and change in technical and occupational standards, and evolving risk management practices reflected in regulation (e.g., Canadian Dam Safety Guidelines).

A large proportion of the capital work completed in 2018-2022, and proposed for the Test Years, is directly attributable to compliance with Yukon Water Board (YWB) directives or licence conditions. Costs attributed to the Generation category are related to maintenance of the hydro-generator facilities and equipment to produce electricity. The proposed Test Period expenditures of \$912,000 to proceed with design and estimating for a replacement FL2 power station progresses the lowest risk alternative identified in the business case (Table 2 of Business Case #39). This will result in increased reliability, greater capacity, and extension of its lifespan. Fish Lake is a permitted and operational renewable source of power and AEY sees the value in continued production due to YIS capacity constraints and Yukon government emissions objectives, with due consideration of YWB obligations.

ATCO Electric Yukon (AEY)
2023-2024 General Rate Application (GRA)
Generation and Waterway Expenditures for Fish Lake
(\$000)

Line No.	GRA	S9.2 Line No.	Project Name	Category (Waterway / Generation)	2013		2014		2015		2016		2017		2018	2019	2020	2021	2022	2023	2024	
					Actual	Approved	Actual	Approved	Actual	Approved	Actual	Approved	Actual	Approved	Actual	Actual	Actual	Actual	Actual	Test	Test	
1	2016-17	2	Fish Lake Unit 1 Turbine and Building Replacement	Generation	1,409	1,798	426		15													
2	2016-17	3	Fish Lake Dyke Upgrade	Waterway	326	300	2,226	1,420														
3	2016-17	4	Fish Lake Unit 2 Siding Replacement	Generation	51	35																
4	2016-17	5	Louise Lake Control Structure	Waterway	49	-																
5	2016-17	6	Fish Lake Unit 1 Fiber Communication	Generation	45	20																
6	2016-17	7	Fish Lake Unit 2 SCADA	Generation	44	50																
7	2016-17	8	Fish Lake Unit 2 Penstock Improvements	Generation	43	40																
8	2016-17	9	Fish Lake Unit 1 Spillway Diversion Structure	Waterway	22	20		100					30	413	0	220	527	-5				
9	2016-17	10	Fish Lake Unit 2 Building Improvements	Generation	20	20																
10	2016-17	11	Fish Lake Unit 2 Vibration Monitoring	Generation	19	20																
11	2016-17	12	Fish Lake Ditch 3 Diversion Replacement	Waterway	16	-	51	1,640	67		2,915											
12	2016-17	13	Fish Lake Unit 2 Head Pond Low Level Outlet Pipe	Waterway				30														
13	2016-17	14	Fish Lake Unit 1 Needle Detach Failure	Generation					21													
14	2016-17	15	Fish Lake Unit 2 Assessment	Generation							98	100	11		-112						35	
15	2016-17	16	Fish Lake Water Monitoring Upgrades	Waterway								25		26								
16	2016-17	17	Fish Lake #2 Head Pond Spillway Replacement	Waterway	30	30					286	20	166	593	540	-17						
17	2016-17	18	Louise Lake Containment Dyke Seismic Analysis	Waterway								40										
18	2016-17	19	Fish Lake Ditch 1 Intake Building - Design	Waterway							2	-	1	31	115	-26	11					
19	2023-24	2	Fish Lake Unit 2 - Replace Power Station - Detailed Design	Generation																		527
20	2023-24	3	Fish Lake 1 Roof Replacement	Generation																		452
21	2023-24	4	Fish Lake 2 Replace Power Station FEED	Generation																		385
22	2023-24	5	Fish Lake 2 Head pond Intake Building Replacement	Waterway																		153
23	2023-24	7	Fish Lake Ditch 1 Failure	Waterway							412		-150									
24	2023-24	11	Fish Lake Unit 2 Condition Assessment and Options Analysis	Generation																		66
25	2023-24	12	Fish Lake 2 TIV actuator and wicket gates	Generation																		37
26	2023-24	13	Fish Lake Unit 1 Roof Design	Generation																		43
27	2023-24	14	Fish Lake Unit 2 Bearing and Shaft Repair	Generation												48	6					16
28	2023-24	15	Fish Lake Unit 2 TIV Replace	Generation											48	-1						
29	2023-24	16	Fish Lake 1 Add TIV Actuator	Generation																		
30	2023-24	17	Fish Lake 1 TIV replacement	Generation																		24
31	2023-24	18	Fish Lake 2 Add bypass valve actuator and automation	Generation																		89
32	2023-24	19	Fish Lake 2 PLC Replacement	Generation																		35
33	2023-24	20	Fish Lake Unit 2 DC TIV Actuator & Wicket Gate Replacement	Generation																		138
34	2023-24	21	Fish Lake Water Monitoring Upgrades	Waterway							10	25	106	25	1	24	0	0				26
35	2023-24	22	Fish Lake Unit 1 Turbine and Building Replacement	Generation							20	16			16	3	4	3				-71
36	2023-24	23	Fish Lake Ditch 3 Diversion Replacement	Waterway							2,601	2,908	168		30	0		29				-27
37	2023-24	24	Louise Lake Containment Dyke Seismic Analysis	Waterway								40										
38	2023-25	110	Louise Lake Auxiliary Structure Replacement	Waterway												11	31	8	2			1
39	2023-26	123	Add transfer trip scheme	Generation																		100
40	2023-24	124	Fish Creek Diversion	Waterway																		317

Category	2013		2014		2015		2016		2017		2018	2019	2020	2021	2022	2023	2024
	Actual	Approved	Actual	Approved	Actual	Approved	Actual	Approved	Actual	Approved	Actual	Actual	Actual	Actual	Actual	Test	Test
Waterway	443	350	2277	3190	67	0	3311	5973	321	1088	686	212	569	32	-25	180	1171
Generation	1631	1983	426	0	36	0	118	100	27	0	-48	50	10	46	173	1133	619

Category	2013-2017	2018-2022	2023-2024	Total
	Actual	Actual	Test	
Waterway	6419	1474	1351	9244
Generation	2238	231	1752	4221

48

September 28, 2023

AEY-UCG-102

**ATCO Electric Yukon (AEY)
2023-2024 General Rate Application (GRA)**

**Information Responses Round 1 to:
The Yukon Utilities Consumers' Group (UCG)
Received: September 6, 2023**

AEY-UCG-102

Reference: Condition Assessment and Options Program for Beaver Ck. Destruction Bay and Stewart Crossing Generating Plants, BC #40; Cost \$627,000

Request:

- (a) Why wasn't a qualified engineer first tendered to evaluate each site instead of spending over half a million dollars mostly on ATCO Electric, a related company, to evaluate the same thing?

Response:

- (a) ATCO Electric conducted condition assessments for multiple AEY sites in 2012. These condition reports used the corporate asset health framework that was in use at the time. AEY has not fully implemented ATCO's asset management systems or programs for continued condition or health monitoring, so these reports were a snapshot in time that aided in short-term decisions and job definitions.

AEY is recommending using third-party consultants to provide comprehensive expert evaluation of three generating sites, known to be in poor operational condition and nearing end of life, due to a lack of internal asset management systems and technical resources. AEY would like to do so in coordination with AEY's development of asset health indicators and lifecycle decision guidelines, so long range plans and recapitalization decisions can be integrated, data-driven, and systematic going forward. The third-party consultants will also identify options for continued reliable utility service at each location, such as rebuilds or alternatives, based upon performance and reliability values and objectives that AEY identifies

September 28, 2023

AEY-UCG-102

in its strategic asset management plans. AEY expects this work will define large capital investments in future years.

September 28, 2023

AEY-UCG-103

**ATCO Electric Yukon (AEY)
2023-2024 General Rate Application (GRA)**

**Information Responses Round 1 to:
The Yukon Utilities Consumers' Group (UCG)
Received: September 6, 2023**

AEY-UCG-103

Reference: Old Crow Plant Design, BC #41.

Request:

- (a) Why would AEY tender all the design and preliminary work at a cost of \$444,000 before you received an okay from the YUB that this plan was acceptable and viable?
- (b) Why did not AEY conduct a multidisciplinary review before and not after the new construction of a facility in 2014?
- (c) Why would AEY not build for a capacity expansion, i.e., larger units, when you constructed a new facility in 2015?
- (d) Has there ever been flooding in the current facilities?
- (e) How much is AEY requesting to go to rate base on this project in 2023? Explain.
- (f) How much is AEY requesting to go to rate base on this project in 2024? Explain.
- (g) Is AEY requesting the YUB to accept the estimated construction costs of \$10.55 million in this GRA?
- (h) Was the Old Crow #3 generator replaced during the last GRA? If yes, what capacity and what cost?

Response:

- (a) The design and preliminary work is required to be performed ahead of time in order to determine a proper scope of work and to estimate the cost of replacement.
- (b) Due to the limitations of transporting a temporary mobile generator into Old Crow in an emergency, the new plant built in Old Crow was designed to be a stand alone structure to provide redundancy for the community that placing all the generation

September 28, 2023

AEY-UCG-103

in one structure could not provide. Once the new plant was operational, AEY could then evaluate the old plant to decide what the best course of action was for it, renovate or replace.

- (c) The design maximum for the new facility was two units rated at ~700 kW. At the time of design based on current and forecasted load growth, this was determined to be sufficient capacity at that time.
- (d) The existing power plant was impacted during the flood of 1991 where water levels were at plant floor levels.
- (e) AEY is requesting \$0 to go into rate base in 2023.
- (f) AEY is requesting \$0 to go into rate base in 2024.
- (g) No. As indicated on page 9-9 of the Application, AEY filed the Business Case with the Application in an effort to be transparent and to notify the Board and other stakeholders regarding larger upcoming capital expenditures. While AEY is seeking Board approval of the uncapitalized costs for this Project forecast during the Test Period, AEY will seek approval of capital costs forecast to be incurred subsequent to the Test Period in a future GRA.
- (h) Yes, this unit was replaced. The new unit is rated at 680 kW and purchased and installed at a cost of \$1,306,136.