BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

DOCKET UE-240006

DOCKET UG-240007

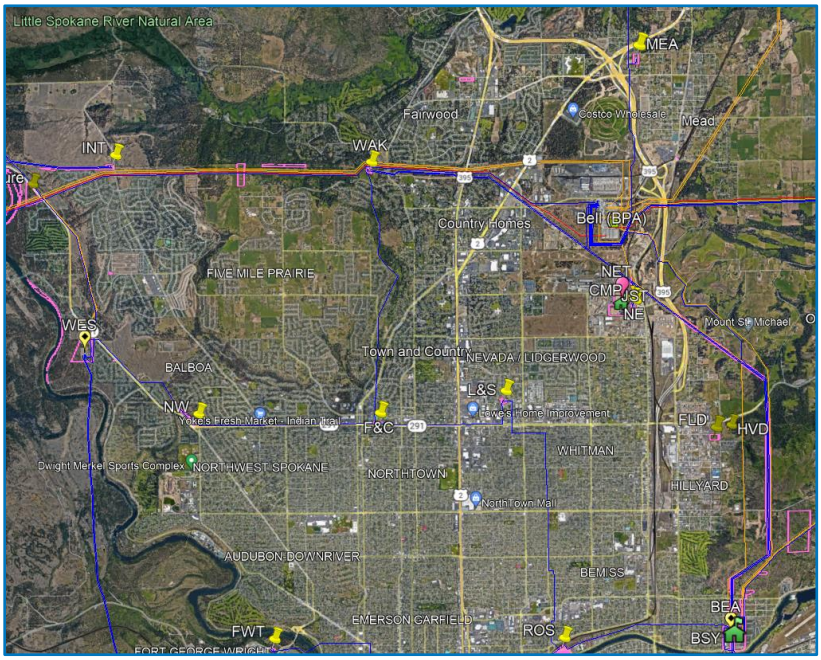
EXH. JDD-9

JOSHUA D. DILUCIANO

REPRESENTING AVISTA CORPORATION

North Spokane Transmission Reinforcement Study

System Impact Study



System Planning
Avista Utilities
PO Box 3727, MSC-16
Spokane, WA 99220
TransmissionPlanning@avistacorp.com

Prepared by: System Planning

Version	Date	Description	Author	Review
V0	1/26/2024	Released	Youngers	Gross

Table of Contents

1. Executive Summary

Growth in North Spokane combined with new operating methodologies and compliance requirements has resulted in a 115kV transmission system in the area with inadequate system performance. There have been numerous accounts in recent years where planned maintenance activities are forgone due to system constraints. Additionally, the System Assessment has identified thermal issues for the Beacon – Francis & Cedar 115kV Transmission Line for N-1-1 (P6) contingencies in 2021 and again in 2023. Numerous N-1-1 outage (A6, P6 & A7) concerns result in inadequate system performance for interconnections between Beacon and Bell. The Beacon and Bell interconnections concerns continue to limit planned outages and may result in load shedding during heavy load hours.

Two proposed projects have been developed to mitigate the identified concerns. The proposed projects can be staged in the implementation, each increasing system reliability, operability, and ultimately providing a more robust transmission system for Avista's customers in the North Spokane region for years to come.

The ultimate scope of the North Spokane Transmission Reinforcement includes new connections to BPA in two locations and pulling four 115kV transmission lines together at a new switching station.

- Loop in existing Boulder – Irvin #1 115kV Transmission Line into BPA's Trentwood station which reduces system reliance on BPA's Bell 230/115kV Transformer #6 and improves system performance for Beacon – Bell interconnections.
- Construct a new switching station (Highland 115kV Station), a new breaker position at BPA's Bell Station, and line reconfigurations to create a Bell – Highland 115kV Transmission Line, Francis & Cedar – Highland 115kV Transmission Line, Highland – Nine Mile 115kV Transmission Line and a Highland – Westside 115kV Transmission Line.

Technical studies have been performed to confirm the projects, as proposed, provide acceptable system performance and mitigate not only the identified performance issues but numerous other system concerns.

The implementation of the proposed projects can be staged and completed independently. The loop in of the Boulder – Irvin #1 115kV Transmission Line into Trentwood is being requested to be in service in 2029 followed closely by the Highland 115kV Station to be completed in 2029 as well.

2. Project Description

2.1. Problem Statement

North Spokane has experienced steady grow in recent years. With the addition of the North Spokane Corridor (estimated completion in 2028) growth will continue to accelerate in the region, further utilizing the region's transmission capacity. The following table shows the forecasted summer load growth for Avista stations in the North Spokane region.

Station	2023	2024	2028	2033	Growth
Beacon N	21.5	21.6	22.2	23.7	**0.68%**
Beacon S	20.9	20.8	21.4	22.9	**0.99%**
Colbert	15.2	15.5	15.8	16.9	**0.33%**
Deer Park	12.5	12.2	12.7	13.6	**1.45%**
F&C	44.6	45.6	46.6	49.8	**0.27%**
Indian Trail	13.4	13.5	13.9	14.9	**0.64%**
Loon Lake	4.1	4.0	4.2	4.5	**1.59%**
L&S	34.8	34.6	35.7	38.1	**1.00%**
Mead	16.7	16.7	17.1	18.3	**0.86%**
Milan	6.3	6.1	6.4	6.8	**1.63%**
Northeast	29.5	29.4	30.3	32.4	**0.87%**
Northwest	26.4	26.9	27.4	29.4	**0.39%**
Waikiki	30.1	30.3	31.1	33.3	**0.62%**

Table 1: North Spokane Summer Load Growth Forecast

North Spokane is generally served by three strong 230/115kV sources including Beacon, Bell (BPA), and Westside. These three sources hold up North Spokane and other areas throughout Spokane, including downtown, the South Hill, the West Plains and the Spokane Valley. An outage of any one of these sources requires additional capacity from the other sources and transmission transport through the 115kV interconnections. Two such outage scenarios in the North Spokane region were identified in the 2021-2022 Avista System Assessment and confirmed in the 2023-2024 System Assessment. Thermal issues were identified on the Beacon – Francis & Cedar 115kV Transmission Line under contingent conditions. Beacon – Bell interconnections also result in thermal issues under near-term P6 contingencies and long-term P1 contingencies.

The System Operating Limits (SOL) methodology requires the BES to be always operated within SOL's post-contingency for the next single contingency. The operating requirements significantly reduce flexibility to perform maintenance of the system therefore reducing reliability. In some instances, planned outages cannot be obtained even in light load conditions.

The following section details system performance concerns on the existing system and known system changes on the planning horizon for the North Spokane region.

2.1.1. Beacon – Bell 115kV Interconnections

There are four 115kV facilities between the Beacon and Bell stations that result in system overloads under operating conditions where two of the following facilities are out of service.

- Bell 230/115kV Transformer #6
- Beacon – Bell #1 115kV Transmission Line
- Beacon – Northeast 115kV Transmission Line
- Bell – Northeast 115kV Transmission Line

A transformer outage followed by an outage of one of three interconnecting 115kV transmission lines (Beacon – Bell, Beacon – Northeast, or Bell – Northeast) results in system overloads on the remaining 115kV transmission line between Beacon and Bell stations. Similarly, an outage of any of the 115kV transmission lines previously listed, followed by a transformer outage results in the same system overloads. Operating the system with any one of the four identified outages may result in post-contingency SOL exceedance.

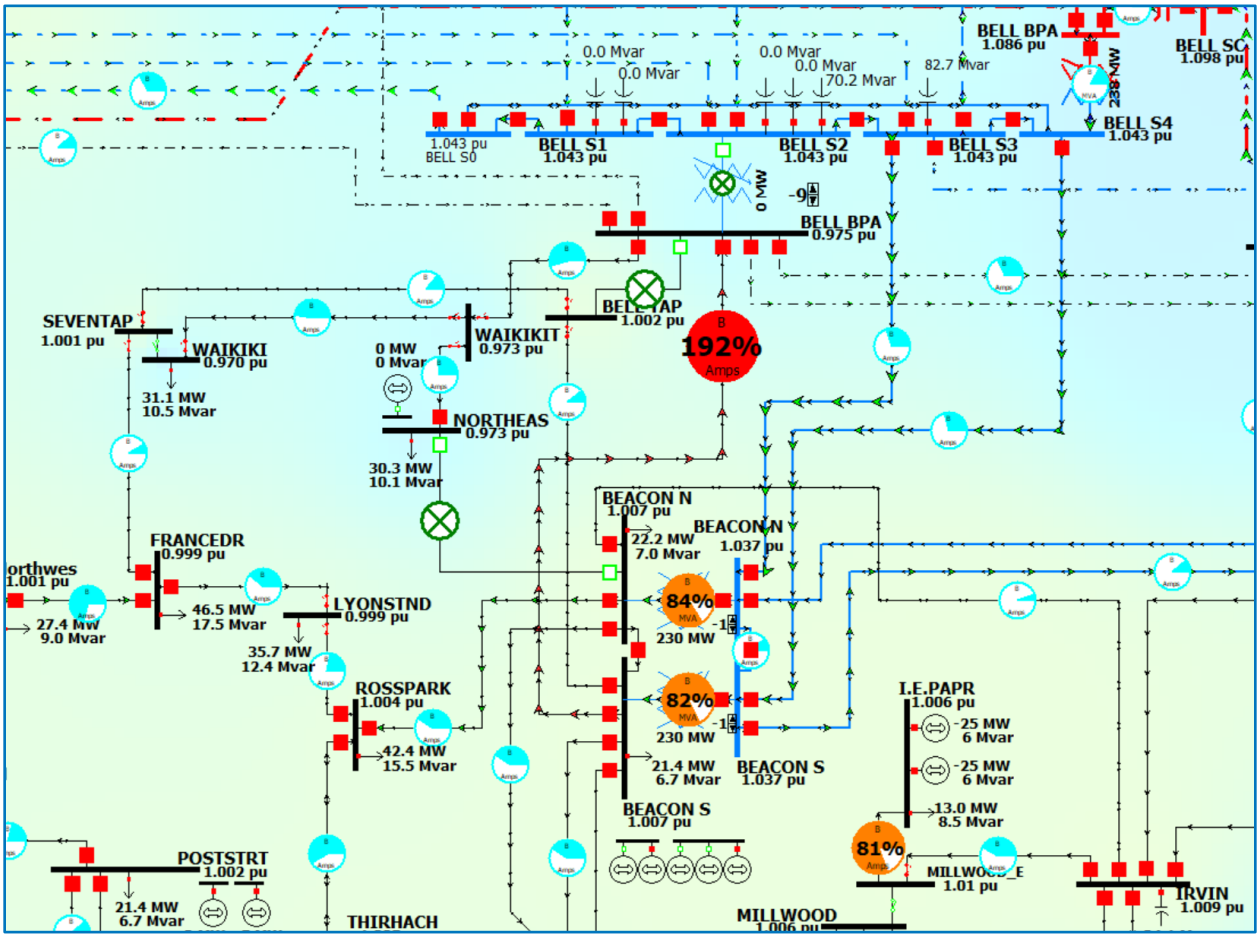


Figure 1: Beacon - Bell 115kV Overload with P6 Contingency

An operating procedure (SOP-42) was developed to mitigate this condition. The operating procedure reconfigures the Beacon – Francis & Cedar 115kV Transmission Line to act as an additional Beacon – Bell 115kV Transmission Line under planned conditions. This requires use of the aux breaker at Bell which is not always available. The operating procedure has provided an alternative to mitigate the concerns thus far but will no longer be sufficient. Thermal concerns due to an N-1 (P1) contingency of the Bell 230/115kV Transformer #6, arose in operations during the 2023 summer season. Steady state analysis of the long-term planning horizon, identified in the 2023-2024 System Assessment, also identified the N-1 (P1) thermal concerns in the heavy summer

scenario. The identified operating procedure will no longer be adequate to mitigate the overload concerns.

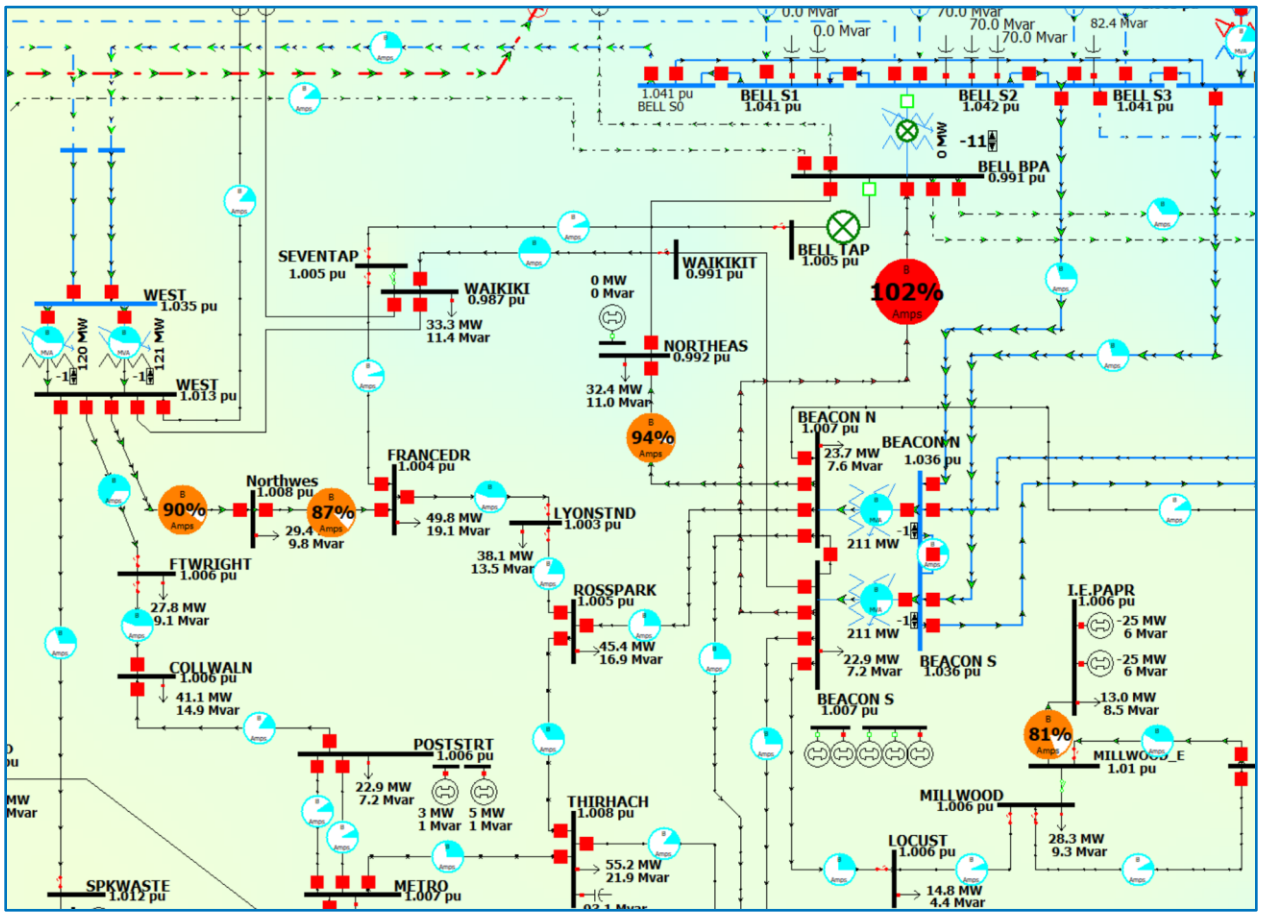


Figure 2: Beacon - Bell 115kV overload with P1 Contingency (Long-term horizon)

2.1.2. Beacon - Francis & Cedar 115kV Transmission Line

The Francis & Cedar Station is served by three 115kV transmission lines. A category P6 contingency involving the Francis & Cedar – Ross Park and Northwest – Westside 115kV Transmission Lines leave only the Beacon – Francis & Cedar 115kV Transmission Line serving the Northwest and Francis & Cedar stations. This outage combination under forced conditions may result in load shedding during Heavy Summer scenarios.

The Beacon – Francis & Cedar 115kV Transmission Line is constrained by sections of seven strand 3/0 copper conductor and 250 copper conductor between the Bell Tap and Waikiki.

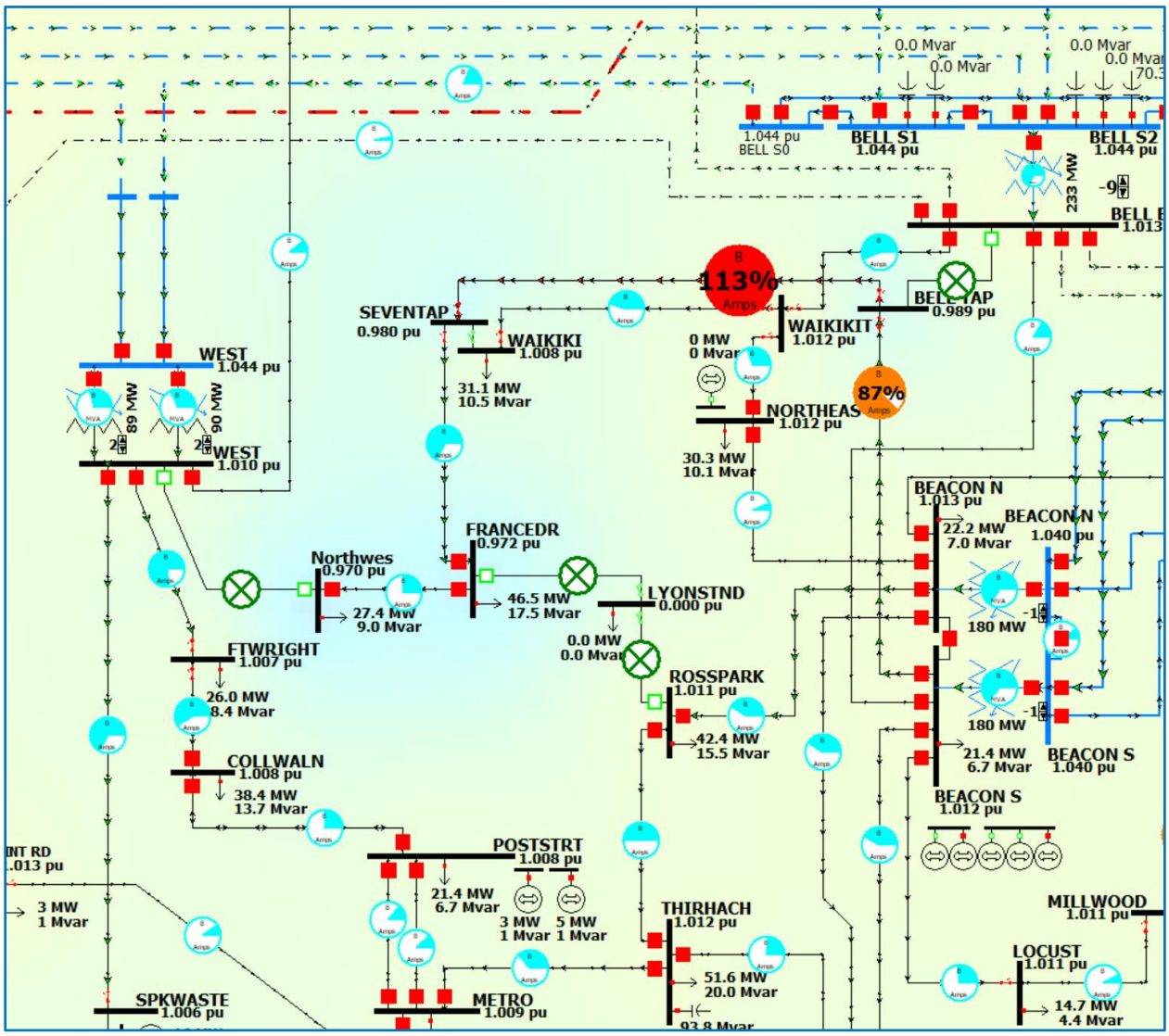


Figure 3: Beacon - Francis & Cedar 115kV Overload with P6 Contingency

2.1.3. Risk Analysis and Project Prioritization

2.1.3.1. Risks

The consequences of not mitigating the identified performance concerns include non-compliance with NERC's TPL-001 requirements, possible forced outages during heavy load conditions, and reducing availability for planned outages.

2.1.3.2. Need by Date

The performance concerns were identified in the 2021-2022 Avista System Assessment and confirmed in the 2023-2024 System Assessment. Additionally, thermal concerns due to an N-1 (P1) contingency of the Bell 230/115kV Transformer #6, arose in operations during the 2023 summer season. The near-term analysis necessitates near-term mitigation with the proposed projects. Recent operational issues may warrant more immediate mitigation plans.

2.1.3.3. Technical Prioritization

Avista's Engineering Roundtable compares projects using a scoring matrix which evaluates both the technical importance and urgency of a project. Table 2 provides the suggested scoring for the Engineer Roundtable to use. The technical importance scoring accounts for non-compliance with NERC TPL-001 requirements and the possibility of forced outages.

Serve Load	Capacity	Reliability	System Perfor-mance	Safety	Environ-mental	Regula-tory	Tangential Benefits	Technical Score
0	3	2	3	0	0	2	0	**52**
Date Flexible	**Months Until**	**Budget**	**Transfor-mers**	**Foreign Utility**	**Number of Stations**			**Urgency Score**
6	4	4	0	2	6	-	-	**68**

Table 2: Engineering Roundtable Prioritization Scoring

2.2. Scope of Study

An initial evaluation was performed for several alternatives which mitigate the concerns identified in Section 2.1.The initial evaluation narrowed the proposed project scope, system requirements and focus of the technical analysis to the following projects.

1. Boulder – Irvin #1 Loop into Trentwood
2. Highland 115kV Station

A study was performed to determine the transmission system performance impacts with the identified mitigation alternatives. Analysis performed included the following:

- Steady State Contingency Analysis
- Voltage Stability Analysis
- Stability Contingency Analysis
- Short Circuit Analysis
- Reliability Analysis

System performance is compared against the criteria defined in *TP-SPP-01 – Transmission System Performance.* TP-SPP-01 contains criteria which encompasses at a minimum the criteria established through regulatory requirements of North American Electric Reliability Corporation and Western Electric Coordinating Council.

2.3. Boulder – Irvin #1 115kV Loop into Trentwood

2.3.1. Project Scope and Requirements

2.3.1.1. System Modifications

Following the technical analysis outlined in Section 0, the scope of the system upgrades shown below are necessary to improve system performance. The proposed scope mitigates existing concerns with the Beacon – Bell interconnections.

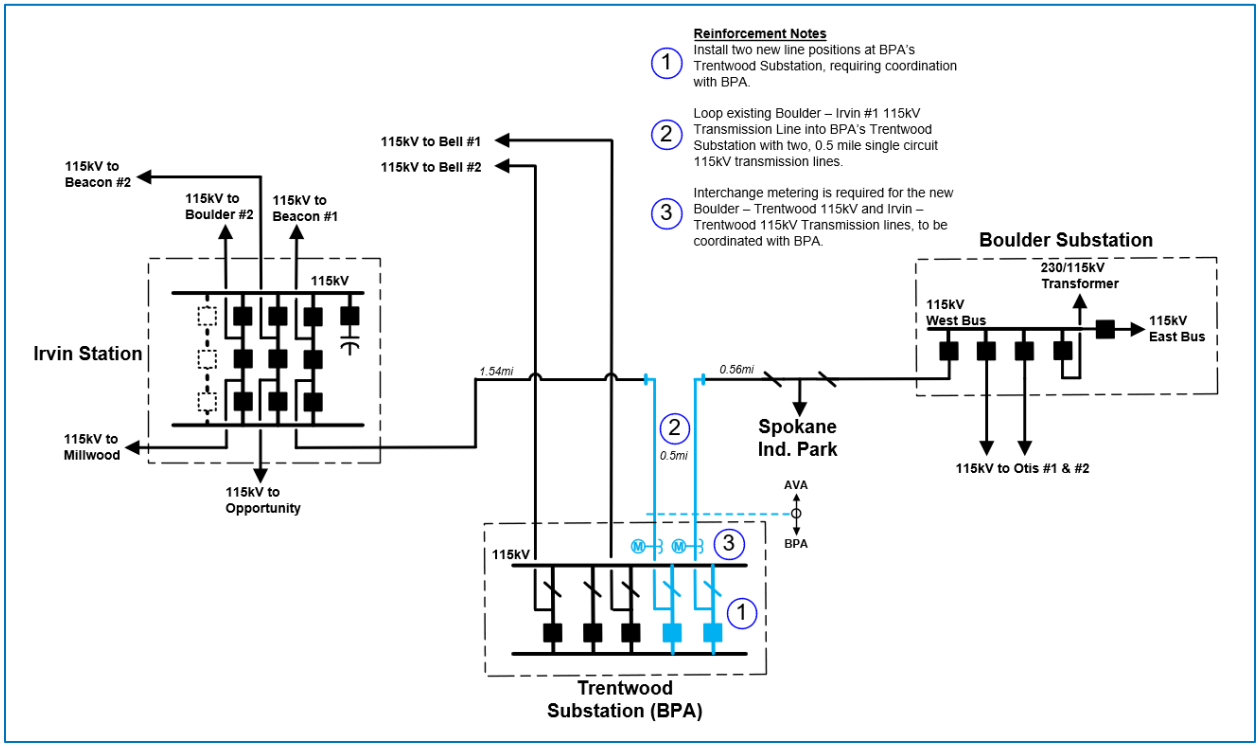


Figure 4: Boulder – Irvin #1 115kV Loop into Trentwood Project Diagram

2.3.1.2. Protection Requirements

Protection relay settings need to be modified at the transmission line terminals to coordinate with the system modifications. The terminals affected include:

- Irvin A902 and A905
- Boulder A712

Protection equipment and settings at Trentwood must be coordinated with BPA.

All 115kV lines in the Spokane area are planned with the expectation of totaling clearing times for line outages to be within five cycles utilizing communication aided protection schemes.

2.3.1.3. Communication Requirements

The new Boulder – Trentwood 115kV and Irvin – Trentwood 115kV Transmission Lines will require a minimum of a single communications path connecting each terminal for communication aided protection schemes. Redundant communication paths are recommended for protection of the Irvin - Trentwood 115kV Transmission Line. Where applicable, existing communication channels can be utilized for protection schemes.

SCADA communications from SOO and BuCC to BPA's Trentwood substation is also required for interchange telemetry with BPA likely to a "customer interface" SEL-2411.

2.3.1.4. Metering Requirements

Avista's Balancing Authority Area will be impacted by the proposed modifications. Interchange metering will be required for the new Boulder – Trentwood 115kV and Irvin – Trentwood 115kV Transmission Lines. Interchange metering details and location to be coordinated with BPA. The proposed metering locations are at Trentwood for the new 115kV transmission lines.

2.3.2. Project Execution

2.3.2.1. Construction Schedule

The proposed project scope is to be completed prior to the 2029 summer operating season. A high-level milestone schedule will be developed with appropriate stakeholders upon project approval.

Consideration should also be given to BPA's typical two-year project schedule requirement for planning, construction, etc.

2.3.2.2. Cost Estimate

Proposed Upgrades	Cost
Install two new line positions at the Trentwood Station	$2,500,000*
Build combined 1-mile transmission line from Boulder – Irvin Right of Way into Trentwood Substation	$1,500,000
Total	**$4,000,000**

Table 3: Project Cost Estimate

*Costs of upgraded BPA facilities at Trentwood will be determined during a Lines and Loads Interconnection Request with BPA.

2.3.2.3. Long-Lead Time Equipment

Any electric system expansion may be delayed by long-lead time requirements, such as equipment, land acquisition, permitting and/or outage windows. Known schedule constraints that may impact the proposed project schedule are detailed in Table 4.

Potential Constraint	Typical Procurement	Extended Procurement	Impact
Communications equipment	3 months	6 months	No
Custom transmission structures	6 months	9 months	No
Main-grid circuit breakers	6 months	36 months	Yes
Transmission right of way	24 months	60 months	No

Table 4: Long-Lead Time Constraints

The Boulder – Irvin transmission lines approach thermal loading concerns in the summer season, therefore planned outages will be limited to the shoulder and winter months.

2.3.3. Contingent Facilities

Contingent facilities are unbuild facilities which if delayed or not build could cause a need for restudying the proposed Irvin – Trentwood 115kV Transmission Line project. The following contingent facilities were identified.

ERT #	Project Name	Scope	Targeted Date of Operation	Status
	Boulder – Irvin #1 115kV Rebuild Project 2022	Project updates the existing Boulder – Irvin #1 115kV Transmission Line from Boulder to SIP. Remaining replacements are existing 556AC on Barker Road and Approximately a ¼ mile section just east of SIP, currently delayed by easement dispute. Replacements will be made with 795ACSS. **New capacity will be 149MVA summer rating.**	Spring 2024	Construction

Table 5: Contingent Facilities

2.4. Highland 115kV Station

2.4.1. Project Scope and Requirements

2.4.1.1. System Modifications

Following the technical analysis outlined in Section 0, the scope of the system upgrades shown below are necessary to improve system performance. The proposed scope mitigates the existing P6 contingency overload concern for the Beacon – Francis & Cedar 115kV Transmission Line. This scope creates another connection to Bell which mitigates some of the Beacon – Bell interconnection concerns.

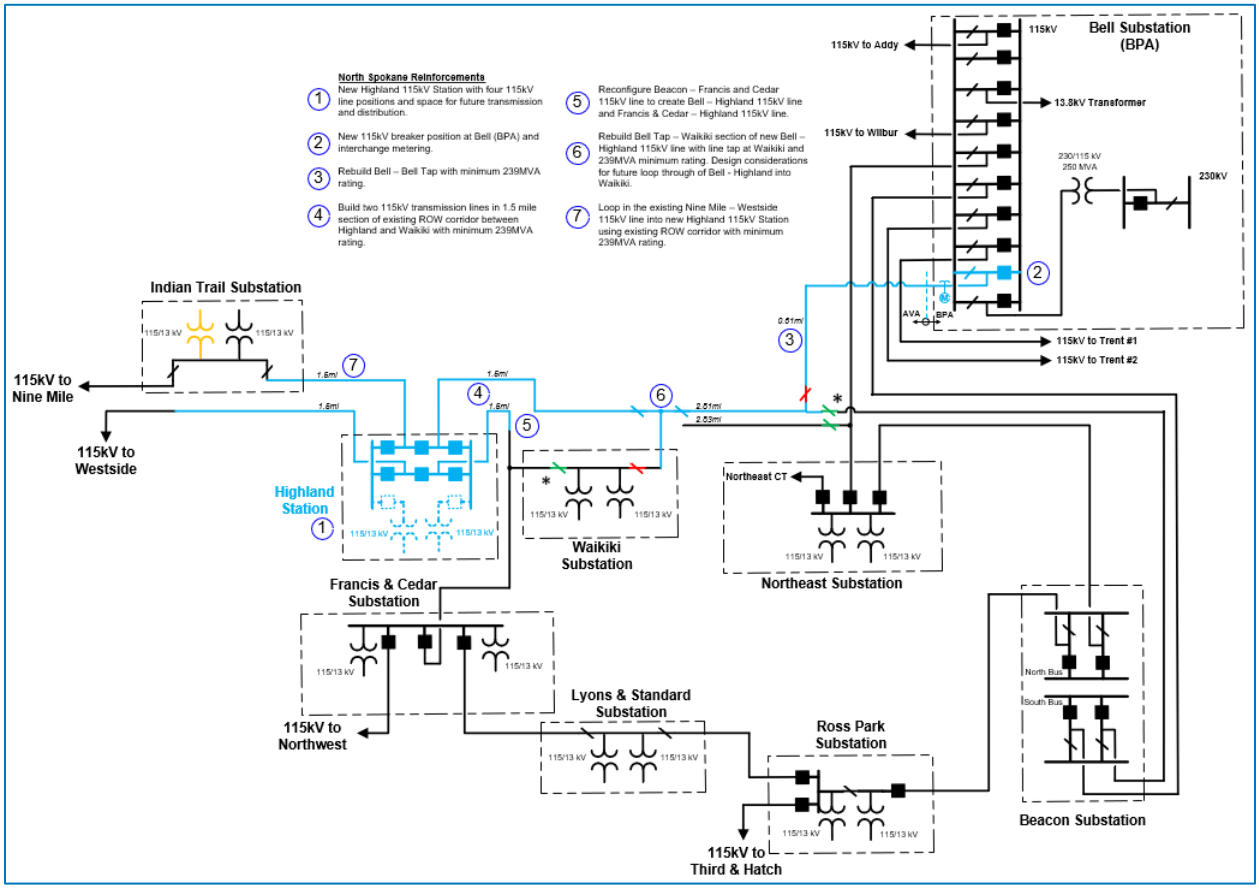


Figure 5: Highland 115kV Station Project Diagram

The 115kV transmission line from Bell Tap to Beacon will remain energized and serve as a maintenance tap.

2.4.1.2. Protection Requirements

Protection relay settings need to be modified at the transmission line terminals to coordinate with the system modifications. The terminals affected include:

- Beacon A609 (serves as maintenance tap)
- Francis & Cedar A674
- Nine Mile A655
- Westside A968 and A1068

A new protection relay package will be developed at the Highland 115kV Station, including line relaying for the proposed Highland – Nine Mile 115kV Transmission Line, Highland – Westside 115kV Transmission Line, Francis & Cedar – Highland 115kV Transmission Line and Bell – Highland 115kV Transmission Line.

Protection relay settings at Bell terminals for the Bell – Highland 115kV Transmission Line and Bell – Northeast 115kV Transmission Line must be coordinated with BPA.

All 115kV lines in the Spokane area are planned with the expectation of totaling clearing times to be within five cycles utilizing communication aided protection schemes.

2.4.1.3. Communication Requirements

All new 115kV transmission lines will require a minimum of a single communications path connecting each terminal for communication aided protection schemes. Redundant communication paths are recommended for protection of the Highland – Nine Mile 115kV Transmission Line. Where applicable, existing communication channels can be utilized for protection schemes.

2.4.1.4. Metering Requirements

Avista's Balancing Authority Area will be impacted by the proposed modifications. Interchange metering will be required for the proposed Bell – Highland 115kV Transmission Line. Current AVA/BPA interchange metering exists (and should suffice for this project) on the normally open Bell B839 air switch to the Beacon – Francis & Cedar 115kV Transmission Line. There is not currently a dedicated breaker for the B839 line position.

Final interchange metering details and location to be coordinated with BPA.

2.4.2. Project Execution

2.4.2.1. Construction Schedule

The proposed project scope is to be completed prior to the 2029 summer operating season. A high-level milestone schedule will be developed with appropriate stakeholders upon project approval.

Consideration should also be given to BPA's typical two-year project schedule requirement for planning, construction, etc.

2.4.2.2. Cost Estimate

Proposed Upgrades	Cost
New Highland switching station with 4x 115kV line positions	$9,200,000
Remote end substation work	$500,000
1x line position at Bell	$750,000*
Reconductor 3.42mi of Bell – Highland 115kV	$3,500,000
Construct two 1.5mi sections of 115kV transmission along existing corridor from Indian Trail to Highland	$3,000,000
Construct two 1.5mi sections of 115kV transmission along existing corridor from Highland to Waikiki	$3,000,000
Total	**$19,950,000**

Table 6: Project Cost Estimate

*Costs of upgraded BPA facilities at Bell will be determined during a Lines and Loads Interconnection Request with BPA.

2.4.2.3. Long-Lead Time Equipment

Any electric system expansion may be delayed by long-lead time requirements, such as equipment, land acquisition, permitting and/or outage windows. Known schedule constraints that may impact the proposed project schedule are detailed in Table 7.

Potential Constraint	Typical Procurement	Extended Procurement	Impact
Communications equipment	3 months	6 months	No
Custom transmission structures	6 months	9 months	No
Main-grid circuit breakers	6 months	36 months	Yes
Main-grid station property siting, 20+ acres	24 months	36 months	No
Sub-transmission station property siting, 4+ acres	12 months	24 months	No
Transmission right of way	24 months	60 months	No

Table 7: Long-Lead Time Constraints

Due to the system constraints currently experienced in the operating horizon, outage windows will be limited to shoulder months.

2.4.3. Contingent Facilities

Contingent facilities are unbuilt facilities which if delayed or not built could cause a need for restudying the proposed Highland 115kV Station project.

No contingent facilities were identified.

3. Technical Analysis

3.1. Simulation and Modeling Methodology

Technical studies used to analyze the project's impact to the transmission system were performed. Transmission system analysis follow the methodology described in *TP-SPP-01 - Transmission System Performance.* The following sections outline specific assumptions used for the North Spokane Transmission Reinforcement Study.

3.1.1. Base Case Assumptions

Project analysis was performed using transmission system models representing the scenario listed in Table 8. Each scenario was used to determine existing transmission system performance as well as post project performance.

Avista Planning cases are tailored from approved WECC cases, and each case includes a full suite of steady state power flow contingency scenarios that are run to analyze the impact of the project alternatives. These contingencies include outages within the Avista Transmission System as well as select outages in adjacent Planning Coordinator and Transmission Planner areas. Contingencies are also added or modified to include elements added to the Transmission System for the purposes of this study.

	Scenario	WECC Case
Five Year	2028 Heavy Summer	28HS2a1
Five Year	2028 Heavy Winter	28HW2a2
Five Year	2028 Heavy Spring	23HSP1a
Ten Year	2033 Heavy Summer	33HS1a1

Table 8: Scenario Studied

3.1.2. Projects Modeled

The transmission system models include representation of projects expected to be constructed within the applicable planning horizon. The models are analyzed with and without these projects to demonstrate the impact of the projects on the performance of the system. Table 9 provides the list of projects included in the models.

Included in Table 9 are designations for projects that are included in the base, the five-year, and the 10-year planning models. The Five-Year Planned Projects are significant because they represent the expected system configuration and performance in the planning horizon. It should be noted the entire scope of each project is considered complete and operational when included in the designated planning model.

Planning Initiative	ERT #	Planning Project Name	Driver	Planning Scope	Scheduled In-service	Status	Included in Five-Year Model	Included in 10-Year Model
East Coeur d'Alene Lake System Reinforcement	12	Carlin Bay Station	Performance & Capacity	Construct new distribution station to include single transformer and two feeders. Transmission integration to include constructing a new radial transmission line from O'Gara Station to Carlin Bay and rebuilding the existing O'Gara Station to a switching station. New microwave communication paths will be established to O'Gara Station.	12/31/2025	Budgeted	X	X
Kettle Falls Stability	96	Kettle Falls Protection System Upgrade	Mandatory & Compliance	Upgrade existing protection schemes on the Addy – Kettle Falls and Colville – Kettle Falls 115kV transmission lines. New relays at Kettle Falls Station and a new communication path from Kettle Falls to Monumental Mountain are required.	6/30/2021	Active	X	X
Lewiston/Clarkston System Reinforcement	62	Lolo Transformer Replacement	Mandatory & Compliance	Replace Lolo 1 230/115kV transformer with 250MVA rated transformer. Replace Lolo 2 230/115kV transformer with 250MVA rated transformer. 115kV circuit breakers, bus work and other capacity-limiting elements will be replaced. Circuit switchers at Lolo and Sweetwater stations will be replaced.	6/30/2024	Budgeted	X	X
Metro Station Rebuild	38	Metro Station Rebuild	Asset Condition	Rebuild existing substation at new location. 115kV bus to be a 6-position ring: 2 – 30MVA transformers, 2 – 115kV UG lines from PST, 2 – 115kV OH lines; switchgear on the 13kV side, both Network and Distribution feeders	12/31/2024	Budgeted	X	X

Planning Initiative	ERT #	Planning Project Name	Driver	Planning Scope	Scheduled In-service	Status	Included in Five-Year Model	Included in 10-Year Model
West Plains System Reinforcement Westside Station Rebuild	100	Melville Station	Performance & Capacity	Scope not complete. New switching station near existing tap to Four Lakes Station off the South Fairchild Tap 115kV transmission line. Construct new transmission line from Airway Heights to Melville including passing through Russel Road and Craig Road distribution stations. Requires new transmission line terminal at existing Airway Heights Station.	12/31/2026	Budgeted	X	X
	131	Garden Springs Station	Performance & Capacity	Construct new 115kV portion of Garden Springs Station at the existing Garden Springs switching location. New station will terminate Airway Heights – Sunset and Sunset – Westside 115kV transmission lines including the South Fairchild Tap. Construct new 230kV portion of Garden Springs Station including two 250MVA nominal 230/115kV transformers. Construct new 230kV transmission line from Garden Springs to a new switching station at interconnection point on the BPA Bell – Coulee #5 230kV transmission line.	12/31/2026	Budgeted		X
	58	Westside Station Rebuild	Mandatory & Compliance	Replace the existing Westside 2 230/115kV transformer and construct necessary bus work and breaker positions. Reconstruct 230 and 115kV buses to double bus double breaker 3000/2000 Amp standard. Phase 4: Complete bus work to double bus, double breaker on both the 230kV and 115kV buses	12/31/2024	Construction	X	X
	N/A	Boulder-Irvin #1 115kV Transmission Line Upgrade	Performance & Capacity	Project updates the existing Boulder-Irvin #1 115kV Transmission Line from Boulder to SIP. Remaining replacements are existing 556 AAC on Barker Road and approximately a ¼ mile section just east of SIP, currently delayed by easement dispute. Replacements will be made with 795 ACSS.	12/31/2023	Construction	X	X

Table 9: Projects Represented in Transmission System Models

3.2. Boulder – Irvin #1 115kV Loop into Trentwood Technical Analysis

3.2.1. Project Representation

The Boulder – Irvin #1 115kV Loop into Trentwood project is represented in steady state analysis as shown in Figure 6. Model parameters for the modified transmission lines are listed in Table 10.

				MVA Limits	
	R	X	B	All Season Norm	All Season CTG
Boulder – Trentwood (SIP – Trentwood) 115kV	0.001038	0.005656	0.000908	257/336/282	257/336/282
Irvin – Trentwood 115kV	0.001931	0.010549	0.001692	239	239

Table 10: Transmission Line Parameters

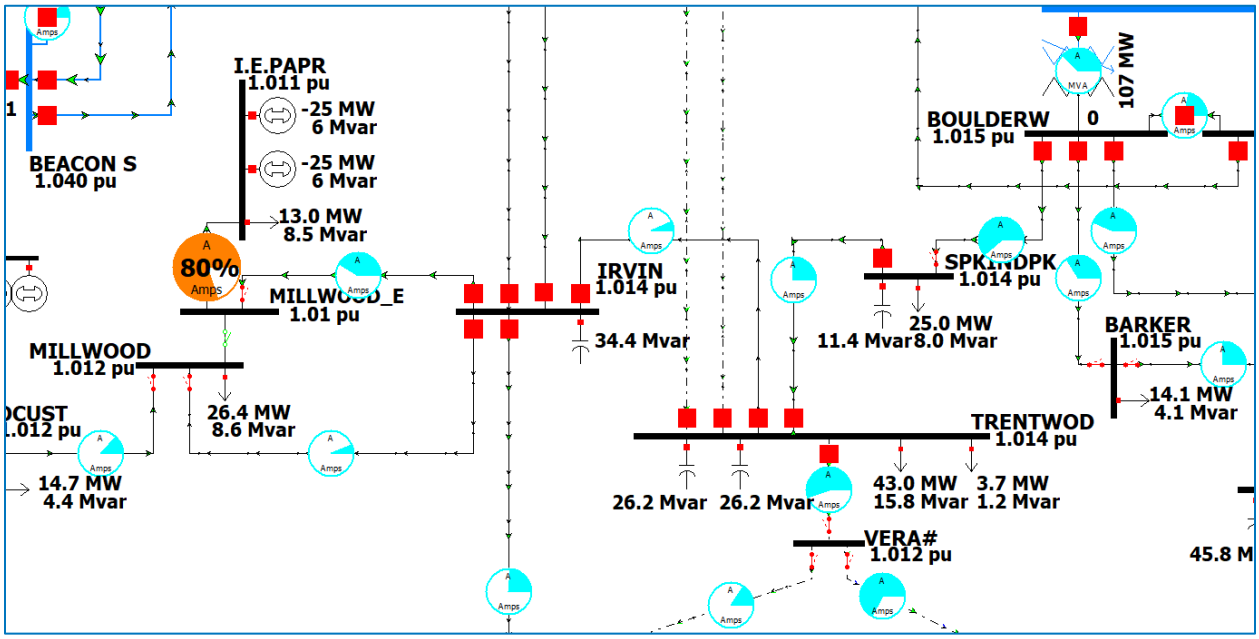


Figure 6: Boulder – Irvin #1 Loop into Trentwood Powerflow Representation

3.2.2. Steady State Contingency Analysis

3.2.2.1. 2028 Heavy Summer Scenario

Performance issues identified in the problem statement are mitigated upon completion of the proposed project, demonstrated in Figure 7. P6 contingencies involving the Bell 230/115kV Transformer #6 and Beacon – Bell interconnections no longer result in system performance violations.

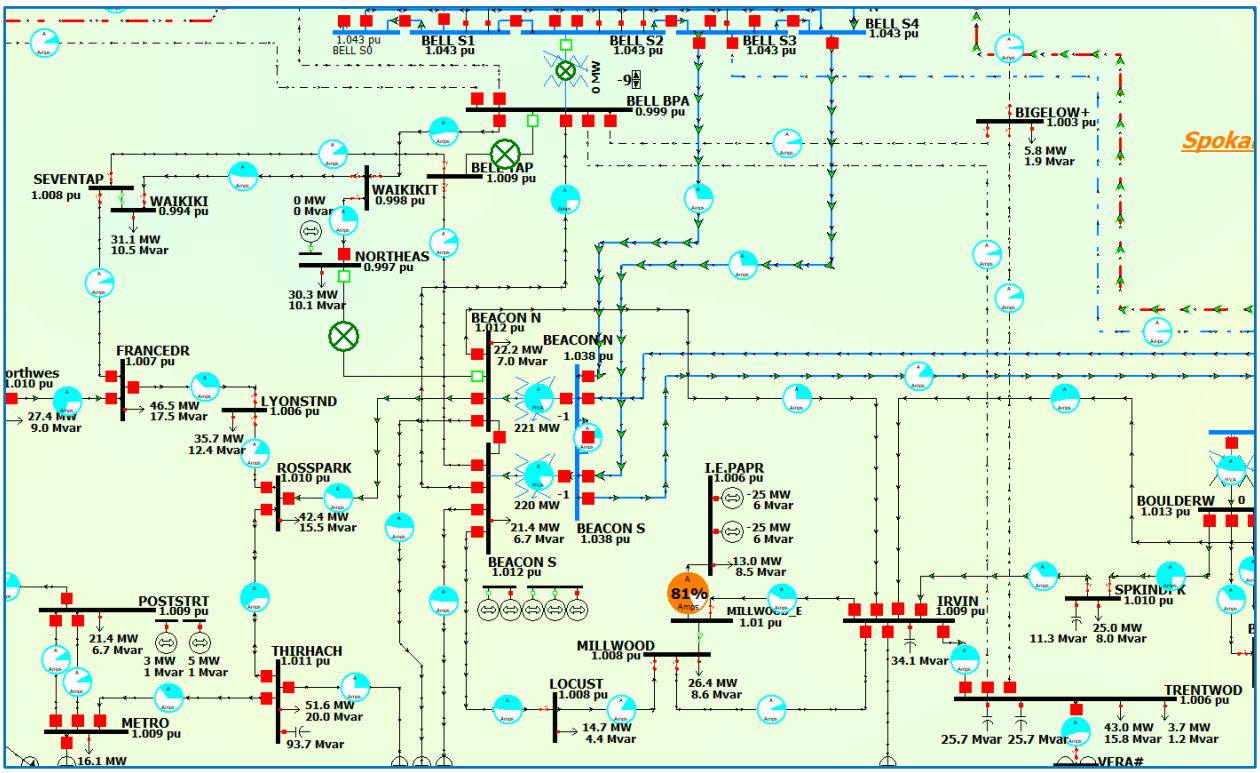


Figure 7: Beacon - Bell 115kV Transmission Line with P6 Event

The following section describes some existing or newly identified performance issues influenced by the project in the heavy summer scenario.

A complete list of steady state contingency analysis results is contained in Section 5.

Heavy Summer Results Summary

	HS_BASE	HS_IRV_TRNT
P6		
N-1: 3TM Bell - Boundary #3 230 kV + T-1: Bell #6 230/115 kV		
Beacon – Bell #1 115 kV	103.5	
N-1: Beacon - Bell #1 115 kV + T-1: Bell #6 230/115 kV		
Beacon - Northeast 115 kV	149.4	
Bell - Northeast 115 kV (Waikiki Tap - Northeast)	119.9	
N-1: Beacon - Northeast 115 kV + T-1: Bell #6 230/115 kV		
Beacon - Bell #1 115 kV	192.0	
N-1: Bell - Northeast 115 kV + T-1: Bell #6 230/115 kV		
Beacon - Bell #1 115 kV	129.9	
N-1: Boulder – Irvin #2 115 kV + T-1: Bell #6 230/115 kV		
Boulder – Trentwood 115 kV (Boulder – Spokane Industrial Park)		105.1
T-1: Addy #3 230/115 kV + T-1: Bell #6 230/115 kV		
Beacon - Bell #1 115 kV	105.6	
Beacon – Northeast 115 kV	96.1	

Table 11: Boulder - Irvin #1 Loop into Trentwood Heavy Summer Results

3.2.2.2. 2028 Heavy Winter Scenario

Performance issues identified in the problem statement are also mitigated in the heavy winter scenario for P6 contingencies involving Beacon – Bell interconnections. The following section includes a summary of results for the heavy winter scenario. Steady state contingency analysis results are contained in Section 5.

Heavy Winter Results Summary

	HW_BASE	HW_IRV_TRNT
P6		
N-1: Beacon - Bell #1 115 kV + T-1: Bell #6 230/115 kV		
Beacon - Northeast 115 kV	**112.4**	
N-1: Beacon - Northeast 115 kV + T-1: Bell #6 230/115 kV		
Beacon - Bell #1 115 kV	**145.7**	
N-1: Bell - Northeast 115 kV + T-1: Bell #6 230/115 kV		
Beacon - Bell #1 115 kV	**109.2**	
T-1: Beacon #2 230/115 kV + T-1: Bell #6 230/115 kV		
Beacon #1 230/115 kV	**110.8**	**104.0**

Table 12: Boulder - Irvin #1 Loop into Trentwood Heavy Winter Results

3.2.2.3. 2028 Heavy Spring Scenario

Performance issues identified in the problem statement are also mitigated in the light spring scenario as shown in the table below. P6 contingencies involving Beacon - Bell interconnections no longer result in system performance violations. The following section provides a summary of the performance influenced by the project in the heavy spring scenario. A complete list of steady state contingency analysis results is contained in Section 5.

Heavy Spring Results Summary

	HSP_BASE	HSP_IRV_TRNT
P6		
N-1: Beacon - Bell #1 115 kV + T-1: Bell #6 230/115 kV		
Beacon - Northeast 115 kV	**116.9**	
Bell - Northeast 115 kV (Waikiki Tap - Northeast)	99.7	
N-1: Beacon - Northeast 115 kV + T-1: Bell #6 230/115 kV		
Beacon - Bell #1 115 kV	**150.1**	
N-1: Bell - Northeast 115 kV + T-1: Bell #6 230/115 kV		
Beacon - Bell #1 115 kV	**119.4**	

Table 13: Boulder - Irvin #1 Loop into Trentwood Heavy Spring Results

3.2.2.4. 2033 Heavy Summer Scenario

The performance issue identified in the problem statement are also mitigated in the 10-year heavy summer scenario for P6 contingencies involving the Beacon – Bell interconnections. The following section provides a summary of the change in performance influenced by the project in the 10-year heavy summer scenario. A complete list of steady state contingency analysis results is contained in Section 5.

Heavy Summer Sensitivity Results Summary

	HSS_BASE	HSS_IRV_TRNT
P1		
T-1: Bell #6 230/115 kV		
Beacon - Bell #1 115 kV	**101.9**	
P6		
N-1: Beacon - Bell #1 115 kV + T-1: Bell #6 230/115 kV		
Beacon - Northeast 115 kV	**164.1**	
Bell - Northeast 115 kV (Bell - Waikiki Tap)	**103.3**	
Bell - Northeast 115 kV (Waikiki Tap - Northeast)	**132.0**	
N-1: Beacon - Northeast 115 kV + T-1: Bell #6 230/115 kV		
Beacon – Bell #1 115 kV	**211.3**	
N-1: Bell - Northeast 115 kV + T-1: Bell #6 230/115 kV		
Beacon – Bell #1 115 kV	**142.9**	
Northwest – Westside 115 kV	96.1	

Table 14: Boulder - Irvin #1 Loop into Trentwood 2033 Heavy Summer Results

3.2.3. Voltage Stability Analysis

Voltage Stability Analysis was performed for the combined scope of the proposed projects in Section 3.4.3.

3.2.4. Stability Contingency Analysis

Stability Contingency Analysis was performed for the combined scope of the proposed projects in Section 3.4.4.

3.2.5. Short Circuit Analysis

Short circuit analysis for a three-phase bus fault was performed to determine adequacy of the circuit breaker interrupting capacity for expected faults. Short circuit analysis was performed for the Irvin – Trentwood 115kV Transmission Line alternative prior to modifying the scope to loop the Boulder – Irvin #1 115kV Transmission Line into the Trentwood station. The results shown in Table 15 represent the Irvin – Trentwood 115kV Transmission Line alternative which produce negligible changes of fault duty from the subject project scope.

The resulting fault duties have little impact due to the proposed project. Circuit switchers at Spokane Industrial Park are currently equipped with protection schemes to mitigate the overdutied equipment concerns. All other existing transmission protective device interrupting ratings are adequate for the fault duties associated with the proposed project.

Station	Pre-Project	Post-Project	Percent Change	Limiting Device Rating	% Duty	Device
B_048023BEACON N	37,489	37,509	0.05%	40kA	93.8%	BKR
B_048025BEACON N	25,418	25,418	0.00%	40kA	63.5%	BKR
B_048029BEACON S	37,444	37,465	0.05%	40kA	93.7%	BKR
B_048031BEACON S	25,447	25,448	0.00%	40kA	63.6%	BKR
B_048165IRVIN	27,114	30,021	10.72%	40kA	75.1%	BKR
B_048166IEP-A	15,026	15,091	0.43%	N/A		
B_048168IEP-B	14,977	15,041	0.43%	N/A		
B_048237MILLWOOD	22,242	23,055	3.66%	40kA	57.6%	CKT SWR
B_048299OPPORTUN	22,492	23,657	5.18%	40kA	59.1%	CKT SWR
B_048311OTIS	23,687	24,386	2.95%	40kA	60.9%	BKR
B_048405SPKINDPK	23,574	24,947	5.82%	6kA	415.8%	CKT SWR
B_048520BOULDERW	29,601	30,710	3.75%	40kA	76.8%	BKR
B_048522BOULDERE	29,538	30,637	3.72%	40kA	76.7%	BKR

Table 15: Boulder - Irvin115kV Loop into Trentwood Fault Duty Results

3.2.6. Reliability Analysis

Exhaustive reliability metrics are not readily available for Avista's electrical system. Reliability is therefore discussed in a relative, qualitative manner. The completion of the Boulder – Trentwood and Irvin – Trentwood 115kV Transmission Lines increase system reliability through the operational benefits provided. Upon completion of the project, planned outages for Beacon – Bell interconnecting facilities can be accommodated for maintenance activities thus increasing reliability with the affiliated facilities. Additionally, untimely unplanned outages for any of the affiliated facilities requiring system reconfiguration and potential dropped load can be avoided.

3.2.7. Redlined Scada Variable Limits

Preliminary SCADA Variable Limits (SVL's) are prepared with the intent of identifying constraints along a new or modified transmission line. The provided SVL's are not intended to be used directly.

Preliminary SVL's for Avista facilities for the Boulder – Trentwood and Irvin – Trentwood 115kV Transmission Lines are shown below. Avista facilities will achieve the required 1200A minimum summer rating utilizing the equipment shown below. The proposed minimum rating of 1200A for equipment at the Trentwood Substation must be coordinated with BPA.

IRVIN-TRENTWOOD 115kV

A-902, A-905, & A-908 **B16XX (BPA)**

				AMBIENT TEMPERATURE (C)								
				-30	-20	-10	0	10	20	30	40	50
LOCATION	**DEVICE**	**TYPE**	**RATING (Amps.)**	**AMPS**	**AMPS**	**AMPS**	**AMPS**	**AMPS**	**AMPS**	**AMPS**	**AMPS**	**AMPS**
IRVIN 115 kV SUB	G.C.B. A-902	SIEMENS SPS2	2000	3002	2876	2746	2611	2469	2321	2165	2000	1823
115kV SOUTH BUS	CONDUCTOR	3" Al. Pipe (85°C)*		3591	3432	3262	3079	2879	2659	2414	2133	2000
(TRENTWOOD LINE)		2 x 1272 AAC "Narcissus" (80°C)		3556	3376	3176	2962	2758	2532	2282	1994	1650
	CURRENT XFMR.	(2) 2000/5 M.R.	conn. 2000/5 (TRF=2)	4000	4000	4000	4000	4000	4000	4000	4000	4000
		(2) 2000/5 M.R.	conn. 1200/5 (TRF=2)	2400	2400	2400	2400	2400	2400	2400	2400	2400
	AIR SWITCH	(2) USCO AGCH5V (DO6)	2000	3192	3071	2946	2815	2678	2533	2362	2157	1929
IRVIN 115 kV SUB	G.C.B. A-905	SIEMENS SPS2	2000	3002	2876	2746	2611	2469	2321	2165	2000	1823
(115kV LINE TIE)	CONDUCTOR	3" Al. Pipe (85°C)*		3591	3432	3262	3079	2879	2659	2414	2133	2000
		2 x 1272 AAC "Narcissus" (80°C)		3556	3376	3176	2962	2758	2532	2282	1994	1650
	CURRENT XFMR.	(4) 2000/5 M.R.	conn. 1200/5 (TRF=2)	2400	2400	2400	2400	2400	2400	2400	2400	2400
	AIR SWITCH	(2) USCO AGCH5V (DO6)	2000	3192	3071	2946	2815	2678	2533	2362	2157	1929
IRVIN 115 kV SUB	G.C.B. A-908	SIEMENS SPS2	2000	3002	2876	2746	2611	2469	2321	2165	2000	1823
115kV NORTH BUS	CONDUCTOR	3" Al. Pipe (85°C)*		3591	3432	3262	3079	2879	2659	2414	2133	2000
(BEACON LINE 1)		2 x 1272 AAC "Narcissus" (80°C)		3556	3376	3176	2962	2758	2532	2282	1994	1650
	CURRENT XFMR.	(2) 2000/5 M.R.	conn. 2000/5 (TRF=2)	4000	4000	4000	4000	4000	4000	4000	4000	4000
		(2) 2000/5 M.R.	conn. 1200/5 (TRF=2)	2400	2400	2400	2400	2400	2400	2400	2400	2400
	AIR SWITCH	(2) USCO AGCH5V (DO6)	2000	3192	3071	2946	2815	2678	2533	2362	2157	1929
	PROTECTION	SEL-421 (Z1MP)	3600	71638	71638	71638	71638	71638	71638	71638	71638	71638
		(Z2MP)		45163	45163	45163	45163	45163	45163	45163	45163	45163
		(ZLF)		3066	3066	3066	3066	3066	3066	3066	3066	3066
		(50P1)		2409	2409	2409	2409	2409	2409	2409	2409	2409
		(67P2)**		2409	2409	2409	2409	2409	2409	2409	2409	2409
		SEL-311L (Z1P)	3600	71638	71638	71638	71638	71638	71638	71638	71638	71638
		(Z2P)		45163	45163	45163	45163	45163	45163	45163	45163	45163
		(ZLF)		3072	3072	3072	3072	3072	3072	3072	3072	3072
		(50P1)		2409	2409	2409	2409	2409	2409	2409	2409	2409
		(67P2)**		2409	2409	2409	2409	2409	2409	2409	2409	2409
TRANSMISSION LINE	CONDUCTOR	795 ACSS "Drake" (200°C)		1854	1816	1777	1736	1699	1660	1620	1578	1534
TRENTWOOD SUB (BPA)	P.C.B. B16XX		2000	2740	2740	2740	2620	2440	2320	2180	2000	
(IRVIN LINE)	AIR SWITCH			1776	1776	1776	1680	1584	1524	1428	1200	
SYSTEM CURRENT LIMIT FOR SPECIFIC TEMPERATURE				**1776**	**1776**	**1776**	**1680**	**1584**	**1524**	**1428**	**1200**	**1534**

Figure 8: Irvin – Trentwood 115kV Proposed SVL

BOULDER-TRENTWOOD 115kV

A-712 **B16XX (BPA)**

				AMBIENT TEMPERATURE (C)								
				-30	-20	-10	0	10	20	30	40	50
LOCATION	**DEVICE**	**TYPE**	**RATING (Amps.)**	**AMPS**	**AMPS**	**AMPS**	**AMPS**	**AMPS**	**AMPS**	**AMPS**	**AMPS**	**AMPS**
BOULDER SUB	G.C.B. A-712	MITSUBISHI 100SFMT40HE	2000	3002	2876	2746	2611	2469	2321	2165	2000	1823
(TRENTWOOD LINE)	CONDUCTOR	3" Al. Pipe (85°C)**		3591	3432	3262	3079	2879	2659	2414	2133	2000
		2" Al. Pipe (85°C)		2196	2099	1995	1883	1762	1629	1481	1313	1114
	CURRENT XFMR.	(2) 2000/5 M.R.	conn. 1200/5 (TRF=2)	2400	2400	2400	2400	2400	2400	2400	2400	2400
		2000/5 M.R.	conn. 2000/5 (TRF=2)	4000	4000	4000	4000	4000	4000	4000	4000	4000
	AIR SWITCH	(2) PASCOR CBSC (DO6)	1200	1915	1843	1768	1689	1607	1520	1417	1294	1157
	PROTECTION	SEL-421 (Z1MP)	3600	30881	30881	30881	30881	30881	30881	30881	30881	30881
		(Z2MP)		19568	19568	19568	19568	19568	19568	19568	19568	19568
		(ZLF)		2447	2447	2447	2447	2447	2447	2447	2447	2447
		(50P1)		1920	1920	1920	1920	1920	1920	1920	1920	1920
		(67P2)***		1920	1920	1920	1920	1920	1920	1920	1920	1920
		SEL-311L (Z1P)	3600	30881	30881	30881	30881	30881	30881	30881	30881	30881
		(Z2P)		19568	19568	19568	19568	19568	19568	19568	19568	19568
		(ZLF)		2447	2447	2447	2447	2447	2447	2447	2447	2447
		(50P1)		1920	1920	1920	1920	1920	1920	1920	1920	1920
		(67P2)***		1920	1920	1920	1920	1920	1920	1920	1920	1920
TRANSMISSION LINE	CONDUCTOR	795 AAC "Arbutus" (80°C)		**1329**	**1262**	**1188**	**1109**	**1033**	**950**	**857**	**750**	**624**
		795 ACSS "Drake" (200°C)		1854	1816	1777	1736	1699	1660	1620	1578	1534
BOULDER-SIP	AIR SWITCH (A-361)	POWERDYNE V11512 (BO2)	1200	2141	2036	1926	1809	1684	1549	1401	1236	1044
SIP-IRVIN	AIR SWITCH (A-360)	USCO AGCH5V (D06)	1200	1915	1843	1768	1689	1607	1520	1417	1294	1157
TRENTWOOD SUB (BPA)	P.C.B. B16XX		2000	2740	2740	2740	2620	2440	2320	2180	2000	
(BOULDER LINE)	AIR SWITCH			1776	1776	1776	1680	1584	1524	1428	1200	
SYSTEM CURRENT LIMIT FOR SPECIFIC TEMPERATURE				**1329**	**1262**	**1188**	**1109**	**1033**	**950**	**857**	**750**	**624**

Figure 9: Boulder - Trentwood 115kV Proposed SVL

3.3. Highland 115kV Station Technical Analysis

3.3.1. Project Representation

The Highland 115kV Station project is represented in steady state analysis in Figure 10. Model parameters for the new and rebuilt transmission lines are listed in Table 16.

	R	X	B	MVA Limits All Season Norm	MVA Limits All Season CTG
Bell – Highland 115kV	0.004652	0.02542	0.004076	239	239
Francis & Cedar – Highland 115kV	0.005723	0.024949	0.003618	119/176/136	119/176/136
Highland – Nine Mile 115kV (Highland – Indian Trail)	0.001413	0.007719	0.001238	239	239
Highland – Westside 115kV	0.005073	0.027309	0.004228	149/220/170	149/220/170

Table 16: Transmission Line Parameters

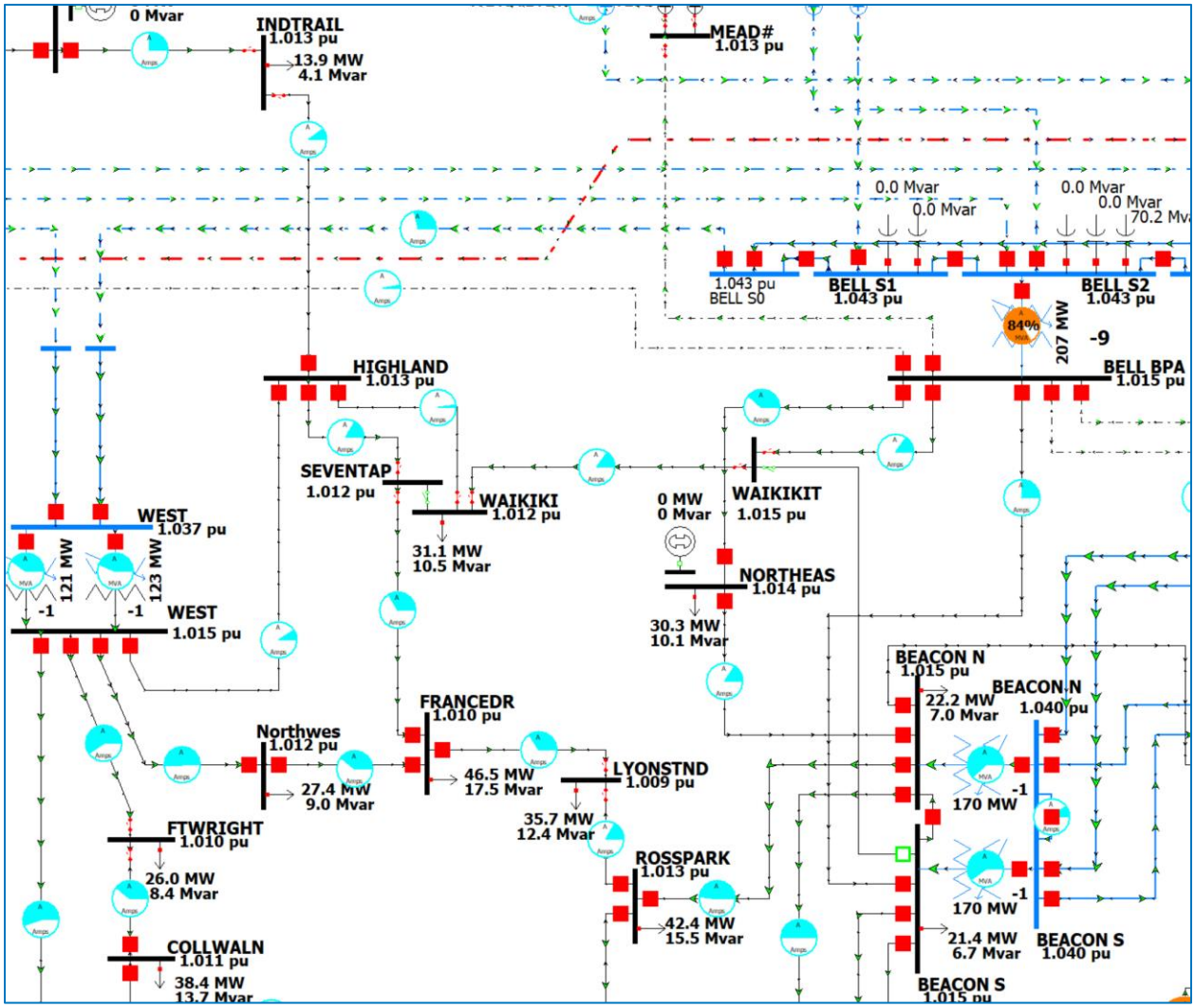


Figure 10: Highland 115kV Station Powerflow Representation

3.3.2. Steady State Contingency Analysis

3.3.2.1. 2028 Heavy Summer Scenario

Performance issues identified in the problem statement are mitigated upon completion of the proposed project, demonstrated in Figure 11. P6 contingencies involving Beacon and Bell interconnections, Francis & Cedar – Ross Park and Northwest – Westside 115kV Transmission Lines no longer result in system performance violations.

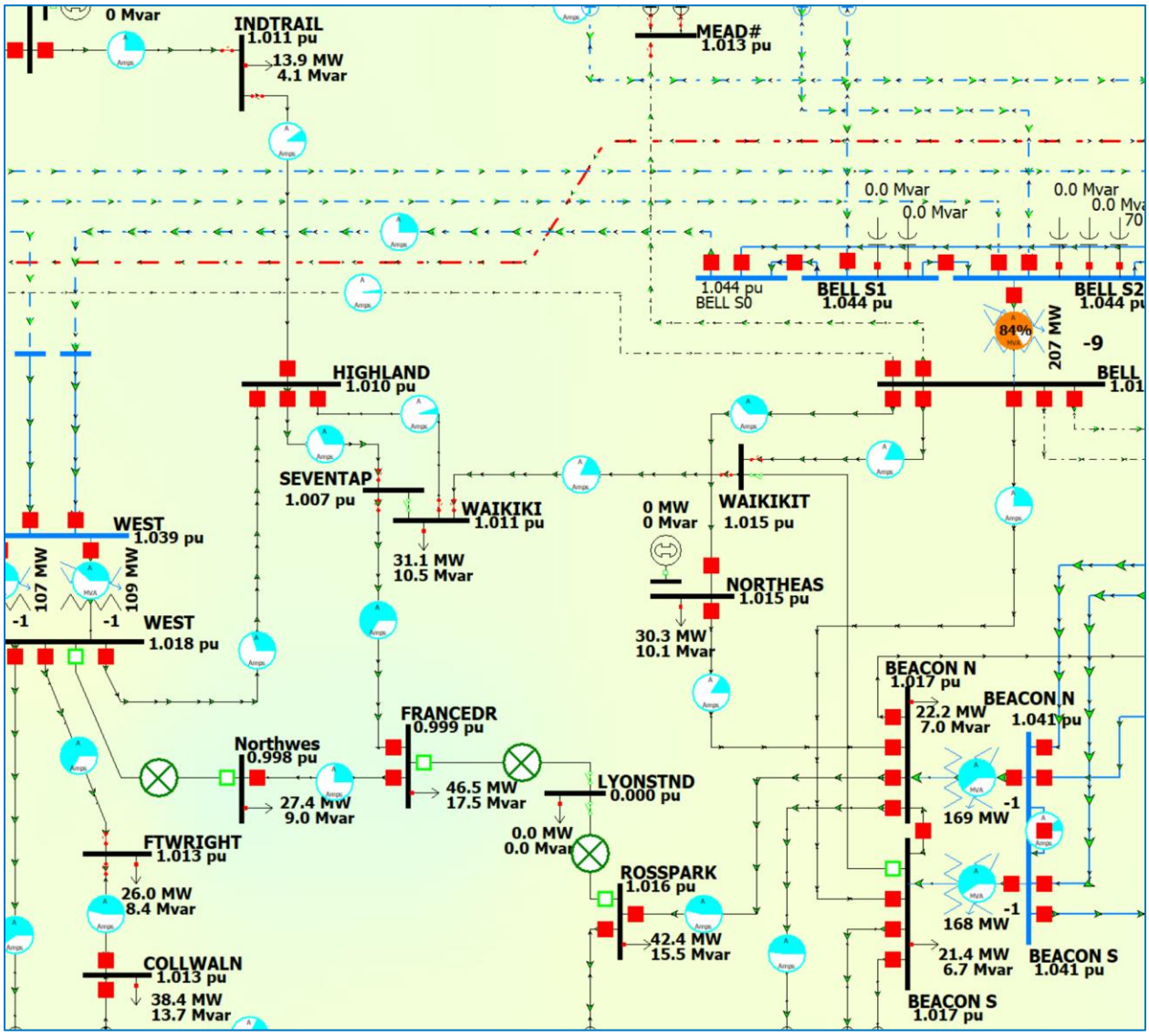


Figure 11: Bell - Highland 115kV Transmission Line with P6 Event

The following section identifies a summary of existing or newly identified performance issues influenced by the project in the heavy summer scenario. Several P6 contingencies result in thermal concerns for Ross Park – Third and Hatch. These thermal concerns are mitigated with the Irvin – Trentwood 115kV Transmission Line or with the addition of the Garden Springs project. A complete list of steady state contingency analysis results is contained in Section 5.

Heavy Summer Results Summary

	HS_BASE	HS_HLD
P6		
N-1: Beacon - Ross Park 115 kV + N-1: Northwest - Westside 115 kV		
Beacon - Francis & Cedar 115 kV (Bell Tap -Waikiki)	103.7	
College and Walnut - Westside 115 kV (Fort Wright - Westside)	97	
N-1: Beacon – Ninth and Central #2 115 kV + N-1: College & Walnut – Westside 115 kV		
Ross Park – Third and Hatch 115 kV		98
N-1: Francis & Cedar - Ross Park 115 kV + N-1: Northwest - Westside 115 kV		
Beacon - Francis & Cedar 115 kV (Bell Tap -Waikiki)	112.5	

Table 17: Heavy Summer Results Summary

3.3.2.2. 2028 Heavy Winter Scenario

Performance issues identified in the problem statement are also mitigated in the heavy winter scenario. P6 contingencies involving Beacon and Bell interconnections no longer result in system performance violations. The following section includes a summary of results for the heavy winter scenario. Steady state contingency analysis results are contained in Section 5.

	HW_BASE	HW_HLD
P6		
N-1: Beacon - Bell #1 115 kV + T-1: Bell #6 230/115 kV		
Beacon - Northeast 115 kV	112.4	
N-1: Beacon - Northeast 115 kV + T-1: Bell #6 230/115 kV		
Beacon - Bell #1 115 kV	145.7	
N-1: Bell - Northeast 115 kV + T-1: Bell #6 230/115 kV		
Beacon - Bell #1 115 kV	109.2	
T-1: Beacon #2 230/115 kV + T-1: Bell #6 230/115 kV		
Beacon #1 230/115 kV	110.8	104.9

Table 18: Heavy Winter Results Summary

3.3.2.3. 2028 Heavy Spring Scenario

Performance issues identified in the problem statement are also mitigated in the heavy spring scenario. P6 contingencies involving Beacon and Bell interconnections no longer result in system performance violations. The following section includes a summary of results for the heavy spring scenario. Steady state contingency analysis results are contained in Section 5.

Heavy Spring Results Summary

	HSP_BASE	HSP_HLD
P6		
N-1: Airway Heights - Devils Gap 115 kV + N-1: Highland - Nine Mile 115 kV		
Addy - Devils Gap 115 kV (Devils Gap - Long Lake Tap)		112.4
N-1: Airway Heights - Devils Gap 115 kV + N-1: Nine Mile - Westside 115 kV		
Addy - Devils Gap 115 kV (Devils Gap - Long Lake Tap)	112.4	
N-1: Beacon - Bell #1 115 kV + T-1: Bell #6 230/115 kV		
Beacon - Northeast 115 kV	116.9	
Bell - Northeast 115 kV (Waikiki Tap - Northeast)	99.7	
N-1: Beacon - Northeast 115 kV + T-1: Bell #6 230/115 kV		
Beacon - Bell #1 115 kV	150.1	
N-1: Bell - Northeast 115 kV + T-1: Bell #6 230/115 kV		
Beacon - Bell #1 115 kV	119.4	

Table 19: Heavy Spring Results Summary

3.3.2.4. 2033 Heavy Summer Scenario

The performance issue identified in the problem statement are also mitigated in the 10-year heavy summer scenario. P6 contingencies involving Beacon and Bell interconnections, Francis & Cedar – Ross Park and Northwest – Westside 115kV Transmission Lines no longer result in system performance violations. The following section includes a summary of results for the 10-year heavy summer scenario. A complete list of steady state contingency analysis results is contained in Section 5.

Heavy Summer Sensitivity Results Summary

	HSS_BASE	HSS_HLD
P1		
T-1: Bell #6 230/115 kV		
Beacon – Bell #1 115kV	101.9	
P6		
N-1: Beacon - Bell #1 115 kV + T-1: Bell #6 230/115 kV		
Beacon - Northeast 115 kV	164.1	
Bell - Northeast 115 kV (Bell - Waikiki Tap)	103.3	
Bell - Northeast 115 kV (Waikiki Tap - Northeast)	132.0	
N-1: Beacon – Francis & Cedar 115kV + N-1: Northwest - Westside 115 kV		
Francis & Cedar – Ross Park 115kV (Lyons and Standard – Ross Park)	105.4	
N-1: Francis & Cedar - Ross Park 115 kV + N-1: Northwest - Westside 115 kV		
Beacon - Francis & Cedar 115 kV (Bell Tap -Waikiki)	121.2	
N-1: Northwest - Westside 115 kV + N-1: Francis & Cedar – Highland 115kV		
Francis & Cedar – Ross Park 115kV (Lyons and Standard – Ross Park)		105.4

Table 20: 2033 Heavy Summer Results

3.3.3. Voltage Stability Analysis

Voltage Stability Analysis was performed for the combined scope of the proposed projects in Section 3.4.3.

3.3.4. Stability Contingency Analysis

Stability Contingency Analysis was performed for the combined scope of the proposed projects in Section 3.4.4.

3.3.5. Short Circuit Analysis

Short circuit analysis for a three-phase bus fault was performed to determine adequacy of the circuit breaker interrupting capacity for expected faults following implementation of the proposed project. The results shown in Table 21 show notable increases in fault duty levels for Indian Trail and Waikiki after implementation of the proposed project.

Circuit switchers at Northeast, Ross Park and Waikiki are currently equipped with protection schemes to mitigate the overdutied equipment concerns. Mitigate plans have been developed for circuit switchers at Francis & Cedar. All other existing transmission protective device interrupting ratings are adequate for the fault duties associated with the proposed project.

Station	Pre-Project	Post-Project	Percent Change	Limiting Device Rating	% Duty	Device
B_048023BEACON N	37,489	37,427	-0.17%	40kA	93.6%	BKR
B_048025BEACON N	25,418	25,434	0.07%	40kA	63.6%	BKR
B_048029BEACON S	37,444	37,345	-0.26%	40kA	93.4%	BKR
B_048031BEACON S	25,447	25,463	0.07%	40kA	63.7%	BKR
B_048127FRANCEDR	20,612	22,582	9.56%	20kA	112.9%	CKT SWR
B_048164INDTRAIL	15,240	18,816	23.5%	25kA	75.3%	CKT SWR

Station	Pre-Project	Post-Project	Percent Change	Limiting Device Rating	% Duty	Device
B_048277NORTHEAS	23,676	25,166	6.29%	4kA	629.2%	CKT SWR
B_048371ROSSPARK	27,323	27,839	1.89%	7kA	397.7%	CKT SWR
B_048447WAIKIKI	13,398	23,031	71.9%	7kA	329.0%	CKT SWR

Table 21: Fault Duty Results for Highland 115kV Station Upgrade

3.3.6. Reliability Analysis

Exhaustive reliability metrics are not readily available for Avista's electrical system. Reliability is therefore discussed in a relative, qualitative manner.

The completion of the Highland 115kV Station project increases system reliability and operational flexibility in the North Spokane area. Planned outages for Beacon – Bell interconnecting facilities can be accommodated for maintenance activities thus increasing reliability with the affiliated facilities. Additionally, untimely unplanned outages for any of the affiliated facilities requiring system reconfiguration and potential dropped load can be avoided.

3.3.7. Redlined Scada Variable Limits

Preliminary SCADA Variable Limits (SVL's) are prepared with the intent of identifying constraints along a modified transmission line. The provided SVL's are not intended to be used directly.

The new transmission line and rebuilt sections of transmission line for Bell – Highland 115kV Transmission Line will be constructed with minimum 1200A equipment.

BELL - HIGHLAND 115 KV

B-839 A-XXX

				AMBIENT TEMPERATURE (C)								
				-30	-20	-10	0	10	20	30	40	50
LOCATION	DEVICE	TYPE	RATING (Amps.)	AMPS	AMPS	AMPS	AMPS	AMPS	AMPS	AMPS	AMPS	AMPS
BELL SUBSTATION (BPA)	P.C.B B-839 (BPA)		3000	4071	4071	3984	3804	3615	3420	3216	3000	
(Highland)	CURRENT XFMR.	C08457		2697	2697	2629	2486	2336	2174	2000	1809	
TRANSMISSION LINE	CONDUCTOR	~~3/0 CU (80°C) *~~		~~625~~	~~594~~	~~561~~	~~525~~	~~490~~	~~451~~	~~409~~	~~360~~	~~304~~
		~~250 CU (80°C) *~~		~~808~~	~~768~~	~~725~~	~~678~~	~~632~~	~~582~~	~~527~~	~~464~~	~~390~~
		795 ACSS "Drake" (200°C)*		**1854**	**1816**	**1777**	**1736**	**1699**	**1660**	**1620**	**1578**	**1534**
	AIR SWITCH B-839		1600	2406	2406	2357	2251	2141	2026	1846	1600	
	AIR SWITCH A-XXX	USCO AGCH-5V (DO6)	2000	3192	3071	2946	2815	2678	2533	2362	2157	1929
	AIR SWITCH A-XXX	USCO AGCH-5V (DO6)	2000	3192	3071	2946	2815	2678	2533	2362	2157	1929
HIGHLAND 115 kV SUB	G.C.B. A-XXX	SIEMENS SPS2	2000	3002	2876	2746	2611	2469	2321	2165	2000	1823
115kV EAST BUS	CONDUCTOR	3" Al. Pipe (85°C)**		3591	3432	3262	3079	2879	2659	2414	2133	2000
(BELL LINE 1)		2 x 1272 AAC "Narcissus" (80°C)		3556	3376	3176	2962	2758	2532	2282	1994	1650
	CURRENT XFMR.	(2) 2000/5 M.R.	conn. 2000/5 (TRF=2)	4000	4000	4000	4000	4000	4000	4000	4000	4000
		(2) 2000/5 M.R.	conn. 1200/5 (TRF=2)	2400	2400	2400	2400	2400	2400	2400	2400	2400
	AIR SWITCH	(2) USCO AGCH5V (DO6)	2000	3192	3071	2946	2815	2678	2533	2362	2157	1929
HIGHLAND 115 kV SUB	G.C.B. A-XXX	SIEMENS SPS2	2000	3002	2876	2746	2611	2469	2321	2165	2000	1823
(115kV LINE TIE)	CONDUCTOR	3" Al. Pipe (85°C)**		3591	3432	3262	3079	2879	2659	2414	2133	2000
		2 x 1272 AAC "Narcissus" (80°C)		3556	3376	3176	2962	2758	2532	2282	1994	1650
	CURRENT XFMR.	(4) 2000/5 M.R.	conn. 1200/5 (TRF=2)	2400	2400	2400	2400	2400	2400	2400	2400	2400
	AIR SWITCH	(2) USCO AGCH5V (DO6)	2000	3192	3071	2946	2815	2678	2533	2362	2157	1929
HIGHLAND 115 kV SUB	G.C.B. A-XXX	SIEMENS SPS2	2000	3002	2876	2746	2611	2469	2321	2165	2000	1823
115kV WEST BUS	CONDUCTOR	3" Al. Pipe (85°C)**		3591	3432	3262	3079	2879	2659	2414	2133	2000
(NINE MILE LINE 1)		2 x 1272 AAC "Narcissus" (80°C)		3556	3376	3176	2962	2758	2532	2282	1994	1650
	CURRENT XFMR.	(2) 2000/5 M.R.	conn. 2000/5 (TRF=2)	4000	4000	4000	4000	4000	4000	4000	4000	4000
		(2) 2000/5 M.R.	conn. 1200/5 (TRF=2)	2400	2400	2400	2400	2400	2400	2400	2400	2400
	AIR SWITCH	(2) USCO AGCH5V (DO6)	2000	3192	3071	2946	2815	2678	2533	2362	2157	1929
	PROTECTION	SEL-421 (Z1MP)	3600	17830	17830	17830	17830	17830	17830	17830	17830	17830
		(Z2MP)		11854	11854	11854	11854	11854	11854	11854	11854	11854
		(ZLF)		1848	1848	1848	1848	1848	1848	1848	1848	1848
		(50P1)		1449	1449	1449	1449	1449	1449	1449	1449	1449
		(67P2)***		1449	1449	1449	1449	1449	1449	1449	1449	1449
		SEL-311L (Z1P)	3600	17830	17830	17830	17830	17830	17830	17830	17830	17830
		(Z2P)		11854	11854	11854	11854	11854	11854	11854	11854	11854
		(ZLF)		1848	1848	1848	1848	1848	1848	1848	1848	1848
		(50P1)		1449	1449	1449	1449	1449	1449	1449	1449	1449
		(67P2)***		1449	1449	1449	1449	1449	1449	1449	1449	1449
SYSTEM CURRENT LIMIT FOR SPECIFIC TEMPERATURE				**1854**	**1816**	**1777**	**1736**	**1699**	**1660**	**1620**	**1578**	**1534**

Figure 12: Bell - Highland 115kV Transmission Line Proposed SVL's

The Francis & Cedar – Highland 115kV Transmission Line will be limited by the 556 AAC conductor.

FRANCIS & CEDAR - HIGHLAND 115 KV

A-674 A-XXX

				AMBIENT TEMPERATURE (C)								
				-30	-20	-10	0	10	20	30	40	50
LOCATION	DEVICE	TYPE	RATING (Amps.)	AMPS	AMPS	AMPS	AMPS	AMPS	AMPS	AMPS	AMPS	AMPS
FRANCIS & CEDAR SUB.	G.C.B. A-674	SIEMENS 121-40-1200 SPST	1200	1801	1726	1648	1566	1482	1393	1299	1200	1094
(HIGHLAND LINE)	CONDUCTOR	3" Al. Pipe (85°C)**		3591	3432	3262	3079	2879	2659	2414	2133	2000
		2" Al. Pipe (85°C)		2196	2099	1995	1883	1762	1629	1481	1313	1114
		556 AAC "Dahlia (80°C)		1059	1006	948	886	825	759	685	601	502
	CURRENT XFMR.	1200/5 M.R.	conn. 1200/5 (TRF=2.0)	2400	2400	2400	2400	2400	2400	2400	2400	2400
		(2) 1200/5 M.R.	conn. 800/5 (TRF=2.0)	1600	1600	1600	1600	1600	1600	1600	1600	1600
	AIR SWITCH	(2) TRAVIS V (BO2)	1200	2141	2036	1926	1809	1684	1549	1401	1236	1044
	PROTECTION	SEL-321 (Z1P)	2400	8607	8607	8607	8607	8607	8607	8607	8607	8607
		(Z2P)		6199	6199	6199	6199	6199	6199	6199	6199	6199
		(50H)***		5792	5792	5792	5792	5792	5792	5792	5792	5792
		(50M)***		576	576	576	576	576	576	576	576	576
		SEL-321 (Z1P)	2400	8607	8607	8607	8607	8607	8607	8607	8607	8607
		(Z2P)		6199	6199	6199	6199	6199	6199	6199	6199	6199
		(50H)***		5792	5792	5792	5792	5792	5792	5792	5792	5792
		(50M)***		576	576	576	576	576	576	576	576	576
		SEL-251	2400	2400	2400	2400	2400	2400	2400	2400	2400	2400
TRANSMISSION LINE	CONDUCTOR	556 AAC "Dahlia" (80°C) *		**1059**	**1006**	**948**	**886**	**825**	**759**	**685**	**601**	**502**
		556 ACSR "Parakeet" (80°C) *		1087	1032	972	908	846	778	702	616	513
		795 ACSS "Drake" (200°C)*		1854	1816	1777	1736	1699	1660	1620	1578	1534
HIGHLAND 115 kV SUB	G.C.B. A-XXX	SIEMENS SPS2	2000	3002	2876	2746	2611	2469	2321	2165	2000	1823
115kV EAST BUS	CONDUCTOR	3" Al. Pipe (85°C)**		3591	3432	3262	3079	2879	2659	2414	2133	2000
(F&C LINE 1)		2 x 1272 AAC "Narcissus" (80°C)		3556	3376	3176	2962	2758	2532	2282	1994	1650
	CURRENT XFMR.	(2) 2000/5 M.R.	conn. 2000/5 (TRF=2)	4000	4000	4000	4000	4000	4000	4000	4000	4000
		(2) 2000/5 M.R.	conn. 1200/5 (TRF=2)	2400	2400	2400	2400	2400	2400	2400	2400	2400
	AIR SWITCH	(2) USCO AGCH5V (DO6)	2000	3192	3071	2946	2815	2678	2533	2362	2157	1929
HIGHLAND 115 kV SUB	G.C.B. A-XXX	SIEMENS SPS2	2000	3002	2876	2746	2611	2469	2321	2165	2000	1823
(115kV LINE TIE)	CONDUCTOR	3" Al. Pipe (85°C)**		3591	3432	3262	3079	2879	2659	2414	2133	2000
		2 x 1272 AAC "Narcissus" (80°C)		3556	3376	3176	2962	2758	2532	2282	1994	1650
	CURRENT XFMR.	(4) 2000/5 M.R.	conn. 1200/5 (TRF=2)	2400	2400	2400	2400	2400	2400	2400	2400	2400
	AIR SWITCH	(2) USCO AGCH5V (DO6)	2000	3192	3071	2946	2815	2678	2533	2362	2157	1929
HIGHLAND 115 kV SUB	G.C.B. A-XXX	SIEMENS SPS2	2000	3002	2876	2746	2611	2469	2321	2165	2000	1823
115kV WEST BUS	CONDUCTOR	3" Al. Pipe (85°C)**		3591	3432	3262	3079	2879	2659	2414	2133	2000
(WESTSIDE LINE 1)		2 x 1272 AAC "Narcissus" (80°C)		3556	3376	3176	2962	2758	2532	2282	1994	1650
	CURRENT XFMR.	(2) 2000/5 M.R.	conn. 2000/5 (TRF=2)	4000	4000	4000	4000	4000	4000	4000	4000	4000
		(2) 2000/5 M.R.	conn. 1200/5 (TRF=2)	2400	2400	2400	2400	2400	2400	2400	2400	2400
	AIR SWITCH	(2) USCO AGCH5V (DO6)	2000	3192	3071	2946	2815	2678	2533	2362	2157	1929
	PROTECTION	SEL-421 (Z1MP)	3600	17830	17830	17830	17830	17830	17830	17830	17830	17830
		(Z2MP)		11854	11854	11854	11854	11854	11854	11854	11854	11854
		(ZLF)		1848	1848	1848	1848	1848	1848	1848	1848	1848
		(50P1)		1449	1449	1449	1449	1449	1449	1449	1449	1449
		(67P2)***		1449	1449	1449	1449	1449	1449	1449	1449	1449
		SEL-311L (Z1P)	3600	17830	17830	17830	17830	17830	17830	17830	17830	17830
		(Z2P)		11854	11854	11854	11854	11854	11854	11854	11854	11854
		(ZLF)		1848	1848	1848	1848	1848	1848	1848	1848	1848
		(50P1)		1449	1449	1449	1449	1449	1449	1449	1449	1449
		(67P2)***		1449	1449	1449	1449	1449	1449	1449	1449	1449
SYSTEM CURRENT LIMIT FOR SPECIFIC TEMPERATURE				**1059**	**1006**	**948**	**886**	**825**	**759**	**685**	**601**	**502**

Figure 13: Francis & Cedar – Highland 115kV Transmission Line Proposed SVL

The Highland – Nine Mile 115kV line will be limited by the existing 795 AAC conductor.

HIGHLAND-NINE MILE 115 KV

A-XXX A-655

				AMBIENT TEMPERATURE (C)								
				-30	-20	-10	0	10	20	30	40	50
LOCATION	DEVICE	TYPE	RATING (Amps.)	AMPS	AMPS	AMPS	AMPS	AMPS	AMPS	AMPS	AMPS	AMPS
HIGHLAND 115 kV SUB	G.C.B. A-XXX	SIEMENS SPS2	2000	3002	2876	2746	2611	2469	2321	2165	2000	1823
115kV EAST BUS	CONDUCTOR	3" Al. Pipe (85°C)**		3591	3432	3262	3079	2879	2659	2414	2133	2000
(BELL LINE 1)		2 x 1272 AAC "Narcissus" (80°C)		3556	3376	3176	2962	2758	2532	2282	1994	1650
	CURRENT XFMR.	(2) 2000/5 M.R.	conn. 2000/5 (TRF=2)	4000	4000	4000	4000	4000	4000	4000	4000	4000
		(2) 2000/5 M.R.	conn. 1200/5 (TRF=2)	2400	2400	2400	2400	2400	2400	2400	2400	2400
	AIR SWITCH	(2) USCO AGCH5V (DO6)	2000	3192	3071	2946	2815	2678	2533	2362	2157	1929
HIGHLAND 115 kV SUB	G.C.B. A-XXX	SIEMENS SPS2	2000	3002	2876	2746	2611	2469	2321	2165	2000	1823
(115kV LINE TIE)	CONDUCTOR	3" Al. Pipe (85°C)**		3591	3432	3262	3079	2879	2659	2414	2133	2000
		2 x 1272 AAC "Narcissus" (80°C)		3556	3376	3176	2962	2758	2532	2282	1994	1650
	CURRENT XFMR.	(4) 2000/5 M.R.	conn. 1200/5 (TRF=2)	2400	2400	2400	2400	2400	2400	2400	2400	2400
	AIR SWITCH	(2) USCO AGCH5V (DO6)	2000	3192	3071	2946	2815	2678	2533	2362	2157	1929
HIGHLAND 115 kV SUB	G.C.B. A-XXX	SIEMENS SPS2	2000	3002	2876	2746	2611	2469	2321	2165	2000	1823
115kV WEST BUS	CONDUCTOR	3" Al. Pipe (85°C)**		3591	3432	3262	3079	2879	2659	2414	2133	2000
(NINE MILE LINE 1)		2 x 1272 AAC "Narcissus" (80°C)		3556	3376	3176	2962	2758	2532	2282	1994	1650
	CURRENT XFMR.	(2) 2000/5 M.R.	conn. 2000/5 (TRF=2)	4000	4000	4000	4000	4000	4000	4000	4000	4000
		(2) 2000/5 M.R.	conn. 1200/5 (TRF=2)	2400	2400	2400	2400	2400	2400	2400	2400	2400
	AIR SWITCH	(2) USCO AGCH5V (DO6)	2000	3192	3071	2946	2815	2678	2533	2362	2157	1929
	PROTECTION	SEL-421 (Z1MP)	3600	17830	17830	17830	17830	17830	17830	17830	17830	17830
		(Z2MP)		11854	11854	11854	11854	11854	11854	11854	11854	11854
		(ZLF)		1848	1848	1848	1848	1848	1848	1848	1848	1848
		(50P1)		1449	1449	1449	1449	1449	1449	1449	1449	1449
		(67P2)***		1449	1449	1449	1449	1449	1449	1449	1449	1449
		SEL-311L (Z1P)	3600	17830	17830	17830	17830	17830	17830	17830	17830	17830
		(Z2P)		11854	11854	11854	11854	11854	11854	11854	11854	11854
		(ZLF)		1848	1848	1848	1848	1848	1848	1848	1848	1848
		(50P1)		1449	1449	1449	1449	1449	1449	1449	1449	1449
		(67P2)***		1449	1449	1449	1449	1449	1449	1449	1449	1449
TRANSMISSION LINE	CONDUCTOR	795 AAC "Arbutus" (80°C) *		**1329**	**1262**	**1188**	**1109**	**1033**	**950**	**857**	**750**	**624**
		795 ACSS "Drake" (200°C)*		1854	1816	1777	1736	1699	1660	1620	1578	1534
INDIAN TRAIL SUB	CONDUCTOR	3" Al. Pipe (85°C)**		3591	3432	3262	3079	2879	2659	2414	2133	2000
		2" Al. Pipe (85°C)		2196	2099	1995	1883	1762	1629	1481	1313	1114
	AIR SWITCH A-741	PASCOR CBSC (D06)	1200	1915	1843	1768	1689	1607	1520	1417	1294	1157
	A-745	PASCOR CBSC (D06)	1200	1915	1843	1768	1689	1607	1520	1417	1294	1157
NINE MILE SUB	G.C.B. A-655	GE/Hita HVB-121-40	2000	3002	2876	2746	2611	2469	2321	2165	2000	1823
(HIGHLAND LINE)	CONDUCTOR	3" Al. Pipe (85°C)**		3591	3432	3262	3079	2879	2659	2414	2133	2000
		2" Al. Pipe (85°C)		2196	2099	1995	1883	1762	1629	1481	1313	1114
	CURRENT XFMR.	(3) 1200/5 M.R.	conn. 1200/5 (TRF=2)	2400	2400	2400	2400	2400	2400	2400	2400	2400
	AIR SWITCH	(2) PASCOR CBSC (DO6)	1200	1915	1843	1768	1689	1607	1520	1417	1294	1157
	PROTECTION	SEL-421-5 (Z1P)	3600	22609	22609	22609	22609	22609	22609	22609	22609	22609
		(Z2P)		9122	9122	9122	9122	9122	9122	9122	9122	9122
		(ZLF)		2441	2441	2441	2441	2441	2441	2441	2441	2441
		(50P1)***		2409	2409	2409	2409	2409	2409	2409	2409	2409
		(67P2)***		1800	1800	1800	1800	1800	1800	1800	1800	1800
		SEL-311L (Z1P)	3600	22590	22590	22590	22590	22590	22590	22590	22590	22590
		(Z2P)		9115	9115	9115	9115	9115	9115	9115	9115	9115
		(ZLF)		2441	2441	2441	2441	2441	2441	2441	2441	2441
		(50P1)***		2409	2409	2409	2409	2409	2409	2409	2409	2409
		(67P2)***		1800	1800	1800	1800	1800	1800	1800	1800	1800
SYSTEM CURRENT LIMIT FOR SPECIFIC TEMPERATURE				**1329**	**1262**	**1188**	**1109**	**1033**	**950**	**857**	**750**	**624**

Figure 14: Highland – Nine Mile 115kV Transmission Line Proposed SVL

The Highland – Westside 115kV line will be limited by the existing 795 AAC conductor.

HIGHLAND - WESTSIDE 115 KV

A-XXX A-968

				AMBIENT TEMPERATURE (C)								
				-30	-20	-10	0	10	20	30	40	50
LOCATION	DEVICE	TYPE	RATING (Amps.)	AMPS	AMPS	AMPS	AMPS	AMPS	AMPS	AMPS	AMPS	AMPS
HIGHLAND 115 kV SUB	G.C.B. A-XXX	SIEMENS SPS2	2000	3002	2876	2746	2611	2469	2321	2165	2000	1823
115kV EAST BUS	CONDUCTOR	3" Al. Pipe (85°C)**		3591	3432	3262	3079	2879	2659	2414	2133	2000
(F&C LINE 1)		2 x 1272 AAC "Narcissus" (80°C)		3556	3376	3176	2962	2758	2532	2282	1994	1650
	CURRENT XFMR.	(2) 2000/5 M.R.	conn. 2000/5 (TRF=2)	4000	4000	4000	4000	4000	4000	4000	4000	4000
		(2) 2000/5 M.R.	conn. 1200/5 (TRF=2)	2400	2400	2400	2400	2400	2400	2400	2400	2400
	AIR SWITCH	(2) USCO AGCH5V (DO6)	2000	3192	3071	2946	2815	2678	2533	2362	2157	1929
HIGHLAND 115 kV SUB	G.C.B. A-XXX	SIEMENS SPS2	2000	3002	2876	2746	2611	2469	2321	2165	2000	1823
(115kV LINE TIE)	CONDUCTOR	3" Al. Pipe (85°C)**		3591	3432	3262	3079	2879	2659	2414	2133	2000
		2 x 1272 AAC "Narcissus" (80°C)		3556	3376	3176	2962	2758	2532	2282	1994	1650
	CURRENT XFMR.	(4) 2000/5 M.R.	conn. 1200/5 (TRF=2)	2400	2400	2400	2400	2400	2400	2400	2400	2400
	AIR SWITCH	(2) USCO AGCH5V (DO6)	2000	3192	3071	2946	2815	2678	2533	2362	2157	1929
HIGHLAND 115 kV SUB	G.C.B. A-XXX	SIEMENS SPS2	2000	3002	2876	2746	2611	2469	2321	2165	2000	1823
115kV WEST BUS	CONDUCTOR	3" Al. Pipe (85°C)**		3591	3432	3262	3079	2879	2659	2414	2133	2000
(WESTSIDE LINE 1)		2 x 1272 AAC "Narcissus" (80°C)		3556	3376	3176	2962	2758	2532	2282	1994	1650
	CURRENT XFMR.	(2) 2000/5 M.R.	conn. 2000/5 (TRF=2)	4000	4000	4000	4000	4000	4000	4000	4000	4000
		(2) 2000/5 M.R.	conn. 1200/5 (TRF=2)	2400	2400	2400	2400	2400	2400	2400	2400	2400
	AIR SWITCH	(2) USCO AGCH5V (DO6)	2000	3192	3071	2946	2815	2678	2533	2362	2157	1929
	PROTECTION	SEL-421 (Z1MP)	3600	17830	17830	17830	17830	17830	17830	17830	17830	17830
		(Z2MP)		11854	11854	11854	11854	11854	11854	11854	11854	11854
		(ZLF)		1848	1848	1848	1848	1848	1848	1848	1848	1848
		(50P1)		1449	1449	1449	1449	1449	1449	1449	1449	1449
		(67P2)***		1449	1449	1449	1449	1449	1449	1449	1449	1449
		SEL-311L (Z1P)	3600	17830	17830	17830	17830	17830	17830	17830	17830	17830
		(Z2P)		11854	11854	11854	11854	11854	11854	11854	11854	11854
		(ZLF)		1848	1848	1848	1848	1848	1848	1848	1848	1848
		(50P1)		1449	1449	1449	1449	1449	1449	1449	1449	1449
		(67P2)***		1449	1449	1449	1449	1449	1449	1449	1449	1449
TRANSMISSION LINE	CONDUCTOR	795 AAC "Arbutus" (80°C) *		**1329**	**1262**	**1188**	**1109**	**1033**	**950**	**857**	**750**	**624**
		795 ACSS "Drake" (200°C)*		1854	1816	1777	1736	1699	1660	1620	1578	1534
WESTSIDE SUB.	G.C.B. A-968	MITSUBISHI 120SFMT40HE1	2000	3002	2876	2746	2611	2469	2321	2165	2000	1823
(HIGHLAND LINE)	CONDUCTOR	3" Al. Pipe (85°C)		3591	3432	3262	3079	2879	2659	2414	2133	2000
		4" Al. Pipe (85°C)		4656	4450	4229	3991	3730	3443	3122	2752	2311
		2 X 1272kCMIL AAC "Narcissus" (80°C)		3556	3376	3176	2962	2758	2532	2282	1994	1650
	CURRENT XFMR	(2) 2000/5 M.R.	conn. 1200/5 (TRF=2)	2400	2400	2400	2400	2400	2400	2400	2400	2400
		(2) 2000/5 M.R.	conn. 2000/5 (TRF=2)	4000	4000	4000	4000	4000	4000	4000	4000	4000
	AIR SWITCH	(2) USCO AGCH5V (DO6)	2000	3192	3071	2946	2815	2678	2533	2362	2157	1929
	PROTECTION	SEL-411L (Z1MP)	3600	22609	22609	22609	22609	22609	22609	22609	22609	22609
		(Z2MP)		13866	13866	13866	13866	13866	13866	13866	13866	13866
		(ZLF)		2441	2441	2441	2441	2441	2441	2441	2441	2441
		(50P1)***		2409	2409	2409	2409	2409	2409	2409	2409	2409
		(67P2)***		2409	2409	2409	2409	2409	2409	2409	2409	2409
		SEL-311L (Z1P)	3600	22609	22609	22609	22609	22609	22609	22609	22609	22609
		(Z2P)		13866	13866	13866	13866	13866	13866	13866	13866	13866
		(ZLF)		2441	2441	2441	2441	2441	2441	2441	2441	2441
		(50P1)***		2409	2409	2409	2409	2409	2409	2409	2409	2409
		(67P2)***		2409	2409	2409	2409	2409	2409	2409	2409	2409
SYSTEM CURRENT LIMIT FOR SPECIFIC TEMPERATURE				**1329**	**1262**	**1188**	**1109**	**1033**	**950**	**857**	**750**	**624**

Figure 15: Highland - Westside 115kV Transmission Line Proposed SVL

3.4. Complete Scope Technical Analysis

This analysis evaluates the system with the Highland 115kV Station and Boulder – Irvin #1 loop into Trentwood projects integrated into the system.

3.4.1. Project Representation

No additional model parameters were implemented for technical analysis for the combined project scope.

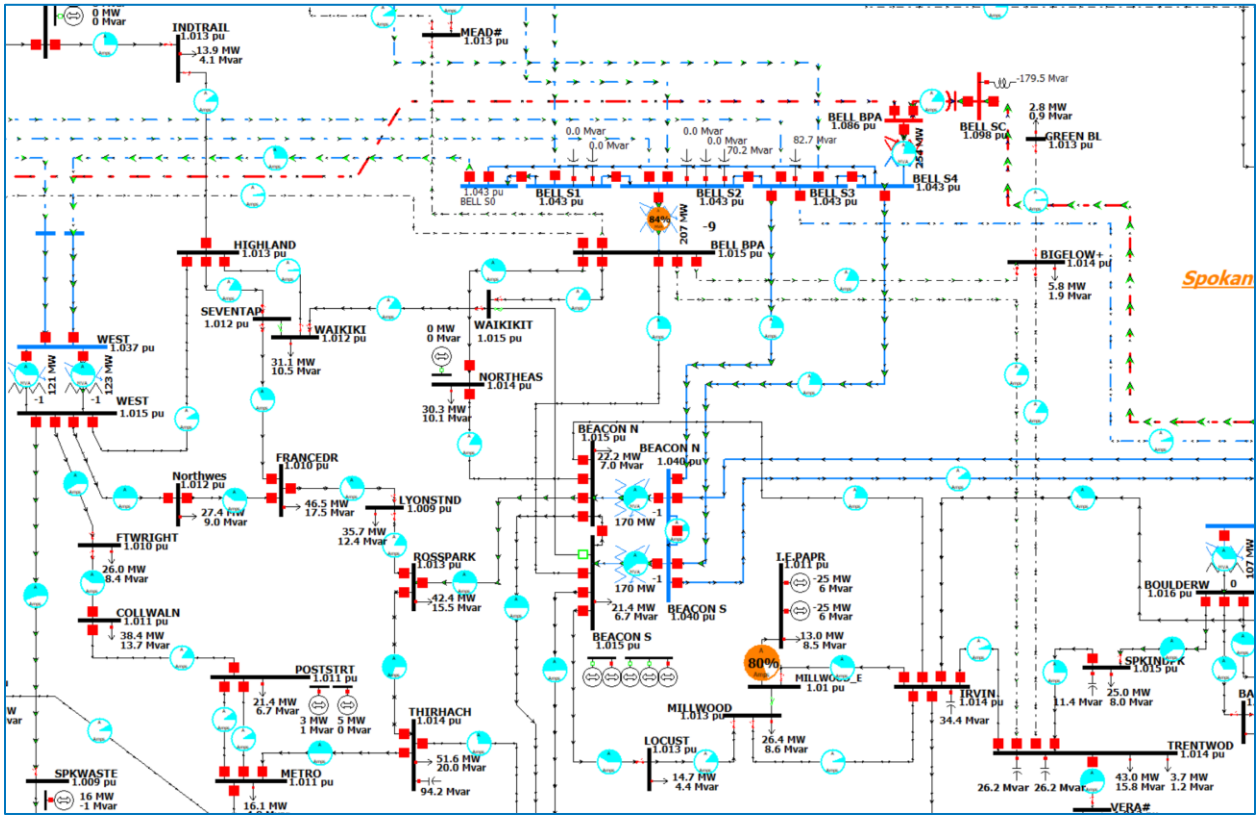


Figure 16: Complete Scope Powerflow Representation

3.4.2. Steady State Contingency Analysis

3.4.2.1. 2028 Heavy Summer Scenario

The complete scope of proposed projects results in adequate system performance relating to the issues identified in the problem statement. Contingency results show new or exacerbated overloads for Ross Park – Third and Hatch and Francis & Cedar – Ross Park transmission lines under P2 and P6 contingencies. Ross Park – Third and Hatch thermal concerns are mitigated with the addition of the Garden Springs project. The Francis & Cedar – Ross Park thermal overload is an existing issue and is not mitigated with the proposed project. Mitigation plans for this concern will be addressed outside the scope of this project. A complete list of steady state contingency analysis results is contained in Section 5.

Heavy Summer Results Summary

	HS_BASE	HS_COMPLETE
P2		
BF: A600 Beacon North & South 115 kV		
College and Walnut - Westside 115 kV (Fort Wright - Westside)	102.2	99.4
Francis & Cedar - Northwest 115 kV	123.2	
Francis & Cedar - Ross Park 115 kV (Francis & Cedar - Lyons and Standard)		105.7
Northwest - Westside 115 kV	117.6	
BF: R427 Beacon North & South 230 kV		
Bell – Northeast 115 kV (Bell – Waikiki Tap)	111.8	
BELL S2 (40088) -> BELL BPA (40087) CKT 6 at BELL S2	105.4	102.1
Francis & Cedar – Northwest 115 kV	104.2	
Northwest – Westside 115 kV	102.4	
P6		
N-1: Beacon - Bell #1 115 kV + T-1: Bell #6 230/115 kV		

	HS_BASE	HS_COMPLETE
Beacon - Northeast 115 kV	149.4	
Bell - Northeast 115 kV (Waikiki Tap - Northeast)	119.9	
N-1: Beacon – Ninth & Central #1 115 kV + N-1: College & Walnut - Westside 115 kV		
Ross Park – Third and Hatch 115 kV		98.8
N-1: Beacon - Northeast 115 kV + T-1: Bell #6 230/115 kV		
Beacon - Bell #1 115 kV	192.0	
N-1: Bell - Northeast 115 kV + T-1: Bell #6 230/115 kV		
Beacon - Bell #1 115 kV	129.9	
N-1: Francis & Cedar – Ross Park 115 kV +N-1: Northwest – Westside 115 kV		
Beacon – Francis & Cedar 115 kV (Bell Tap – Waikiki)	112.5	

Table 22: Complete Project Scope Heavy Summer Results

3.4.2.2. 2028 Heavy Winter Scenario

Analysis of the complete scope of the proposed projects has similar results as shown in Section 3.2.2 and 3.3.2 above, for heavy winter results.

3.4.2.3. 2028 Heavy Spring Scenario

Analysis of the complete scope of the proposed projects has similar results as shown in Section 3.2.2 and 3.3.2 above, for heavy spring results.

3.4.2.4. 2033 Heavy Summer Sensitivity Scenario

The complete scope of proposed projects results in adequate system performance relating to the issues identified in the problem statement. Contingency analysis did not result in new or exacerbated overloads for the system in the 10-year heavy summer scenario. A complete list of steady state contingency analysis results is contained in Section 5.

Heavy Summer Sensitivity Results Summary

	HSS_BASE	HSS_COMPLETE
P1		
T-1: Bell #6 230/115 kV		
Beacon – Bell #1 115 kV	101.9	
P2		
BF: A600 Beacon North & South 230 kV		
Francis & Cedar - Northwest 115 kV	114.3	
Northwest - Westside 115 kV	111.8	
BF: R427 Beacon North & South 230 kV		
Bell - Northeast 115 kV (Bell - Waikiki Tap)	102.2	
BELL S2 (40088) -> BELL BPA (40087) CKT 6 at BELL S2	102.0	96.1
Francis & Cedar - Northwest 115 kV	113.2	
Northwest - Westside 115 kV	110.8	
P6		
N-1: Beacon - Bell #1 115 kV + T-1: Bell #6 230/115 kV		
Beacon - Northeast 115 kV	164.1	
Bell - Northeast 115 kV (Bell – Waikiki Tap)	103.3	
Bell - Northeast 115 kV (Waikiki Tap - Northeast)	132.0	
N-1: Beacon - Northeast 115 kV + T-1: Bell #6 230/115 kV		
Beacon – Bell #1 115 kV	211.3	
N-1: Bell - Northeast 115 kV + T-1: Bell #6 230/115 kV		
Beacon – Bell #1 115 kV	142.9	
Northwest – Westside 115 kV	96.1	
N-1: Francis & Cedar - Ross Park 115 kV + N-1: Northwest - Westside 115 kV		
Beacon - Francis & Cedar 115 kV (Bell Tap -Waikiki)	121.2	
T-1: Beacon #1 230/115 kV + T-1: Beacon #2 230/115 kV		
BELL S2 (40088) -> BELL BPA (40087) CKT 6 at BELL S2	95.8	
Francis & Cedar - Northwest 115 kV	105.4	
Northwest - Westside 115 kV	104.5	

	HSS_BASE	HSS_COMPLETE
T-1: Beacon #1 230/115 kV + T-1: Bell #6 230/115 kV		
Beacon – Bell #1 115 kV	98.8	
Beacon #2 230/115 kV	**108.2**	96.9
Francis & Cedar - Northwest 115 kV	**107.1**	
Northwest - Westside 115 kV	**106.0**	
T-1: Beacon #2 230/115 kV + T-1: Bell #6 230/115 kV		
Beacon – Bell #1 115 kV	97.7	
Beacon #1 230/115 kV	**110.5**	99.1
Francis & Cedar - Northwest 115 kV	**107.1**	
Northwest - Westside 115 kV	**106.0**	

Table 23: Complete Project Scope 2033 Heavy Summer Results

3.4.3. Voltage Stability Analysis

Voltage stability analysis was performed for the complete scope of the proposed projects.

3.4.3.1. Power/Voltage (PV) Adequacy

With the necessary network upgrades represented in the model, a Load Ramp PV Curve analysis was conducted while monitoring all buses in the local area. The PV curve process automatically solves a sequence of power flows at incremental levels of power transfer between a source Injection Group and a sink Injection Group. The source Injection Group, supplying the generation necessary for the incremental load increase, was configured to be sourced from all generation in WECC. Power transfer of load in the Spokane areas was incrementally increased, while performing contingency analysis for a pre-defined set of contingencies at each load increment, until voltage collapse occurred. This process provides the resulting PV Curve as shown in Figure 17.

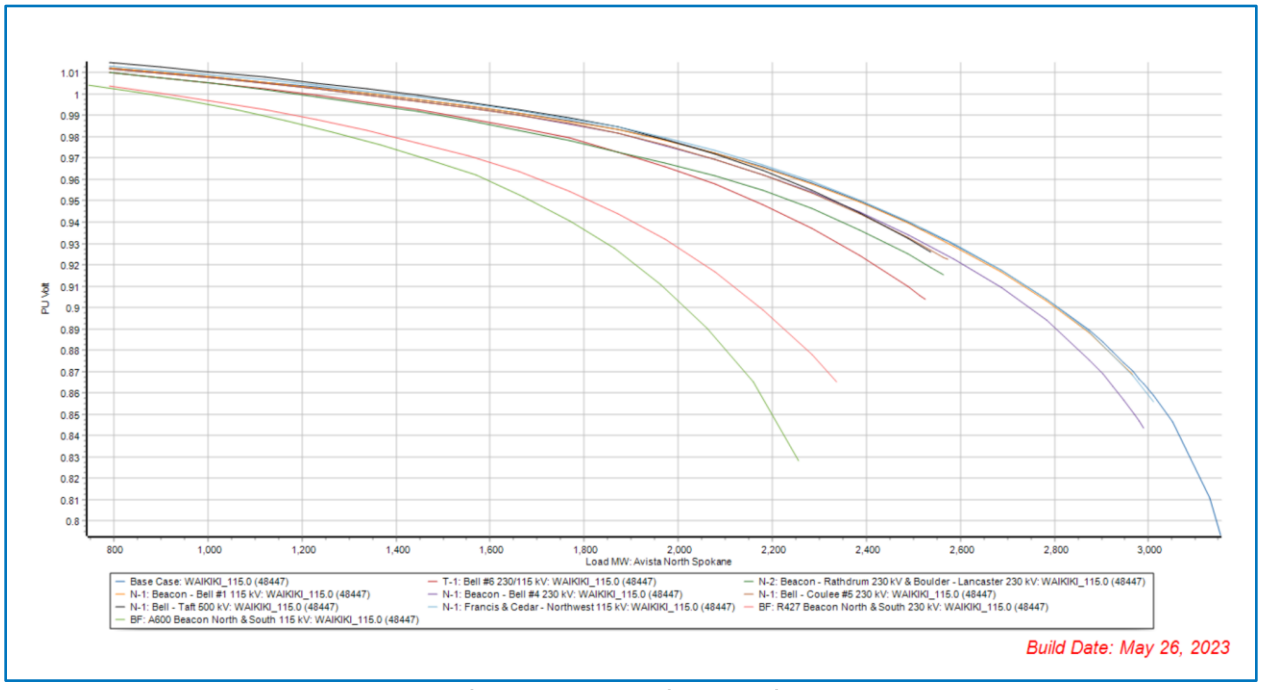


Figure 17: PV Plot Results

The most limiting contingency, of the subset of contingencies evaluated, is the A600 Beacon 115kV bus-tie breaker failure.

3.4.3.2. Reactive/Voltage (QV) Stability Analysis

The reactive power and voltage relationship show the sensitivity and variation of bus voltages with respect to reactive power injections or absorptions. A system is considered stable, with respect to voltage, if QV sensitivity is positive for every bus. Positive reactive margin is an indication of how far a transmission system is from voltage instability. Low reactive margin (below 200Mvar at any 230kV bus or any 230/115kV source on the low side) is considered marginal and is indicative of potential system concerns.

Voltage adequacy studies were performed to determine the relative strength of the local transmission system. Several buses in the area were selected as an injection bus where reactive load was increased until the voltage collapsed (i.e., the case became numerically unstable) for each contingency.

Evaluated buses demonstrate positive reactive margin in both pre and post project scenarios. The results provided in Table 24 show reduced reactive margin for the studied contingencies. Results indicate notable improvements for Francis & Cedar and Waikiki bus with the complete proposed scope.

	Reactive Margin		
Bus/Contingency	**Pre-Project**	**Post-Project**	**Percent Change**
CHENEY 115			
BASECASE	-228.14	-210.77	-7.61%
BF: A600 BEACON NORTH & SOUTH 115 KV	-182.51	-191.21	4.77%
BF: R427 BEACON NORTH & SOUTH 230 KV	-197.34	-198.84	0.76%
N-1: BEACON - BELL #1 115 KV	-209.37	-210.64	0.61%
N-1: BEACON - BELL #4 230 KV	-209.24	-210.35	0.53%
N-1: BELL - COULEE #5 230 KV	-209.10	-210.20	0.53%
N-1: BELL - TAFT 500 KV	-210.32	-211.42	0.52%
N-1: FRANCIS & CEDAR - NORTHWEST 115 KV	-209.37	-210.31	0.45%
N-2: BEACON - RATHDRUM 230 KV & BOULDER - LANCASTER 230 KV	-205.24	-206.29	0.51%
T-1: BELL #6 230/115 KV	-206.64	-207.77	0.55%
BEACON N 115			
BASECASE	-1848.36	-1432.33	-22.51%
BF: A600 BEACON NORTH & SOUTH 115 KV	0	0	
BF: R427 BEACON NORTH & SOUTH 230 KV	-1095.04	-973.94	-11.06%
N-1: BEACON - BELL #1 115 KV	-1636.78	-1405.65	-14.12%
N-1: BEACON - BELL #4 230 KV	-1612.40	-1381.69	-14.31%
N-1: BELL - COULEE #5 230 KV	-1589.16	-1360.82	-14.37%
N-1: BELL - TAFT 500 KV	-1509.65	-1330.03	-11.90%
N-1: FRANCIS & CEDAR - NORTHWEST 115 KV	-1605.16	-1411.8	-12.05%
N-2: BEACON - RATHDRUM 230 KV & BOULDER - LANCASTER 230 KV	-1582.52	-1383.03	-12.61%
T-1: BELL #6 230/115 KV	-1447.25	-1291.29	-10.78%
BEACON S 115			
BASECASE	-1847.59	-1432.05	-22.49%
BF: A600 BEACON NORTH & SOUTH 115 KV	0	0	
BF: R427 BEACON NORTH & SOUTH 230 KV	-1094.34	-973.45	-11.05%
N-1: BEACON - BELL #1 115 KV	-1628.94	-1403.39	-13.85%
N-1: BEACON - BELL #4 230 KV	-1611.86	-1381.29	-14.30%
N-1: BELL - COULEE #5 230 KV	-1588.72	-1360.48	-14.37%
N-1: BELL - TAFT 500 KV	-1509.38	-1329.84	-11.89%
N-1: FRANCIS & CEDAR - NORTHWEST 115 KV	-1604.99	-1411.84	-12.03%
N-2: BEACON - RATHDRUM 230 KV & BOULDER - LANCASTER 230 KV	-1582.07	-1382.7	-12.60%
T-1: BELL #6 230/115 KV	-1443.95	-1291.26	-10.57%
FRANCIS & CEDAR 115			
BASECASE	-1155.51	-1029.27	-10.93%
BF: A600 BEACON NORTH & SOUTH 115 KV	-574.19	-797.56	38.90%
BF: R427 BEACON NORTH & SOUTH 230 KV	-842.15	-866.90	2.94%
N-1: BEACON - BELL #1 115 KV	-1002.40	-1029.04	2.66%
N-1: BEACON - BELL #4 230 KV	-1000.00	-1017.16	1.72%
N-1: BELL - COULEE #5 230 KV	-995.86	-1000.62	0.48%
N-1: BELL - TAFT 500 KV	-967.24	-987.25	2.07%

Bus/Contingency	Reactive Margin		Percent Change
	Pre-Project	Post-Project	
N-1: FRANCIS & CEDAR - NORTHWEST 115 KV	-661.35	-783.08	18.41%
N-2: BEACON - RATHDRUM 230 KV & BOULDER - LANCASTER 230 KV	-987.14	-1004.61	1.77%
T-1: BELL #6 230/115 KV	-964.34	-929.65	-3.60%
THIRD & HATCH 115			
BASECASE	-1327.47	-1040.48	-21.62%
BF: A600 BEACON NORTH & SOUTH 115 KV	-588.22	-655.66	11.47%
BF: R427 BEACON NORTH & SOUTH 230 KV	-893.32	-815.00	-8.77%
N-1: BEACON - BELL #1 115 KV	-1113.49	-1034.08	-7.13%
N-1: BEACON - BELL #4 230 KV	-1127.50	-1020.50	-9.49%
N-1: BELL - COULEE #5 230 KV	-1138.88	-1009.92	-11.32%
N-1: BELL - TAFT 500 KV	-1092.93	-995.74	-8.89%
N-1: FRANCIS & CEDAR - NORTHWEST 115 KV	-1113.98	-1036.37	-6.97%
N-2: BEACON - RATHDRUM 230 KV & BOULDER - LANCASTER 230 KV	-1102.94	-1012.06	-8.24%
T-1: BELL #6 230/115 KV	-1068.35	-964.48	-9.72%
WAIKIKI 115			
BASECASE	-792.90	-730.73	-7.84%
BF: A600 BEACON NORTH & SOUTH 115 KV	-503.42	-472.77	-6.09%
BF: R427 BEACON NORTH & SOUTH 230 KV	-631.42	-639.82	1.33%
N-1: BEACON - BELL #1 115 KV	-657.68	-728.88	10.83%
N-1: BEACON - BELL #4 230 KV	-688.81	-724.83	5.23%
N-1: BELL - COULEE #5 230 KV	-685.36	-718.41	4.82%
N-1: BELL - TAFT 500 KV	-671.35	-715.88	6.63%
N-1: FRANCIS & CEDAR - NORTHWEST 115 KV	-687.13	-720.52	4.86%
N-2: BEACON - RATHDRUM 230 KV & BOULDER - LANCASTER 230 KV	-679.35	-713.92	5.09%
T-1: BELL #6 230/115 KV	-494.09	-702.25	42.13%
WESTSIDE 115			
BASECASE	-1420.24	-1205.42	-15.13%
BF: A600 BEACON NORTH & SOUTH 115 KV	-869.27	-941.58	8.32%
BF: R427 BEACON NORTH & SOUTH 230 KV	-1107.65	-1035.51	-6.51%
N-1: BEACON - BELL #1 115 KV	-1248.24	-1204.18	-3.53%
N-1: BEACON - BELL #4 230 KV	-1248.92	-1194.66	-4.34%
N-1: BELL - COULEE #5 230 KV	-1256.31	-1165.91	-7.20%
N-1: BELL - TAFT 500 KV	-1199.78	-1139.61	-5.02%
N-1: FRANCIS & CEDAR - NORTHWEST 115 KV	-1163.65	-1106.29	-4.93%
N-2: BEACON - RATHDRUM 230 KV & BOULDER - LANCASTER 230 KV	-1232.26	-1176.88	-4.49%
T-1: BELL #6 230/115 KV	-1211.19	-1137.36	-6.10%

Table 24: QV Analysis Results

3.4.4. Stability Contingency Analysis

Modifications to the transmission system may impact the transient stability performance of the transmission system. An analysis is necessary to determine if the completion of the proposed projects will introduce new transient stability issues.

3.4.4.1. Transient Performance

A high generation, light load scenario where power angles across transmission lines are relatively large will typically create the highest potential for transient performance issues. Spring runoff for the hydroelectric facilities in North Idaho and Eastern Montana is the scenario historically studied. Combining spring runoff with high output from the Colstrip area along with full output at Lancaster and Rathdrum provides the most stressed scenario to verify transient performance.

Communication aided protection schemes with maximum five cycle clearing times are required for new and modified 115kV transmission lines per *SP-SPP-02 – Facility Interconnection Requirements*. No material changes between pre and post project transient performance was observed for other evaluated contingencies in the region.

Transient simulations were performed for the proposed or impacted transmission lines for scenarios with and without communication aided protection schemes. The following table summarizes the transient performance results with and without communication aided protection schemes.

	28LS_NCom	28LS_Com
BF: A612 Beacon 115kV, Beacon – Irvin #2 115kV 3P (BEA-IRV #2 @BEA)		
NOXON12	OOS	OOS
NOXON34	OOS	OOS
BF: A712 Boulder West 115kV, Boulder - Trentwood 115kV 3P (BLD-TRNT @BLD)		
POSTFL15	OOS	OOS
BF: A712 Boulder West 115kV, Boulder - Trentwood 115kV 3P (BLD-TRNT @TRNT)		
POSTFL15	OOS	
BF: A905 Irvin 115kV, Irvin - Trentwood 115kV, Beacon - Irvin #1 115kV 3P (IRV-TRNT @TRNT)		
POSTFL15	OOS	
BF: A905 Irvin 115kV, Irvin - Trentwood 115kV, Beacon - Irvin #1 115kV 3P (IRV-TRNT @IRV)		
CABGOR34	OOS	
HUNGHR12	OOS	
LIBBY_01	OOS	
LIBBY_02	OOS	
LIBBY_03	OOS	
LIBBY_04	OOS	
LIBBY_05	OOS	
LION_MTN+	OOS	
NOXON 5	OOS	
NOXON12	OOS	
NOXON34	OOS	
POSTFL15	OOS	
TROY+	OOS	
BF: A968 Westside 115kV, Highland - Westside 115kV 3P (HLD-WES @WES)		
NINEMI12	OOS	
NINEMI34	OOS	
NOXON12	OOS	
BF: AXXX Highland 115kV, Bell - Highland 115kV 3P (BEL-HLD @HLD)		
ALBENI F1	OOS	
ALBENI F2	OOS	
ALBENI F3	OOS	
BLACKEGL GEN	OOS	
CABGOR12	OOS	
CABGOR34	OOS	
CANYONFRYGN1	OOS	
CANYONFRYGN2	OOS	
CANYONFRYGN3	OOS	
HUNGHR12	OOS	
LIBBY_01	OOS	
LIBBY_02	OOS	
LIBBY_03	OOS	
LIBBY_04	OOS	
LIBBY_05	OOS	
LION_MTN+	OOS	
LITFAL12	OOS	
LITFAL34	OOS	
LONGLKG1	OOS	
LONGLKG2	OOS	
LONGLKG3	OOS	
LONGLKG4	OOS	
MONTANA ONE	OOS	

	28LS_NCom	28LS_Com
NINEMI12	OOS	OOS
NINEMI34	OOS	OOS
NORTH_BENCH#	OOS	
NOXON 5	OOS	
NOXON12	OOS	
NOXON34	OOS	
POSTFL15	OOS	
RYAN GEN1-3	OOS	
RYAN GEN4-6	OOS	
TROY+	OOS	
YELLO3-4	OOS	
CHEF_JO_1516	OOS	
DWORSHAK_01	OOS	
CHEF_JO_0102	OOS	
CHEF_JO_0506	OOS	
LOW_GRN_0304	OOS	
CHEF_JO_0910	OOS	
DWORSHAK_02	OOS	
YELLO1-2	OOS	
CHEF_JO_1314	OOS	
BOUNDG51	OOS	
DWORSHAK_03	OOS	
CHEF_JO_1112	OOS	
BF: AXXX Highland 115kV, Francis & Cedar - Highland 115kV 3P (F&C-HLD @HLD)		
LIBBY_02	OOS	
LIBBY_04	OOS	
LIBBY_05	OOS	
LION_MTN+	OOS	
LITFAL12	OOS	
LONGLKG1	OOS	
LONGLKG2	OOS	
LONGLKG3	OOS	
LONGLKG4	OOS	
NINEMI12	OOS	OOS
NINEMI34	OOS	OOS
NOXON 5	OOS	
NOXON12	OOS	
NOXON34	OOS	
TROY+	OOS	
N-1: Highland – Nine Mile 115 kV 3P @ HLD		
NINEMI12	OOS	
NINEMI34	OOS	
N-1: Irvin - Trentwood 115kV 3P @ IRV		
COLMBIA_FALS	WR1. 1.4	
EUREKA	WR1. 1.4	
FLATHEAD_S	WR1. 1.4	
HASKILL+	WR1. 1.4	
LAKESIDE+	WR1. 1.4	
LIBBYFEC	WR1. 1.4	
LION_MTN+	WR1. 1.4	
N_BENCH+	WR1. 1.4	
NORTH_BENCH#	WR1. 1.4	
STILLWATER+	WR1. 1.4	
TREGO	WR1. 1.4	
TROY+	WR1. 1.4	
TRUMBUL_CRK+	WR1. 1.4	
YAAK+	WR1. 1.4	

	28LS_NCom	28LS_Com
N-1: Irvin - Trentwood 115kV 3P @ TRNT		
COLMBIA_FALS	**WR1. 1.4**	
EUREKA	**WR1. 1.4**	
FLATHEAD_S	**WR1. 1.4**	
HASKILL+	**WR1. 1.4**	
LAKESIDE+	**WR1. 1.4**	
LIBBYFEC	**WR1. 1.4**	
LION_MTN+	**WR1. 1.4**	
N_BENCH+	**WR1. 1.4**	
NORTH_BENCH#	**WR1. 1.4**	
STILLWATER+	**WR1. 1.4**	
TREGO	**WR1. 1.4**	
TROY+	**WR1. 1.4**	
TRUMBUL_CRK+	**WR1. 1.4**	
YAAK+	**WR1. 1.4**	

Table 25: Transient Performance Summary

Irvin – Trentwood 115kV

Faults were simulated to represent three-phase and single-phase breaker failure events and three-phase line outage events for the Irvin - Trentwood 115kV Transmission Line and its terminals.

The three-phase breaker failure events and line outage events create localized instability as shown in the following plots. Many generators in the region go out of step and insufficient voltage recovery was identified following the simulated events with non-communication aided protection. The out of step conditions and voltage recovery concerns are mitigated with faster clearing communication aided protection schemes.

Based on the simulated performance, redundant communication aided protection is recommended between Irvin and Trentwood but not required to meet TPL-001-5 performance criteria.

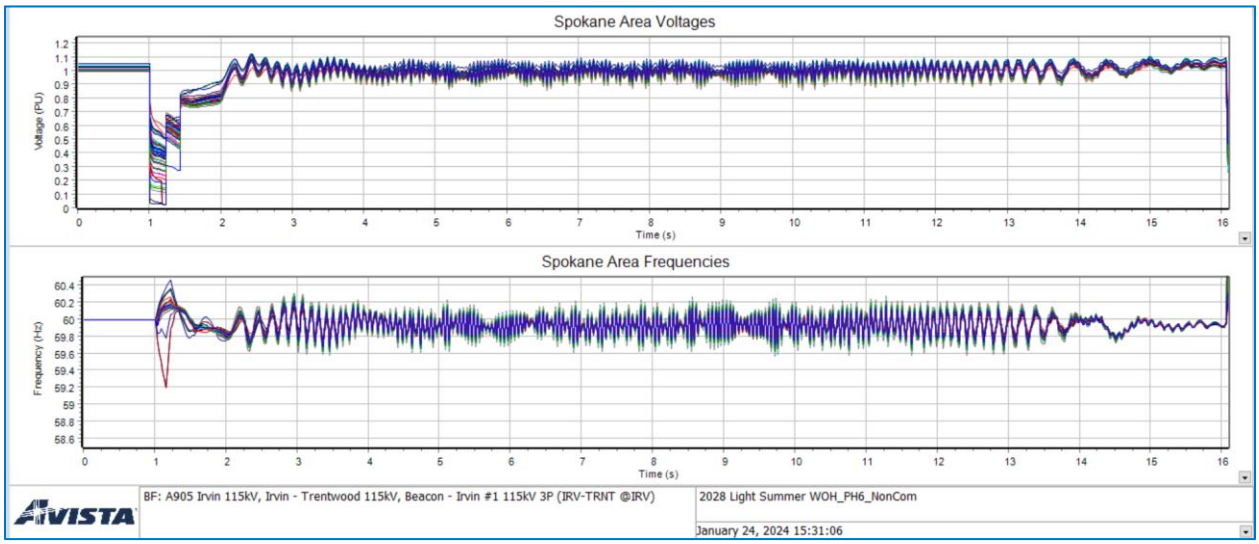


Figure 18: Non-Communication Aided Breaker Failure Event at Irvin

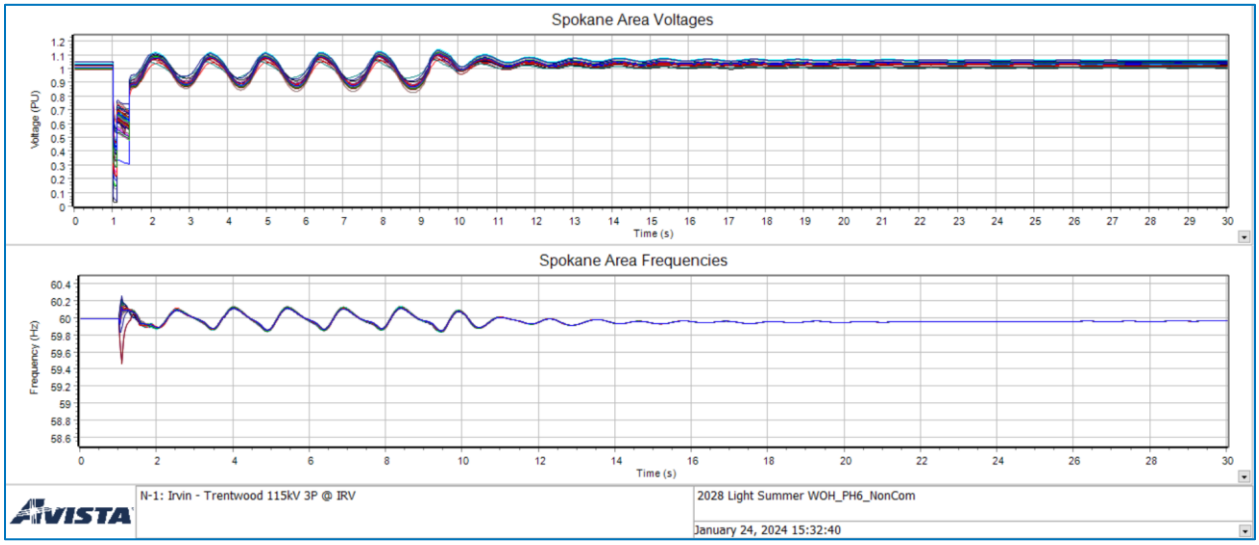


Figure 19: Non-Communication Aided Line Outage with Fault near Irvin

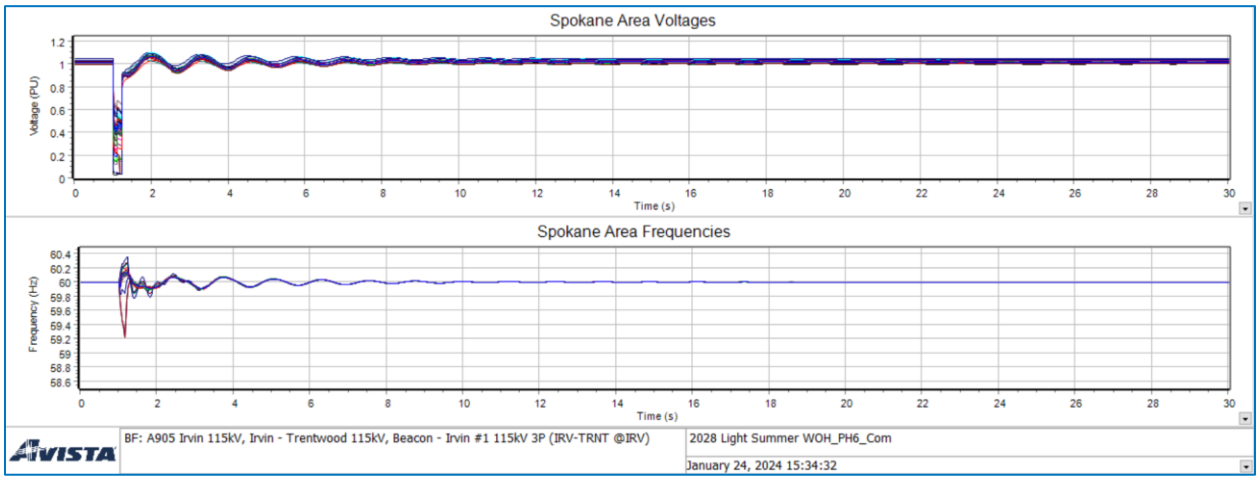


Figure 20: Communication Aided Breaker Failure Event at Irvin

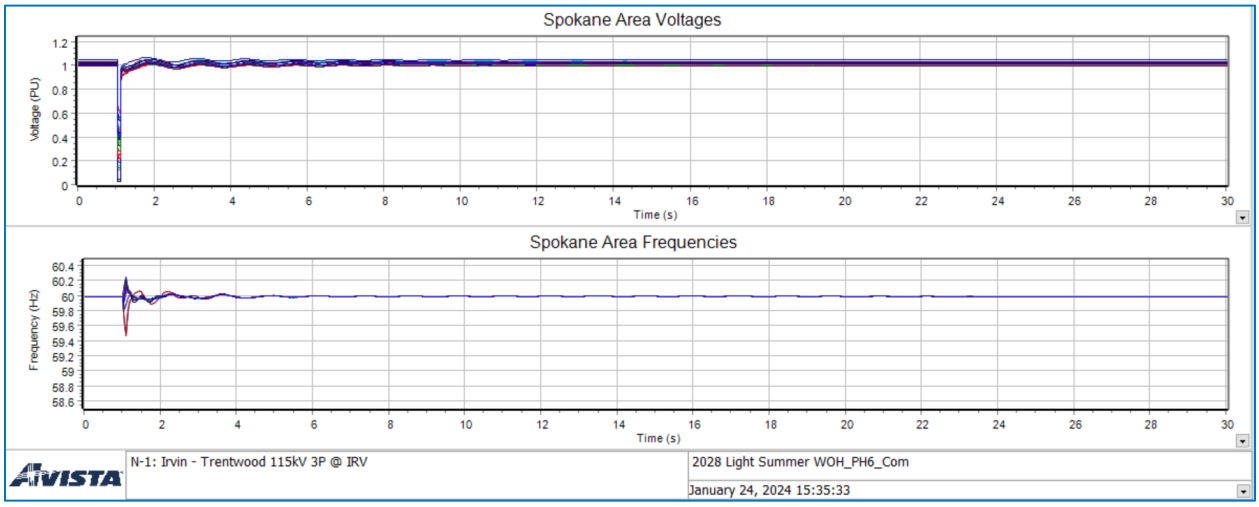


Figure 21: Communication Aided Line Outage with Fault near Irvin

Boulder – Trentwood 115kV

Faults were simulated to represent three-phase and single-phase breaker failure events and three-phase line outage events for the Boulder - Trentwood 115kV Transmission Line and its terminals.

The three-phase breaker failure events result in out of step conditions for Post Falls Unit 6. The out of step condition remains a concern with faster clearing communication aided protection schemes for a three-phase breaker failure event at Boulder.

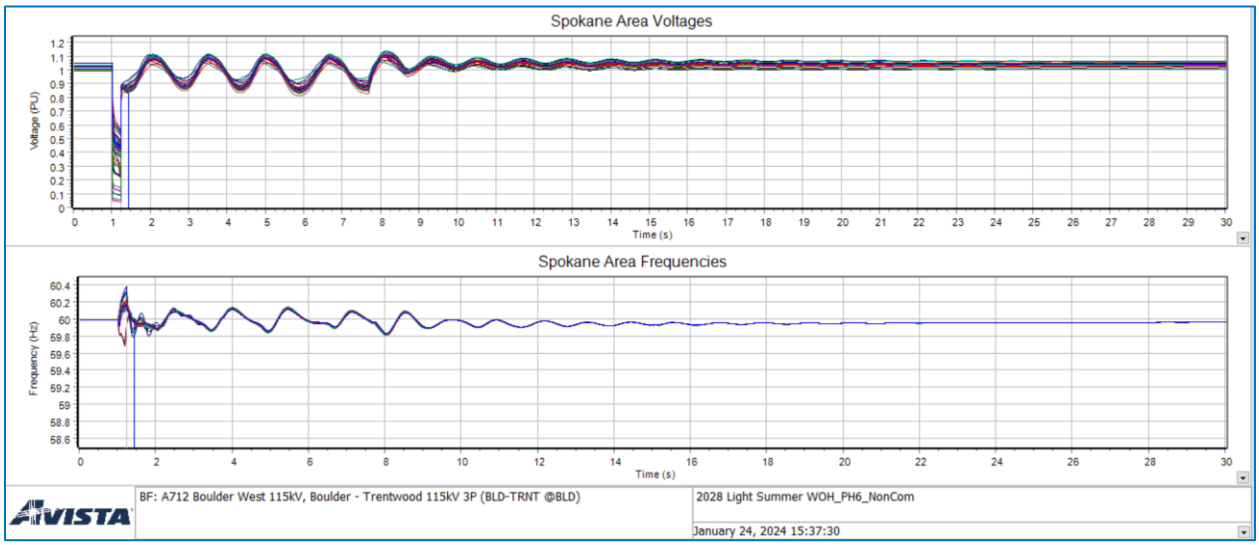


Figure 22: Non-Communication Aided Breaker Failure Event at Boulder

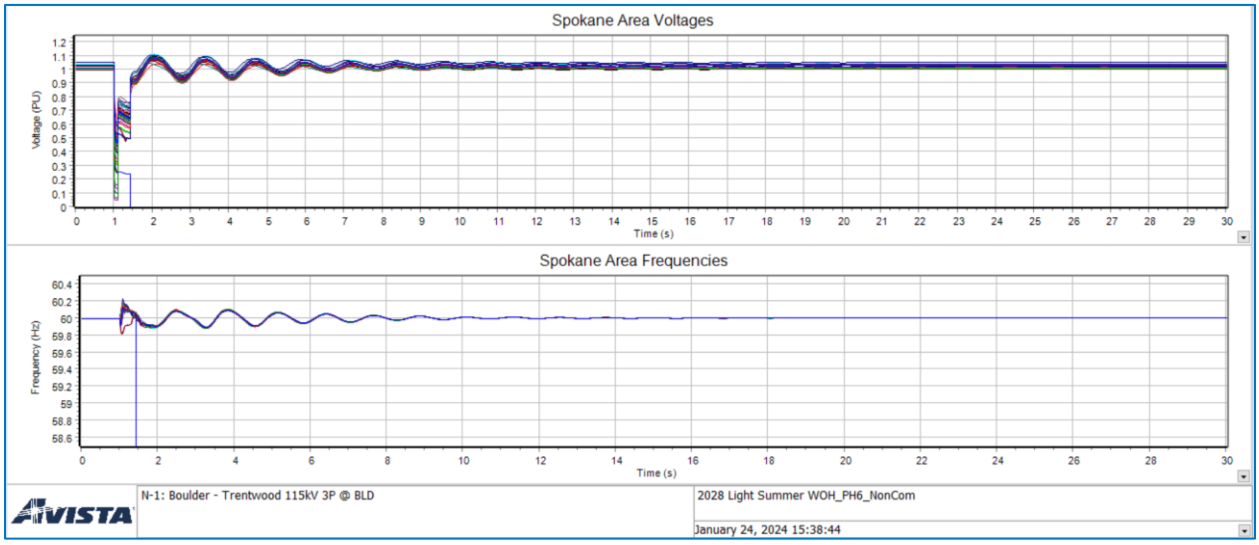


Figure 23: Non-Communication Aided Line Outage with Fault near Boulder

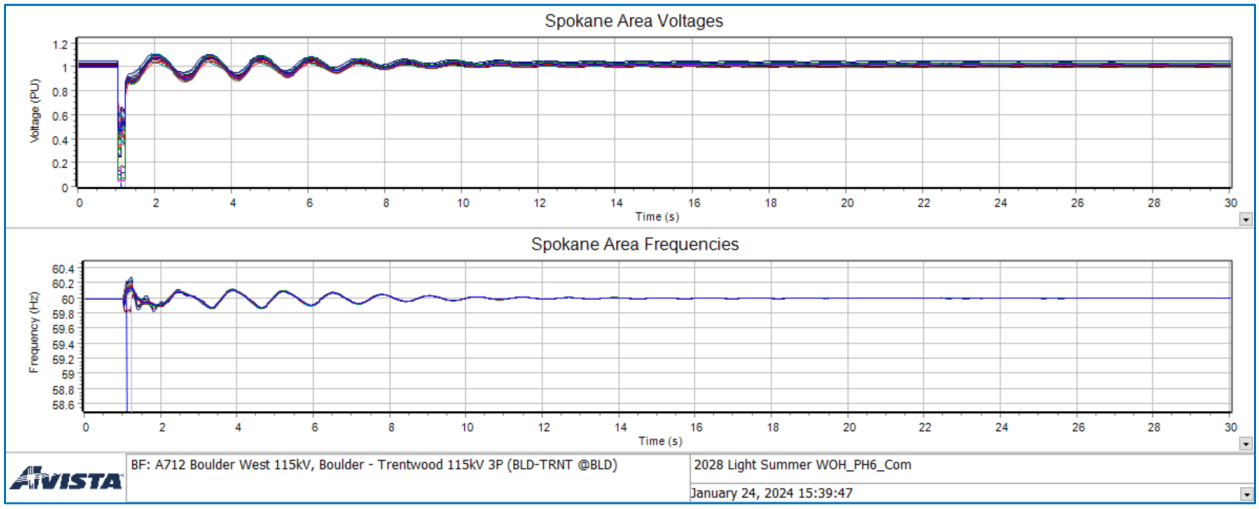


Figure 24: Communication Aided Breaker Failure Event at Boulder

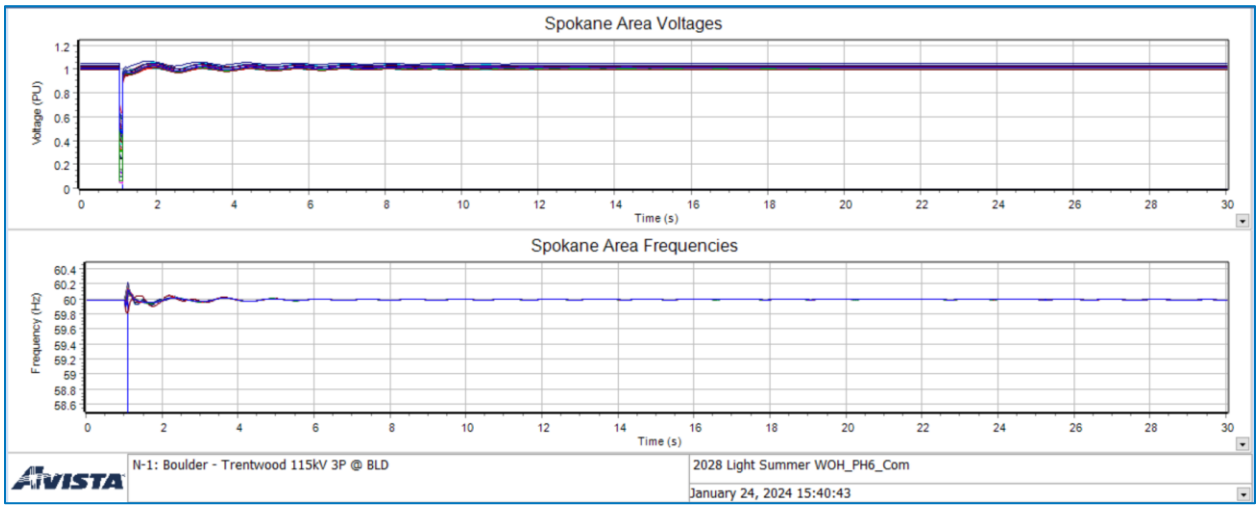


Figure 25: Communication Aided Line Outage with Fault near Boulder

Bell – Highland 115kV

Faults were simulated to represent three-phase and single-phase breaker failure events and three-phase line outage events for Bell – Highland 115kV Transmission Line and its terminals.

The three-phase breaker failure events result in out of step conditions for multiple generators with non-communication aided fault clearing times. The out of step condition remains a concern for Nine Mile generation with faster clearing communication aided protection schemes for a three-phase breaker failure event at Highland.

Adequate performance was observed for simulations of three-phase line outage events using non-communicated aided fault clearing times. Based on the simulated performance, redundant communications are not required.

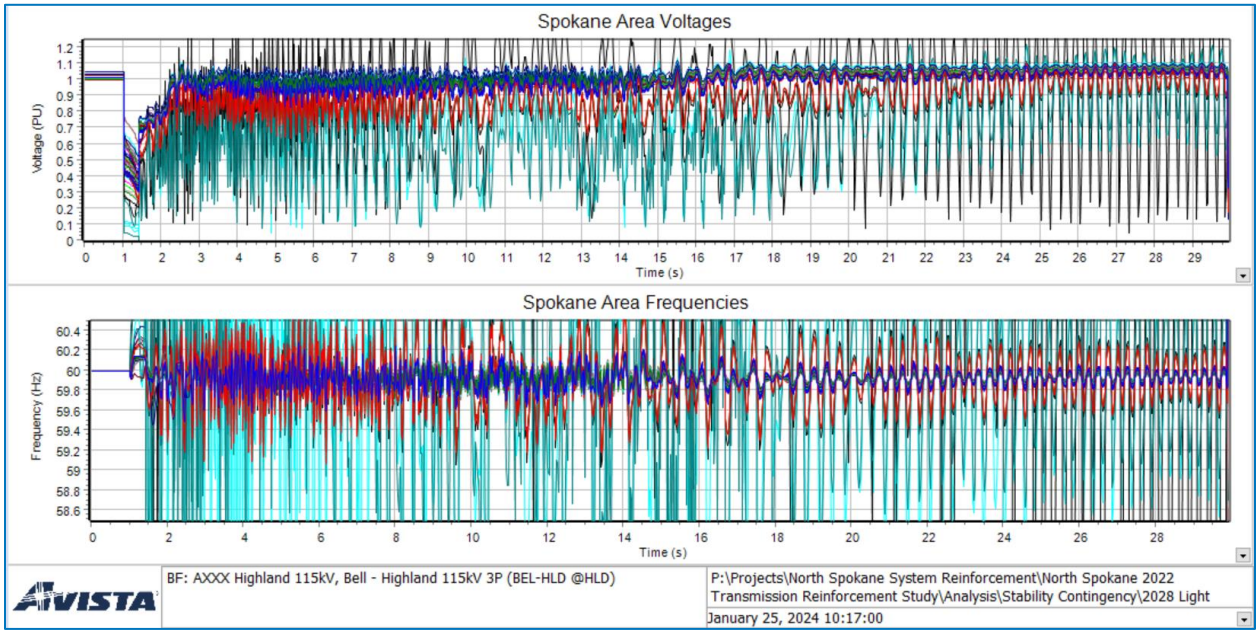


Figure 26: Non-Communication Aided Breaker Failure Event at Highland

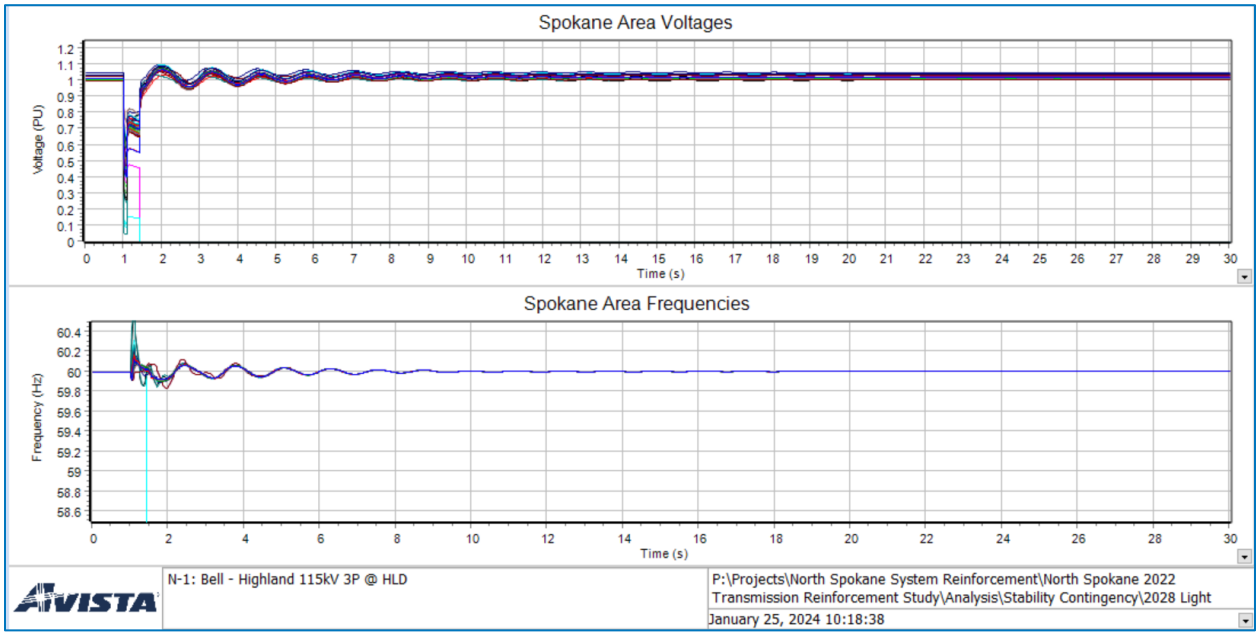


Figure 27: Non-Communication Aided Line Outage with Fault near Highland

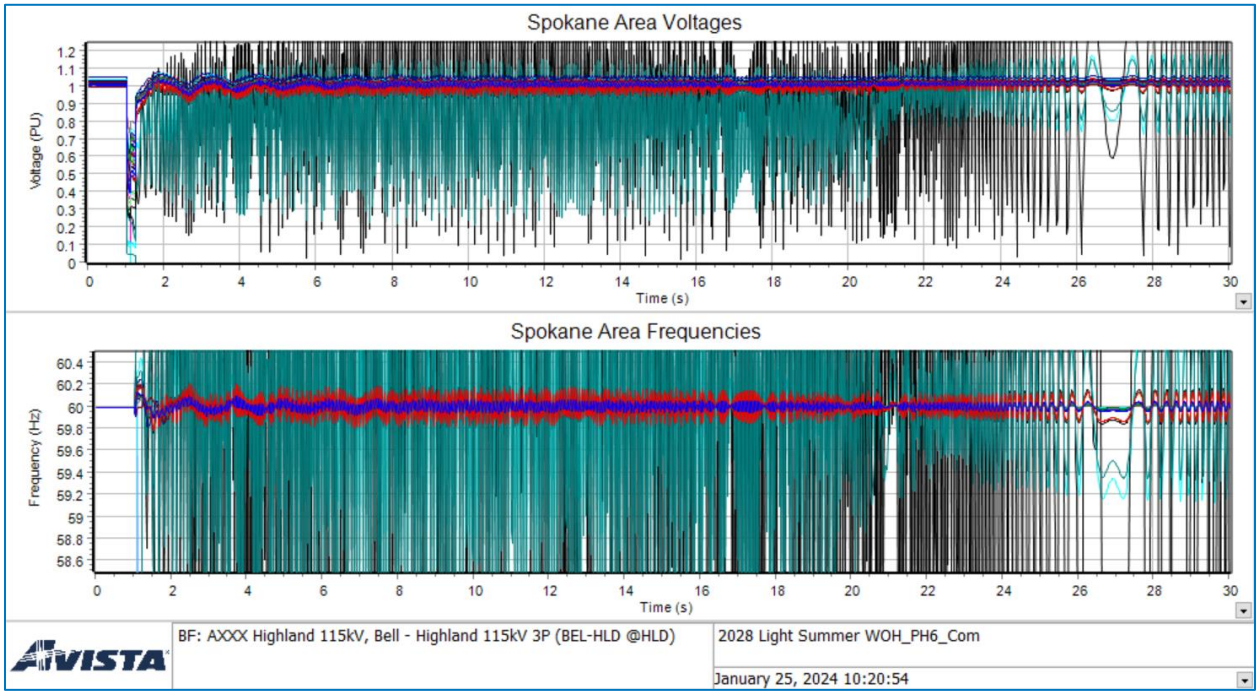


Figure 28: Communication Aided Breaker Failure Event at Highland

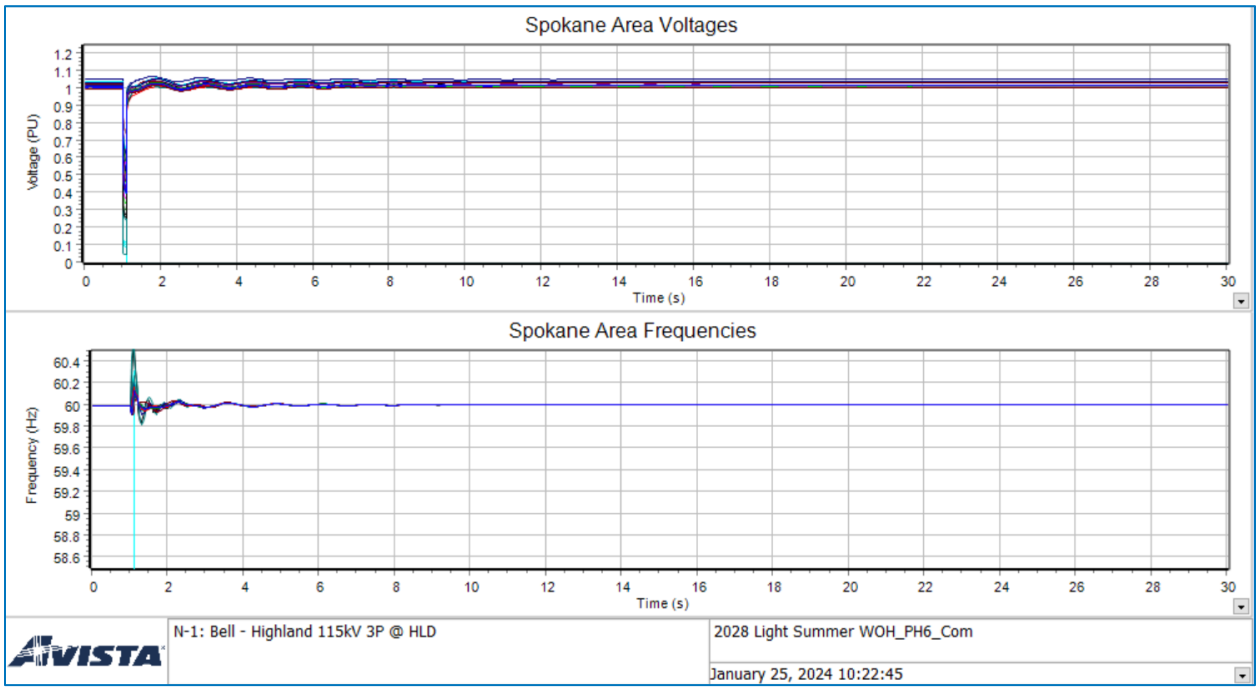


Figure 29: Communication Aided Line Outage with Fault near Highland

Francis & Cedar – Highland 115kV

Faults were simulated to represent three-phase and single-phase breaker failure events and three-phase line outage events for Francis & Cedar – Highland 115kV Transmission Line and its terminals.

The three-phase breaker failure events result in out of step conditions for multiple generators with non-communication aided fault clearing times. The out of step condition

remains a concern for Nine Mile generation with faster clearing communication aided protection schemes for a three-phase breaker failure event at Highland.

Adequate performance was observed for simulations of three-phase line outage events using non-communicated aided fault clearing times. Based on the simulated performance, redundant communications are not required.

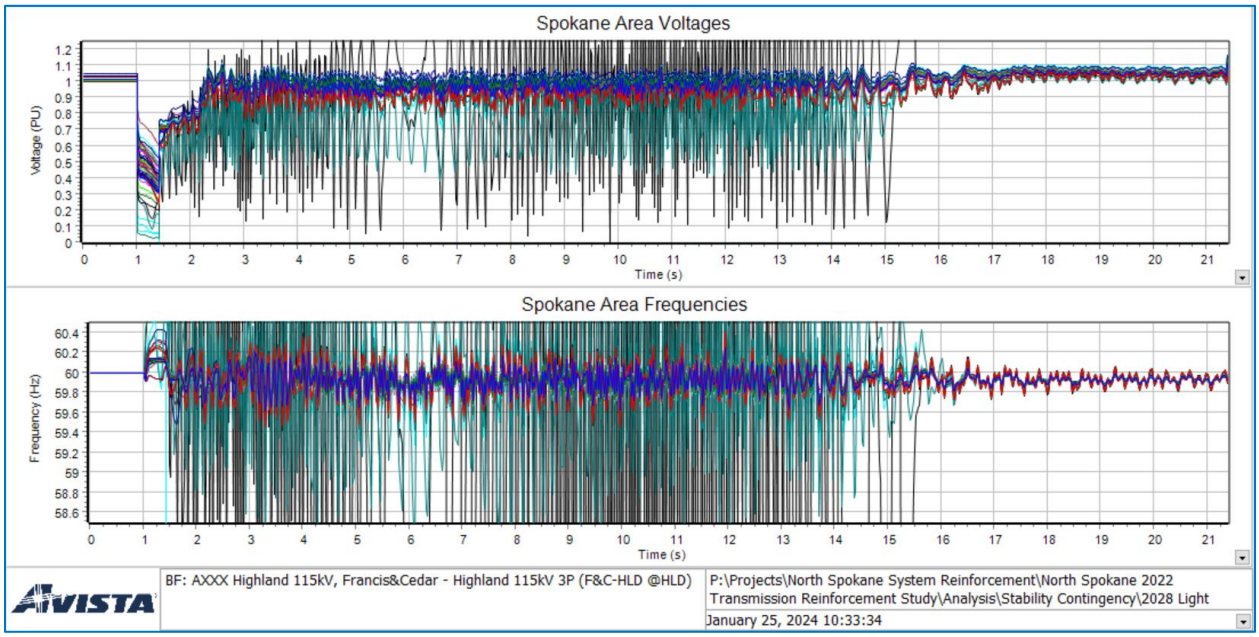


Figure 30: Non-Communication Aided Breaker Failure Event at Highland

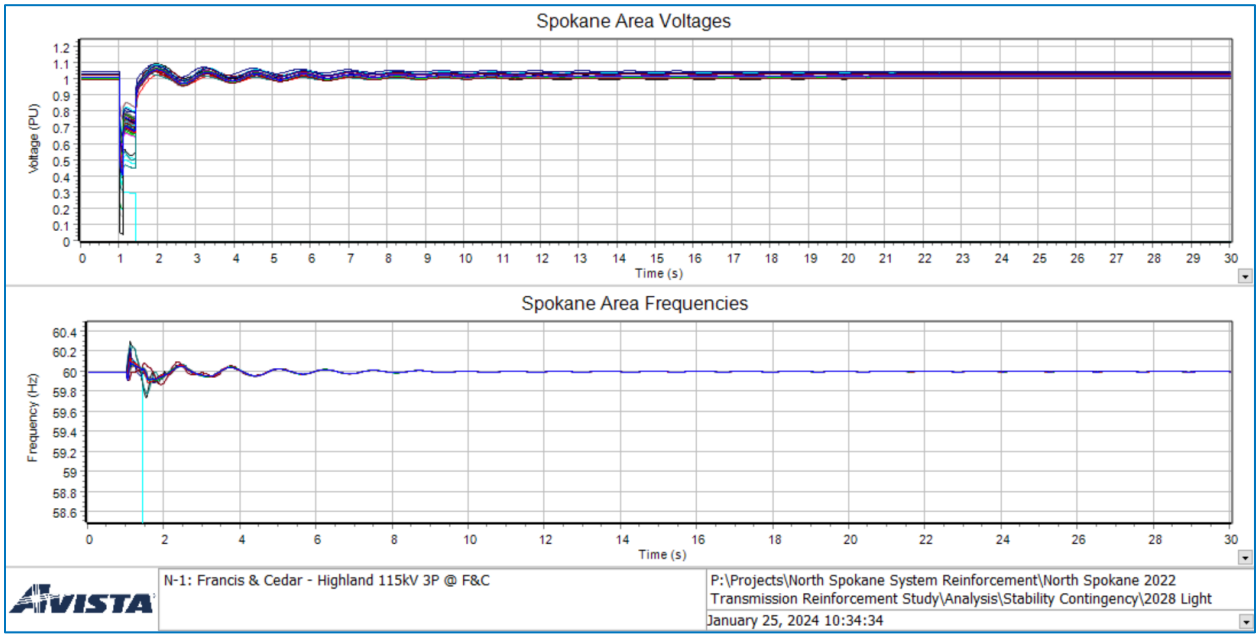


Figure 31: Non-Communication Aided Line Outage with Fault near Francis & Cedar

Highland – Nine Mile 115kV

Faults were simulated to represent three-phase and single-phase breaker failure events and three-phase line outage events for Highland – Nine Mile 115kV Transmission Line and its terminals. The three-phase line outage event results in out of step conditions for

all four generators at the Nine Mile facility following the simulated events with non-communication aided protection. The out of step condition is mitigated with faster clearing communication aided protection schemes.

Based on the simulated performance, redundant communication aided protection is recommended between Highland and Nine Mile but not required to meet TPL-001-5 performance criteria.

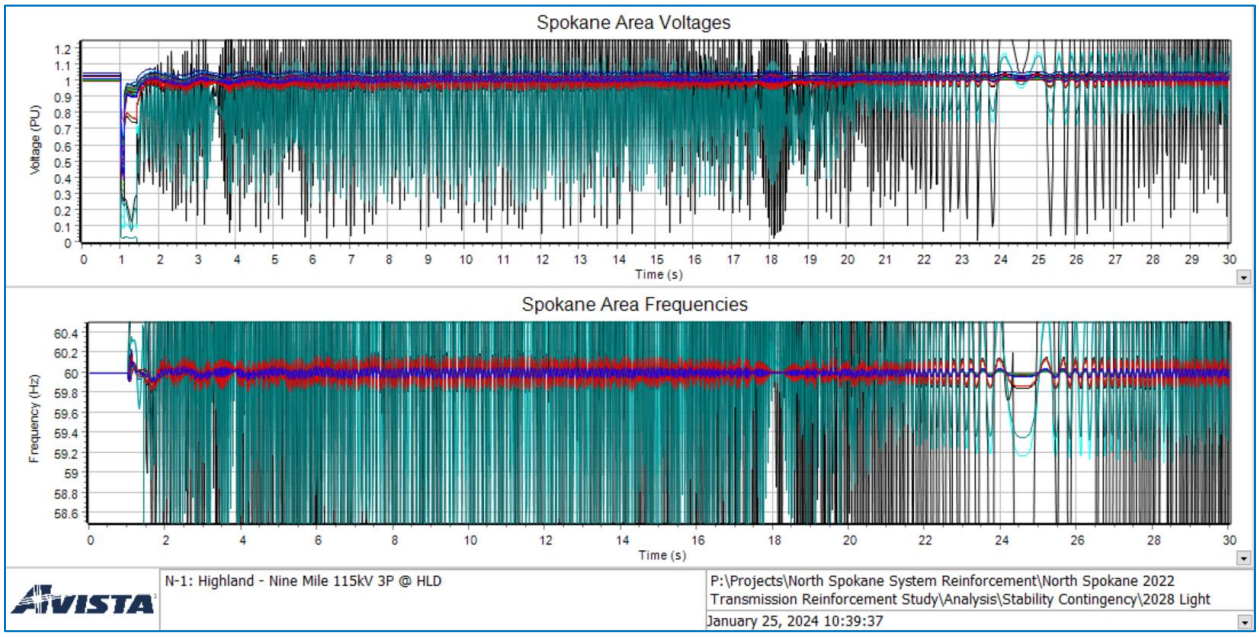


Figure 32: Non-Communication Aided Line Outage with Fault near Highland

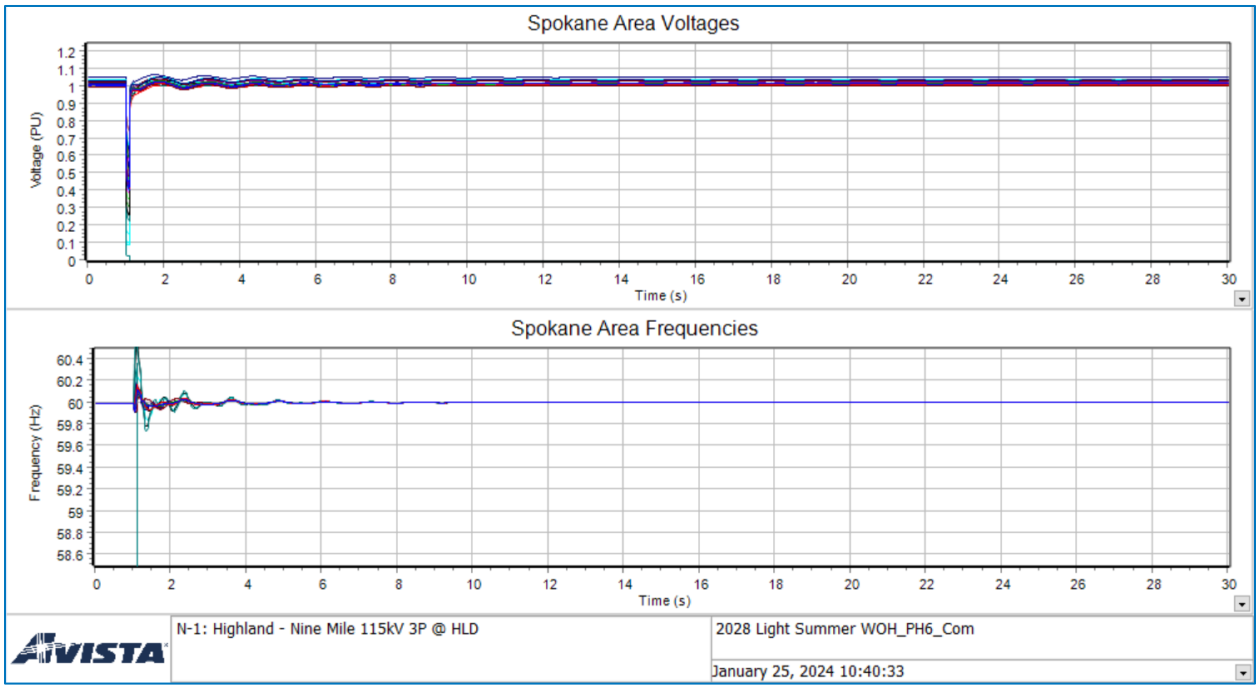


Figure 33: Communication Aided Line Outage with Fault near Highland

Highland – Westside 115kV

Faults were simulated to represent three-phase and single-phase breaker failure events and three-phase line outage events for Highland – Westside 115kV Transmission Line and its terminals.

The three-phase breaker failure events result in out of step conditions for multiple generators with non-communication aided fault clearing times. The out of step condition is mitigated with faster clearing communication aided protection schemes for a three-phase breaker failure event at Westside.

Adequate performance was observed for line outage simulations using non-communication aided fault clearing times. Based on the simulated performance, redundant communications are not required.

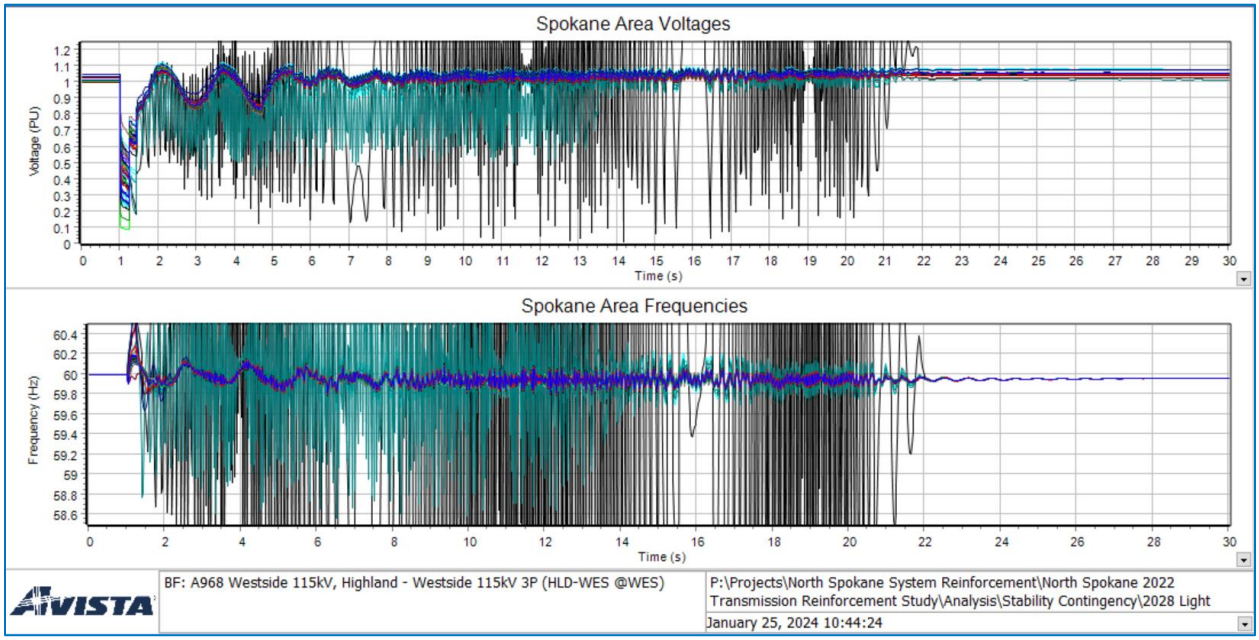


Figure 34: Non-Communication Aided Breaker Failure Event at Westside

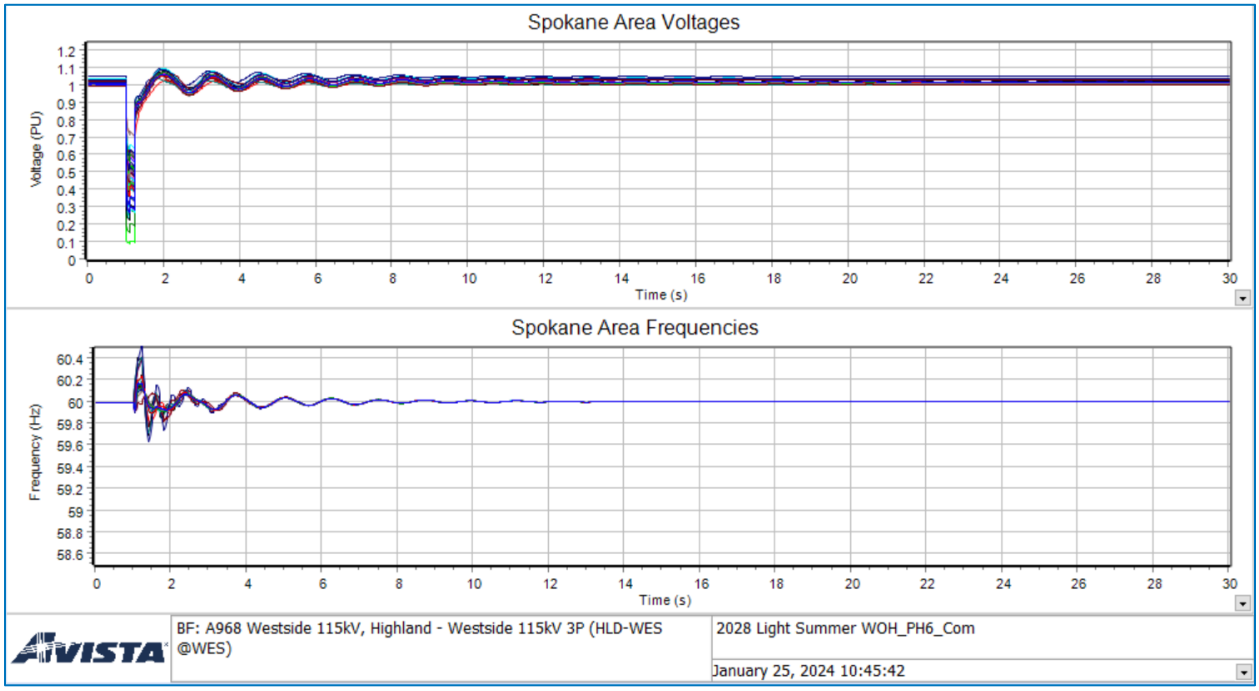


Figure 35: Communication Aided Breaker Failure Event at Westside

3.4.4.2. Maximum Clearing Times

Communication aided protection schemes are required for the following new and modified transmission lines to achieve adequate transient performance.

- Irvin – Trentwood 115kV
- Boulder – Trentwood 115kV
- Bell – Highland 115kV
- Francis & Cedar – Highland 115kV
- Highland – Nine Mile 115kV
- Highland – Westside 115kV

Additionally, redundant communications are recommended for Irvin – Trentwood 115kV and Highland – Nine Mile 115kV, though not required per TPL-005 performance criteria.

3.4.4.3. Single Point of Failure

During analysis of the transient performance of the proposed project, faults were simulated assuming no communications, resulting in longer fault clearing times. A single path of communications is required for all new 115kV transmission lines but there may instances in which planned outages or failures prevent the communications systems from performing. Stability concerns were identified for instances when communication aided protection is not available. NERC compliance standard, TPL-005 does not require mitigation of the stability concerns, however consensus among internal stakeholders may warrant mitigation of such risks.

3.4.5. Short Circuit Analysis

Short circuit analysis for a three-phase bus fault was performed to determine adequacy of the circuit breaker interrupting capacity for expected faults following implementation

of the complete scope of the proposed projects. The results shown in Table 26 show increased fault duty levels after implementation of the proposed projects.

The resulting fault duties amplify existing overdutied equipment concerns. As noted above, circuit switchers at Northeast, Ross Park, Spokane Industrial Park and Waikiki are currently equipped with protection schemes to mitigate the overdutied equipment concerns. Mitigation plans have been developed for circuit switchers at Francis & Cedar.

Station	Pre-Project	Post-Project	Percent Change	Limiting Device Rating	% Duty	Device
B_048023BEACON N	37,489	37,338	-0.40%	40kA	93.3%	BKR
B_048025BEACON N	25,418	25,434	0.06%	40kA	63.6%	BKR
B_048029BEACON S	37,444	37,257	-0.50%	40kA	93.1%	BKR
B_048031BEACON S	25,447	25,464	0.07%	40kA	63.7%	BKR
B_048127FRANCEDR	20,612	22,654	9.90%	20kA	113.3%	CKT SWR
B_048164INDTRAIL	15,240	19,009	24.73%	25kA	76.0%	CKT SWR
B_048165IRVIN	27,114	28,841	6.37%	40kA	72.1%	BKR
B_048166IEP-A	15,026	15,069	0.29%	N/A		
B_048168IEP-B	14,977	15,019	0.29%	N/A		
B_048237MILLWOOD	22,242	22,656	1.86%	40kA	56.6%	CKT SWR
B_048277NORTHEAS	23,676	26,211	10.71%	4kA	655.3%	CKT SWR
B_048299OPPORTUN	22,492	23,316	3.66%	40kA	58.3%	CKT SWR
B_048311OTIS	23,687	24,716	4.34%	40kA	61.8%	BKR
B_048371ROSSPARK	27,323	27,802	1.75%	7kA	397.2%	CKT SWR
B_048405SPKINDPK	23,574	25,794	9.41%	6kA	429.9%	CKT SWR
B_048447WAIKIKI	13,398	23,620	76.29%	7kA	337.4%	CKT SWR
B_048520BOULDERW	29,601	31,336	5.86%	40kA	78.3%	BKR
B_048522BOULDERE	29,538	31,251	5.80%	40kA	78.1%	BKR

Table 26: Combined Scope Fault Duty Results

3.4.6. Reliability Analysis

Analysis of the complete scope of the proposed projects has the reliability impacts previously discussed for each individual project.

3.4.7. Redlined SCADA Variable Limits

Reference individual project sections for proposed SVLs.

4. Project Alternatives

The following information provides the technical analysis results for network upgrade alternatives considered. The body of the report contains the preferred alternative to address the performance issues identified in the problem statement. Providing the alternative technical analysis results is intended to be informative to System Planners and demonstrate, in part, how the preferred alternative was selected.

Project alternatives were evaluated using the 2027 Heavy Summer case.

4.1. Do Nothing

This option is not recommended as it does not mitigate P1 and P6 outage concerns leaving vulnerable operating conditions.

4.2. Reconductor 115kV Transmission Lines to Fix P6 Outages

This option evaluates reconductoring four lines (25.3 total miles) to gain increased capacities as shown.

Transmission Line	Existing Capacity (MVA)	Proposed Capacity (MVA)
Beacon – Bell #1 (6.9 miles)	71.1	239
Bell – Northeast (1.5 miles)	122.7	239
Beacon – Northeast (5.3 miles)	120.0	239
Beacon – Francis & Cedar (11.6 miles)	92.4	239

Table 27: Reconductor Capacity Increase

The scope of this option includes upgrading equipment to accommodate 239MVA rating for all four lines (Requires replacement of 2” bus pipe at Beacon, air switches and CT’s). Assuming 1200A SVL rating can be achieved.

This option lowers the impedance into the North Spokane load center, placing increased reliance on the Bell 230/115kV Transformer #6. P1 outages with either transformer at Beacon overload BPA’s Bell 230/115kV Transformer #6. Various P2 and P6 outages concerns are created, or existing concerns exacerbated. This option will also increase fault current in the Spokane area adding to fault duty concerns at Beacon.

Preliminary contingency analysis for the alternative revealed the following:

- New or increased overload concerns for the Bell 230/115kV Transformer #6 results from:
  - Loss of Beacon #1 230/115kV Transformer
  - Loss of Beacon #2 230/115kV Transformer
  - Loss of Bell – Westside 230kV and Boulder – Lancaster 230kV
  - Various other P6 outages

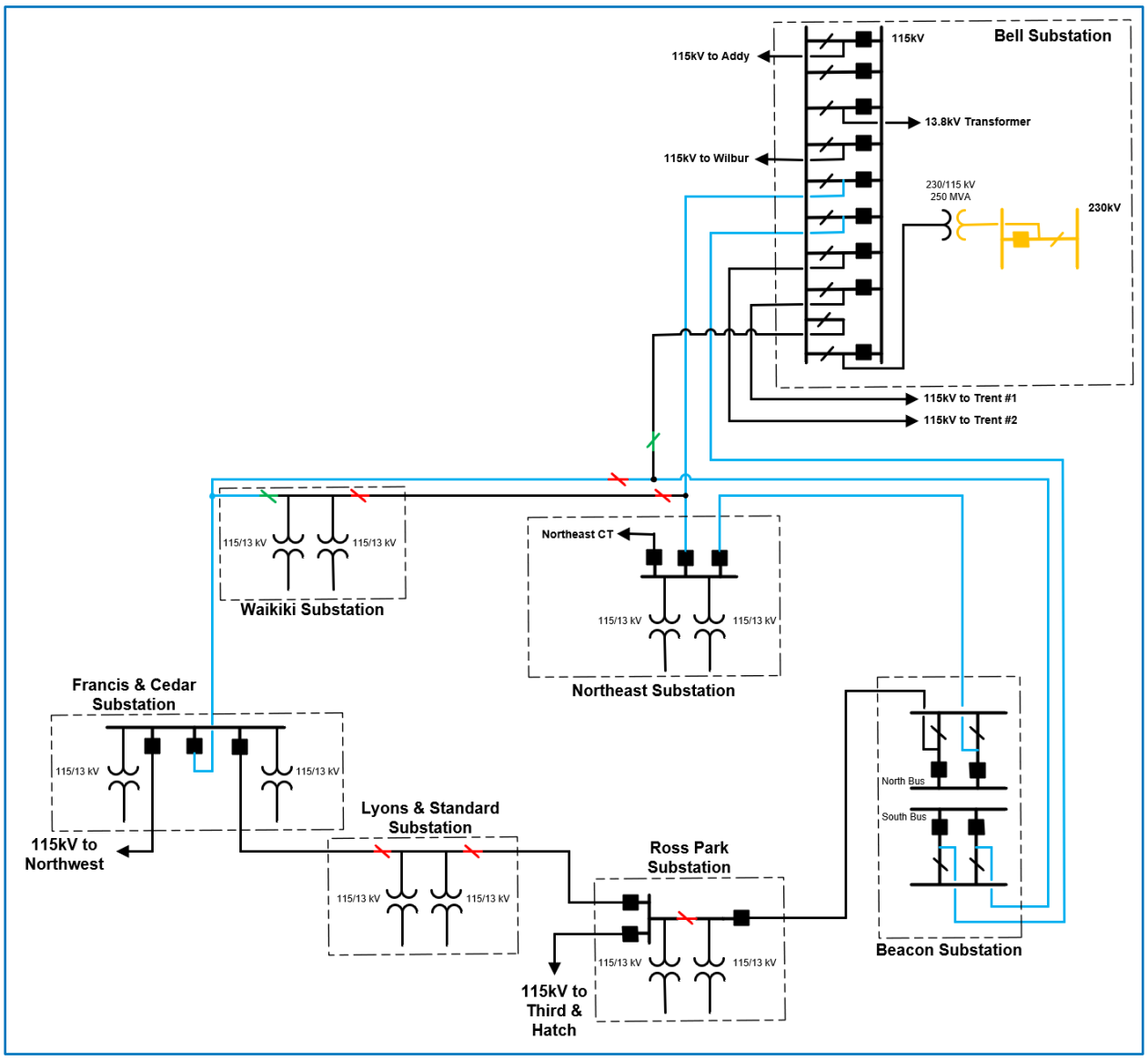


Figure 36: Alternative Project Diagram

Upgrades	Cost/unit	Cost
Reconductor 13.7 miles Beacon – Bell Interconnections (Beacon – Bell, Beacon – Northeast, and Bell – Northeast)	$1mil/mile	$14mil
Reconductor 11.6-mile Beacon – Francis & Cedar line	$1mil/mile	$12mil
Total Project Cost	**-**	**$26mil**

Table 28: Alternative Cost Estimate

4.3. Loop Beacon – Francis & Cedar line into Bell

This option evaluates a reconfiguration of the existing lines, identifying system impacts to looping in the existing Beacon – Francis & Cedar 115kV line into Bell. This would create an additional Beacon – Bell 115kV line and a new Bell – Francis & Cedar 115kV line. Two new 115kV line positions will be required at Bell.

This option has previously been reviewed and discussed, for more information reference the 2014 Memo, “Beacon – Bell – Francis & Cedar 115 Interconnection at Bell Sub”.

To address the P6 concern with the existing Beacon – Francis & Cedar line reconductoring (or other mitigation method) will be required from the new Bell – Francis & Cedar line.

This option increases operability and reliability of the system. Allows taking a Beacon – Bell 115 circuit out of service supporting the North Spokane load center out of Bell. Beacon and Bell 230/115kV transformers support each other. This options also supports BPA by providing flexibility to take Bell 230/115kV Transformer #6 out of service.

Concerns associated with Avista’s Beacon – Bell Interconnections are mitigated; however, this option also lowers the impedance into the North Spokane load center, placing increased reliance on the Bell 230/115kV Transformer #6. P1 outages with either transformer at Beacon or an outage of the Bell – Westside 230kV line overload BPA’s Bell 230/115kV Transformer #6. Various P2 and P6 outages concerns are created, or existing concerns exacerbated.

Preliminary contingency analysis for the alternative revealed the following:

- New or increased overload concerns for the Bell 230/115kV Transformer #6 results from:
  - Loss of Beacon #1 230/115kV Transformer
  - Loss of Beacon #2 230/115kV Transformer
  - Loss of Bell – Westside 230kV
  - Beacon 115kV bus-tie Breaker Failure
  - Boulder 115kV bus-tie Breaker Failure
  - Addy – Kettle Falls B1137 Breaker Failure
  - Beacon North 115kV bus outage
  - Bell S0 230kV bus outage
  - Open at Addy for the Addy – Bell 115kV line
  - Various other P6 outages
- New or increased overload concerns for Bell – Francis & Cedar 115kV line results from:
  - Beacon 230kV bus-tie Breaker Failure
  - Various P6 outages
- New or increased overload concerns for Francis & Cedar – Northwest 115kV line results from:
  - Various P6 outages
- New or increased overload concerns for Northwest – Westside 115kV line results from:
  - Various P6 outages

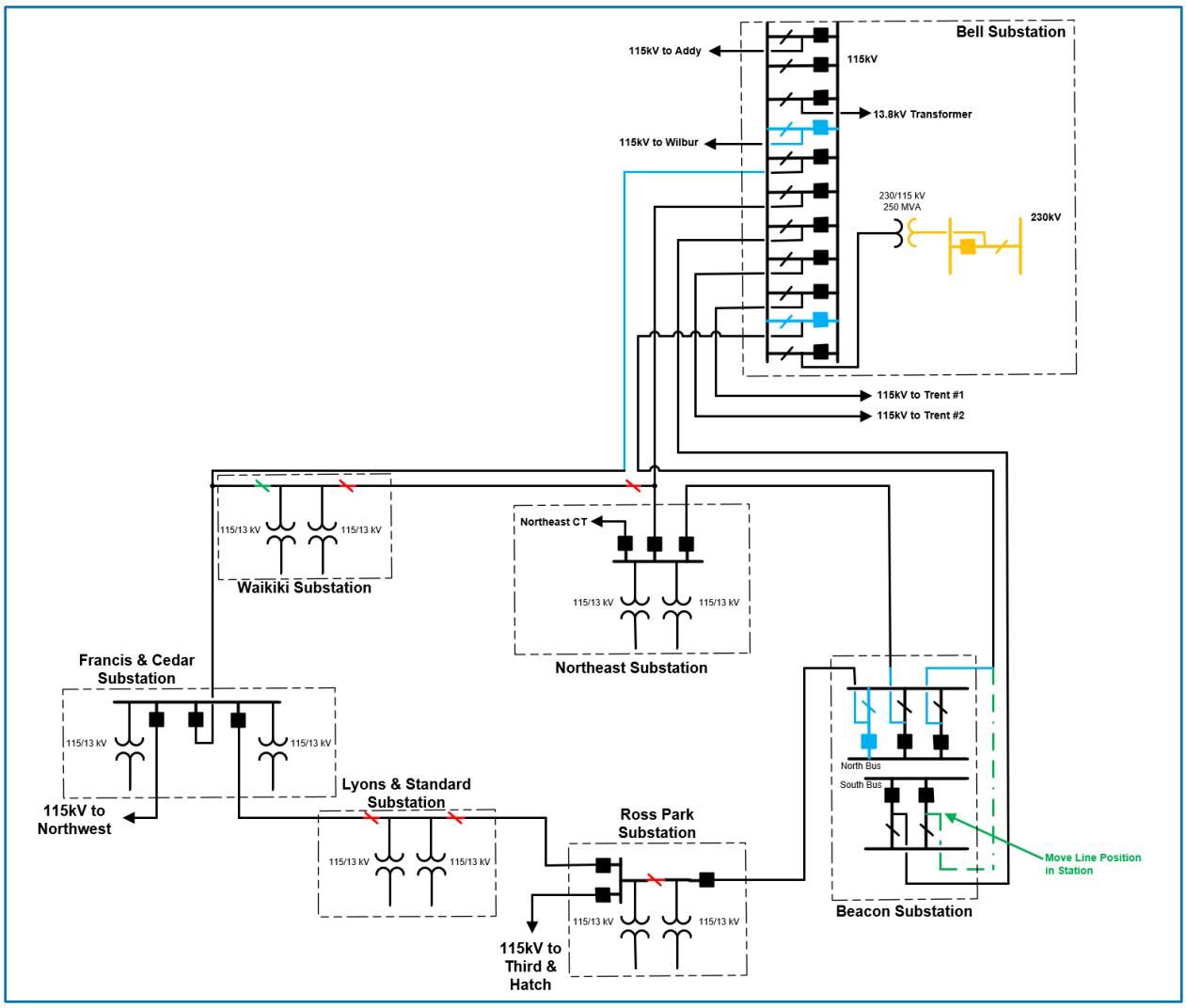


Figure 37: Alternative Project Diagram

Upgrades	Cost/unit	Cost
2x line positions at Bell	$750k/position	$1.5mil
1x line position at the Beacon north bus	$750k/position	$750k
New transmission from Bell to interceptions point of Francis & Cedar line (0.61 miles)	$1mil/mile	$610k
Total Project Cost	**-**	**$2.86mil**

Table 29: Alternative Cost Estimate

4.4. Bell 230/115kV Transformer #7

This option evaluates a reconfiguration of the existing Bell Substation by adding a second 250MVA autotransformer. A second autotransformer will require a new 230kV line position and a new 115kV line position.

This option increases the flow from Bell into North Spokane through Avista's interconnections which creates different outage concerns. This option also increases fault duty in the area which exacerbates an existing concern with breakers at Beacon approaching their fault current ratings.

Preliminary contingency analysis for the alternative revealed the following:

- New or increased overload concerns for Ross Park – Third and Hatch 115kV line results from:
  - Ninth and Central 115kV bus-tie Breaker Failure
- New or increased overload concerns for Beacon – Bell #1 115kV line results from:
  - Beacon 230kV bus-tie Breaker Failure
  - Various other P6 outages
- New or increased overload concerns for Bell – Northeast 115kV line results from:
  - Beacon 230kV bus-tie Breaker Failure
  - Beacon 115kV south bus outage
  - Various other P6 outages
- New or increased overload concerns for Beacon – Ninth and Central #1 115kV results from:
  - Loss of Beacon – Ninth and Central #2 115kV and Beacon – Ross Park 115kV
- New or increased overload concerns for Beacon – Ninth and Central #2 115kV results from:
  - Loss of Beacon – Ninth and Central #1 115kV and Beacon – Ross Park 115kV

To address the P6 concern with the existing Beacon – Francis & Cedar line reconductoring (or other mitigation method) will be required from the new Bell – Francis & Cedar line.

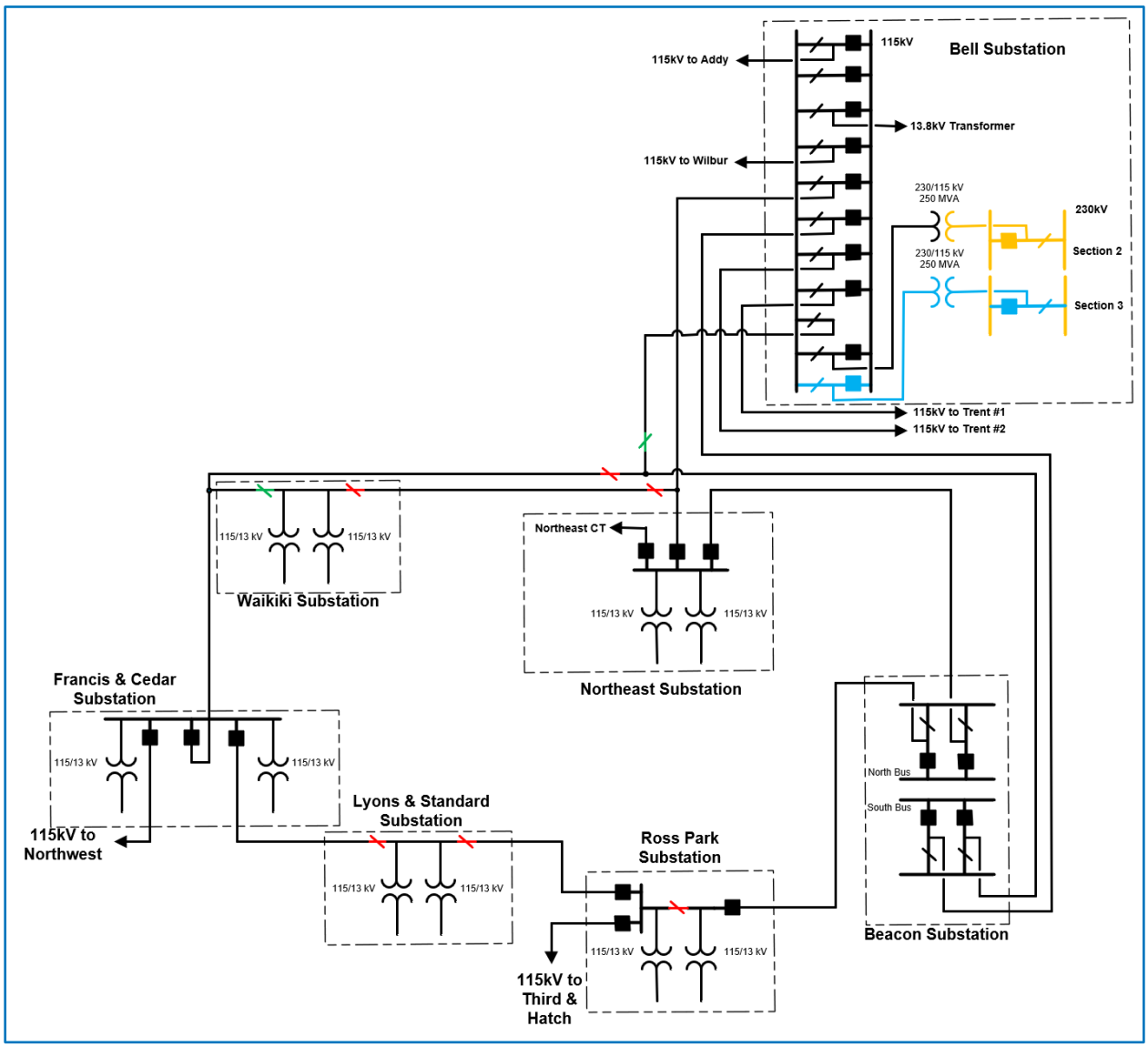


Figure 38: Alternative Project Diagram

Upgrades	Cost/unit	Cost
1x 115kV line position at Bell	$750k/position	$750k
1x 230kV line position at Bell	$1mil/position	$1mil
1x Autotransformer		$4mil
Total Project Cost	**-**	**$5.75mil**

Table 30: Alternative Cost Estimate

4.5. Trentwood 230/115kV Transformer

A similar option to the additional transformer at Bell, a second transformer could be located in the Spokane Valley near Trentwood. This would provide a backup source for Bell 230/115kV Bank #6 in a different location. The option interconnects the Bell – Lancaster 230kV line to bring a new 230kV source into Trentwood.

Preliminary contingency analysis for the alternative revealed the following:

- New or increased overload concerns for Ross Park – Third and Hatch 115kV line results from:
  - Ninth and Central 115kV bus-tie Breaker Failure
- New or increased overload concerns for Beacon – Bell #1 115kV line results from:
  - Beacon 230kV bus-tie Breaker Failure
  - Various other P6 outages
- New or increased overload concerns for Bell – Northeast 115kV line results from:
  - Beacon 230kV bus-tie Breaker Failure
  - Beacon 115kV south bus outage
  - Various other P6 outages
- New or increased overload concerns for Beacon – Ninth and Central #1 115kV results from:
  - Loss of Beacon – Ninth and Central #2 115kV and Beacon – Ross Park 115kV
- New or increased overload concerns for Beacon – Ninth and Central #2 115kV results from:
  - Loss of Beacon – Ninth and Central #1 115kV and Beacon – Ross Park 115kV

Adding a second transformer in the region or in the Spokane Valley does not resolve the other P6 outage involving Francis & Cedar – Ross Park and Northwest – Westside. To address the other P6 concern with the existing Beacon – Francis & Cedar line reconductoring (or other mitigation method) will be required from the new Bell – Francis & Cedar line.

No project diagram developed for this alternative.

Upgrades	Cost/unit	Cost
1x 115kV line position at Trentwood	$750k/position	$750k
2x 230kV line positions at Trentwood	$1mil/position	$2mil
1x Autotransformer		$4mil
New 230kV conductor from Bell – Lancaster 230kV 5.3 miles	$2.25mil/mile	$12mil
Total Project Cost	**-**	**$18.75mil**

Table 31: Alternative Cost Estimate

4.6. Indian Trail – Waikiki 115kV

This option evaluates construction of a new 115kV source along the Beacon – Francis & Cedar line. The new line is evaluated as an Indian Trail – Waikiki 115kV line. The new line mitigates one of the P6 outages (Francis & Cedar – Ross Park and Northwest – Westside) identified in the problem statement. The other P6 outage involving Beacon and Bell interconnections is not completely resolved. Additional mitigation for the Beacon and Bell interconnections will be required.

Preliminary contingency analysis for the alternative revealed the following:

- New or increased overload concerns for the Bell 230/115kV Transformer #6 results from:
  - Beacon 115kV bus-tie Breaker Failure
  - Various other P6 outages
- New or increased overload concerns for Bell – Northeast 115kV line results from:
  - Beacon 115kV bus-tie Breaker Failure
  - Various other P6 outages
- New or increased overload concerns for Ross Park – Third and Hatch 115kV line results from:
  - Ninth and Central 115kV bus-tie Breaker Failure
- New or increased overload concerns for Beacon – Bell #1 115kV line results from:
  - Loss of Bell 230/115kV Transformer #6 and Bell – Northeast 115kV

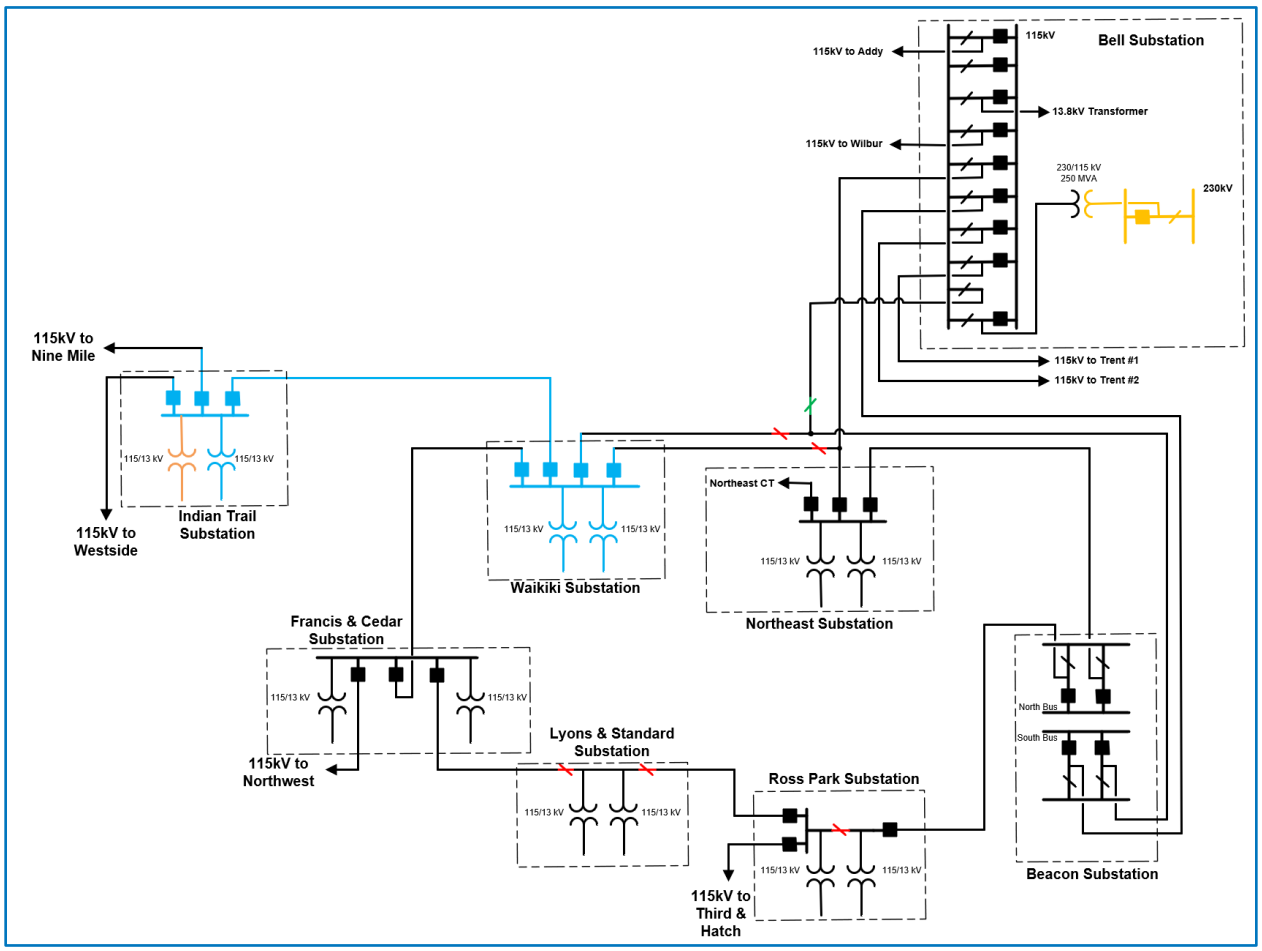


Figure 39: Alternative Project Diagram

Upgrades	Cost/unit	Cost
New switching station at Indian Trail with 3x 115kV lines	$	$6mil*
New switching station at Waikiki with 4x 115kV lines	$	$8mil
3 miles of new 115kV transmission from Indian Trail to Waikiki	$	$3mil
Total Project Cost	**-**	**$17.0mil**

Table 32: Alternative Cost Estimate

*Excludes Distribution Costs.

4.7. BESS (Battery Energy Storage System) Dispatch

A BESS could provide short time support for an outage of the Bell 230/115 Bank #6 transformer or outages resulting in the Beacon – Francis & Cedar line overload. This option would mitigate concerns for P6 outages on a short time basis. BESS is not cost effective at this time and may not provide the needed long-term reliability. The battery source availability is dependent upon battery capabilities.

A BESS of approximately 40MW would be required at Francis & Cedar to mitigate overloads on the Beacon – Francis & Cedar 115kV line under the P6 outage, on the 5-year planning horizon.

A BESS of approximately 70MW would be required at Bell or Trentwood to mitigate overloads on the Beacon – Bell interconnections, on the 5-year planning horizon.

Preliminary contingency analysis does not impact evaluation of this option and therefore was not performed.

No project diagram developed for this alternative.

Upgrades	Cost/unit	Cost
BESS 40MW, 8hr Lithium-Ion	$1.854mil/MW	$74.16mil
BESS 70MW, 8hr Lithium-Ion	$1.854mil/MW	$129.78mil
Integration costs		$10mil
Total Project Cost	**-**	**$213.94mil**

Table 33: Alternative Cost Estimate

4.8. Bell – Westside 115kV

This option adds an additional 115kV line into Bell. By adding another source into Bell, the Beacon – Bell interconnection issues are mitigated. This option does not resolve the other P6 outage involving Francis & Cedar – Ross Park and Northwest – Westside. Additional mitigation for the Beacon – Francis & Cedar line is required.

No project diagram developed for this alternative.

Upgrades	Cost/unit	Cost
1x 115kV line position at Bell	$750k/position	$750k
1x 115kV line position at Westside	$750k/position	$750k
Construct ~8 miles 115kV transmission line	$1mil/mile	$8mil
Total Project Cost	**-**	**$9.5mil**

Table 34: Alternative Cost Estimate

4.9. Hawthorne Switching Station

This option includes construction of a new switching station (Hawthorne) with breakers, located near the existing Bell Tap. The new station would require three 115kV line positions. A new breaker line positions would be required at Bell. The new station would result in the following new lines:

- Beacon – Hawthorne 115kV
- Bell – Hawthorne 115kV
- Francis & Cedar – Hawthorne 115kV

The options include reconductoring from Bell to Hawthorne with 239MVA rating.

This option has similar performance to the Beacon – Francis & Cedar loop in option. The option resolves interconnection concerns between Beacon and Bell however the other P6 outage involving Francis & Cedar – Ross Park and Northwest – Westside is not resolved. Additional mitigation for the Beacon – Francis & Cedar line is required.

Preliminary contingency analysis was not performed for this alternative.

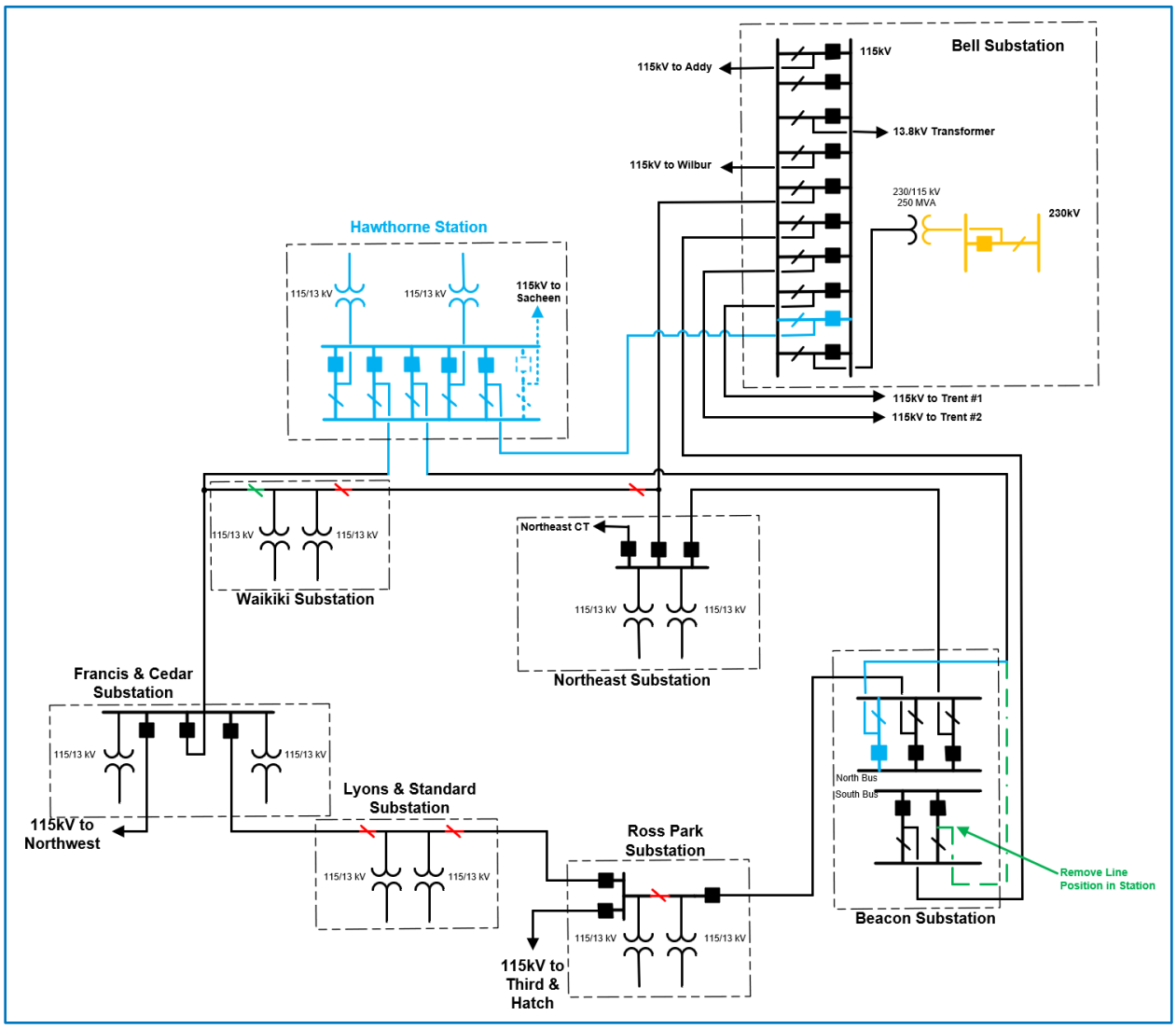


Figure 40: Alternative Project Diagram

Upgrades	Cost/unit	Cost
New switching station with 5x 115kV line positions		$10mil*
1x line positions at Bell	$750k/position	$750k
1x line position at the Beacon north bus	$750k/position	$750k
New 1-mile Bell – Hawthorne 115kV line	$1mil/mile	$1mil
Total Project Cost	**-**	**$27.5mil**

Table 35: Alternative Cost Estimate

*Excludes Distribution Costs.

4.10. Irvin – Trentwood 115kV Transmission Line

This option was evaluated and considered the primary proposed project until the loop in of Boulder – Irvin #1 into Trentwood was evaluated. The Irvin – Trentwood 115kV line option performed very well to correct Beacon – Bell interconnection concerns. However,

the scope of looping in the Boulder – Irvin #1 line into Trentwood performed slightly better, with reduced scope.

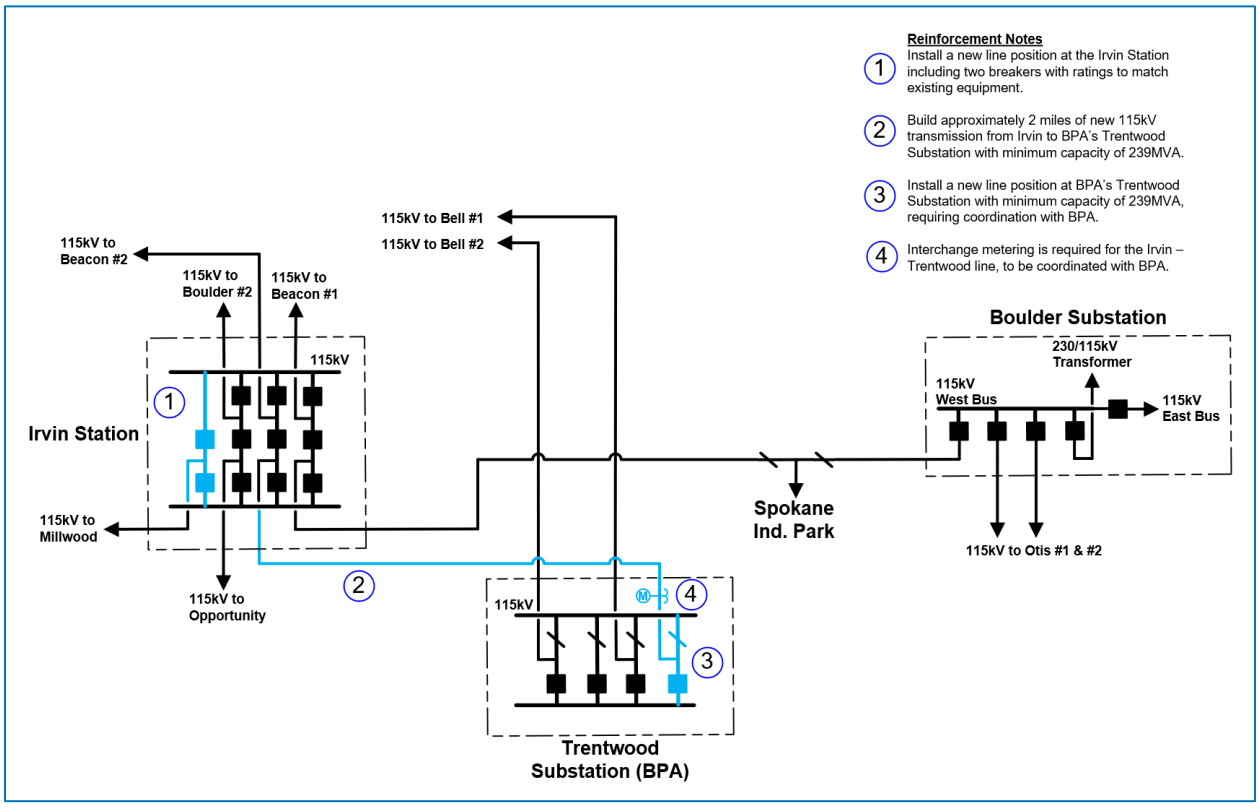


Figure 41: Alternative Project Diagram

Upgrades	Cost
Install one new line position at the Trentwood Station	$500,000
Install one new line position at the Irvin Station	$1,000,000
Build 2-mile transmission line from Irvin to Trentwood	$2,000,000
Total	**$3,500,000**

Table 36: Alternative Cost Estimate

5. Steady State Contingency Results

5.1. 2028 Heavy Summer Results

	HS_BASE	HS_IRV_TRNT	HS_HLD	HS_COMP
P2				
BF: A600 Beacon North & South 115 kV				
College and Walnut - Westside 115 kV (Fort Wright - Westside)	**102.2**	**102.3**	98.2	99.4
Francis & Cedar - Northwest 115 kV	**123.2**	**123.3**		
Francis & Cedar - Ross Park 115 kV (Francis & Cedar - Lyons and Standard)			**103.7**	**105.7**
Northwest - Westside 115 kV	**117.6**	**117.7**		
BF: A688 Ninth & Central North & South 115 kV				
Ross Park - Third and Hatch 115 kV	**114.8**	**114.4**	**119.4**	**117.9**
BF: R427 Beacon North & South 230 kV				
Beacon – Bell #1 115kV		95.0		
Bell - Northeast 115 kV (Bell - Waikiki Tap)	**111.8**	**119.9**		
BELL S2 (40088) -> BELL BPA (40087) CKT 6 at BELL S2	**105.4**	**102.4**	**104.6**	**102.1**
Francis & Cedar - Northwest 115 kV	**104.2**	**105.3**		
Northwest - Westside 115 kV	**102.4**	**103.2**		
BUS: Beacon North 115 kV				
Beacon - Ninth and Central #2 115 kV	99.1	**101.8**	**102.2**	**103.5**
P3				
G-1: Kettle Falls Thermal Units 1&2 + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	96.7			
P6				
N-1: 3TM Bell - Boundary #3 230 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**103.5**			
N-1: 3TM Boundary - Box Canyon - Colville BPA 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	95.9			
N-1: Airway Heights - Devils Gap 115 kV + N-1: College & Walnut - Westside 115 kV				
Ross Park - Third and Hatch 115 kV			97.2	98.4
N-1: Airway Heights - Devils Gap 115 kV + N-1: Ninth & Central - Third & Hatch 115 kV				
Ross Park - Third and Hatch 115 kV			98.8	98.3
N-1: Beacon - Bell #1 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Northeast 115 kV	**149.4**			
Bell - Northeast 115 kV (Waikiki Tap - Northeast)	**119.9**			
N-1: Beacon – Bell #4 230 kV + N-1: Beacon – Bell #5 230 kV				
Bell – Northeast 115kV		95.4		
N-1: Beacon - Francis & Cedar 115 kV + N-1: Northwest - Westside 115 kV				
Francis & Cedar - Ross Park 115 kV (Lyons and Standard - Ross Park)	98.1	98.1		
N-1: Beacon - Ninth & Central #1 115 kV + N-1: Beacon - Ninth & Central #2 115 kV				
Ross Park - Third and Hatch 115 kV	**115.8**	**118.3**	**120.6**	**122.5**
N-1: Beacon - Ninth & Central #1 115 kV + N-1: Bell - Westside 230 kV				
Ross Park - Third and Hatch 115 kV				95.7
N-1: Beacon - Ninth & Central #1 115 kV + N-1: College & Walnut - Westside 115 kV				
Ross Park - Third and Hatch 115 kV		95.2	96.6	98.6
N-1: Beacon - Ninth & Central #2 115 kV + N-1: Bell - Westside 230 kV				
Ross Park - Third and Hatch 115 kV				96.3
N-1: Beacon - Ninth & Central #2 115 kV + N-1: College & Walnut - Westside 115 kV				
Ross Park - Third and Hatch 115 kV		95.9	97.2	99.3
N-1: Beacon - Ninth & Central #2 115 kV + N-1: Ross Park - Third & Hatch 115 kV				

	HS_BASE	HS_IRV_TRNT	HS_HLD	HS_COMP
Beacon - Ninth and Central #1 115 kV	97.6	**100.7**	99.8	**102.7**
N-1: Beacon - Northeast 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**192**		**107.3**	
N-1: Beacon - Ross Park 115 kV + N-1: Bell - Westside 230 kV				
Bell – Francis and Cedar 115kV (Francis and Cedar – Waikiki)				95.3
Ninth and Central - Third and Hatch 115 kV (Latah Tap - Third and Hatch)	**111.9**	**111.3**		
N-1: Beacon - Ross Park 115 kV + N-1: Northwest - Westside 115 kV				
Beacon - Francis & Cedar 115 kV (Bell Tap -Waikiki)	**103.7**	**104.0**		
Bell - Francis & Cedar 115 kV (Francis & Cedar - Waikiki)				96.5
College and Walnut - Westside 115 kV (Fort Wright - Westside)	97	97.7		
N-1: Beacon - Ross Park 115 kV + T-1: Bell #6 230/115 kV				
Francis & Cedar - Northwest 115 kV			95.7	
Northwest - Westside 115 kV			95.5	
N-1: Bell - Creston 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**102**			
N-1: Bell - Northeast 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**129.9**			
N-1: Bell - Westside 230 kV + T-1: Bell #6 230/115 kV				
Beacon #1 230/115 kV	**101.8**	96.8	**101.4**	96.5
Beacon #2 230/115 kV	99.5		99	
Boulder – Trentwood 115kV (Boulder – Spokane Industrial Park)		97.2		97.2
N-1: Boulder - Irvin #2 115 kV + T-1: Bell #6 230/115 kV				
Boulder – Trentwood 115kV (Boulder – Spokane Industrial Park)		**105.1**		**101.4**
N-1: College & Walnut - Post Street 115 kV + N-1: Ninth & Central - Third & Hatch 115 kV				
Ross Park - Third and Hatch 115 kV			95.3	95.7
N-1: College & Walnut - Westside 115 kV + N-1: Francis & Cedar - Northwest 115 kV				
Sunset - Westside 115kV (Garden Spring - Spokane Waste-To-Energy Tap)	96.7	97.4		
N-1: College & Walnut - Westside 115 kV + N-1: Metro - Third & Hatch 115 kV				
Sunset - Westside 115kV (Garden Spring - Spokane Waste-To-Energy Tap)	96.4	96.9		95.7
N-1: College & Walnut - Westside 115 kV + N-1: Ninth & Central - Third & Hatch 115 kV				
Ross Park - Third and Hatch 115 kV	**103.7**	**103.9**	**106.7**	**107.1**
N-1: College & Walnut - Westside 115 kV + N-1: Northwest - Westside 115 kV				
Sunset - Westside 115kV (Garden Spring - Spokane Waste-To-Energy Tap)	**102.5**	**103.2**		
N-1: College & Walnut - Westside 115 kV + N-1: Sunset - Westside 115 kV				
Francis & Cedar - Northwest 115 kV	**100.8**	**101.7**		
Northwest - Westside 115 kV	98.9	99.7		
Ross Park - Third and Hatch 115 kV	96.7	98	97.4	99.3
N-1: College & Walnut - Westside 115 kV + T-1: Bell #6 230/115 kV				
Francis & Cedar - Northwest 115 kV			95.9	
Northwest - Westside 115 kV			95.5	
N-1: Francis & Cedar - Northwest 115 kV + N-1: Sunset - Westside 115 kV				
College and Walnut - Westside 115 kV (Fort Wright - Westside)	**100**	**100.9**		
N-1: Francis & Cedar - Ross Park 115 kV + N-1: Northwest - Westside 115 kV				
Beacon - Francis & Cedar 115 kV (Bell Tap -Waikiki)	**112.5**	**112.5**		
N-1: Ninth & Central - Sunset 115 kV + N-1: Ninth & Central - Third & Hatch 115 kV				
Ross Park - Third and Hatch 115 kV	95.1		98.7	97.9

	HS_BASE	HS_IRV_TRNT	HS_HLD	HS_COMP
N-1: Northwest - Westside 115 kV + N-1: Bell - Francis & Cedar 115 kV				
Francis & Cedar - Ross Park 115 kV (Lyons and Standard - Ross Park)			98	98
N-1: Northwest - Westside 115 kV + N-1: Sunset - Westside 115 kV				
College and Walnut - Westside 115 kV (Fort Wright - Westside)	**108.1**	**109**		
N-1: Northwest - Westside 115 kV + T-1: Beacon #2 230/115 kV				
Beacon #1 230/115 kV		95.2		
N-1: Northwest - Westside 115 kV + T-1: Bell #6 230/115 kV				
College and Walnut - Westside 115 kV (Fort Wright - Westside)	97	95.3		
N-1: Sunset - Westside 115 kV + T-1: Bell #6 230/115 kV				
Francis & Cedar - Northwest 115 kV			95.1	
S-1: Trentwood G1S1 115kV Switched Shunt + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	96.2			
S-1: Trentwood G1S2 115kV Switched Shunt + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	96.2			
T-1: Addy #3 230/115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**105.6**			
Beacon - Northeast 115 kV	96.1			
T-1: Beacon #1 230/115 kV + T-1: Beacon #2 230/115 kV				
Bell - Northeast 115 kV (Bell - Waikiki Tap)	**103.1**	**115.7**		
BELL S2 (40088) -> BELL BPA (40087) CKT 6 at BELL S2	99.5		99.5	
Boulder – Trentwood 115 kV (Boulder - Spokane Industrial Park)		96.5		95.7
Francis & Cedar - Northwest 115 kV	97.4	97.9		
Northwest - Westside 115 kV	97	97.4		
T-1: Beacon #1 230/115 kV + T-1: Bell #6 230/115 kV				
Beacon #2 230/115 kV	**120.7**	**113.8**	**115.5**	**110.5**
Boulder – Trentwood 115 kV (Boulder - Spokane Industrial Park)		**106.8**		**102.4**
Francis & Cedar - Northwest 115 kV	95		98	
Northwest - Westside 115 kV			97.4	
T-1: Beacon #2 230/115 kV + T-1: Bell #6 230/115 kV				
Beacon #1 230/115 kV	**123.4**	**118.3**	**118.1**	**114.6**
Boulder – Trentwood 115 kV (Boulder - Spokane Industrial Park)		**106.9**		**102.4**
Francis & Cedar - Northwest 115 kV			97.6	
Northwest - Westside 115 kV			97.1	
T-1: Bell #6 230/115 kV + T-1: Kettle Falls #2 115/13.8 kV				
Beacon - Bell #1 115 kV	96.5			
T-1: Westside #1 230/115 kV + T-1: Westside #2 230/115 kV				
Metro - Third and Hatch 115 kV	**106.6**	**106.6**	97.8	96.6
P7				
N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Metro - Third and Hatch 115 kV	**106.6**	**106.6**	98.2	95.9
A6				
N-1: 3TM Bell - Boundary #3 230 kV Open @ BOUN + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**100.1**			
N-1: 3TM Boundary - Box Canyon - Colville BPA 115 kV Open @ COLV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	96.1			
N-1: Addy - Bell 115 kV Open @ ADD + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**129.6**			
Beacon - Northeast 115 kV	**116**			
N-1: Addy - Devils Gap 115 kV Open @ ADD + N-1: College & Walnut - Westside 115 kV Open @ WES				
Ross Park - Third and Hatch 115 kV				96.5

	HS_BASE	HS_IRV_TRNT	HS_HLD	HS_COMP
N-1: Airway Heights - Devils Gap 115 kV + N-1: College & Walnut - Westside 115 kV Open @ C&W				
Ross Park - Third and Hatch 115 kV			96.1	97.7
N-1: Airway Heights - Devils Gap 115 kV + N-1: College & Walnut - Westside 115 kV Open @ WES				
Metro - Third and Hatch 115 kV			98.5	98.3
Ross Park - Third and Hatch 115 kV	**100.7**	**101.5**	**103.5**	**104.8**
Sunset - Westside 115kV (Garden Spring - Spokane Waste-To-Energy Tap)	96.6	97.1		
N-1: Airway Heights - Devils Gap 115 kV + N-1: Ninth & Central - Sunset 115 kV Open @ 9CE				
Metro - Sunset 115 kV			96.3	95.7
Metro - Third and Hatch 115 kV	96.3	95.6	**103.8**	**102.4**
N-1: Airway Heights - Devils Gap 115 kV + N-1: Sunset - Westside 115 kV Open @ WES				
College and Walnut - Westside 115 kV (Fort Wright - Westside)	**102.8**	**103.4**		
Metro - Sunset 115 kV	**105.5**	**105.9**	**103.4**	**104.1**
Ross Park - Third and Hatch 115 kV	95.9	96.6	99.8	**101**
N-1: Airway Heights - Devils Gap 115 kV Open @ AIR + N-1: College & Walnut - Westside 115 kV				
Ross Park - Third and Hatch 115 kV			95.6	96.9
N-1: Airway Heights - Devils Gap 115 kV Open @ AIR + N-1: College & Walnut - Westside 115 kV Open @ C&W				
Ross Park - Third and Hatch 115 kV			96.1	97.4
N-1: Airway Heights - Devils Gap 115 kV Open @ AIR + N-1: College & Walnut - Westside 115 kV Open @ WES				
Metro - Third and Hatch 115 kV			98.7	98.5
Ross Park - Third and Hatch 115 kV	**100.8**	**101.6**	**103.5**	**104.9**
Sunset - Westside 115kV (Garden Spring - Spokane Waste-To-Energy Tap)	95.9	96.4		
N-1: Airway Heights - Devils Gap 115 kV Open @ AIR + N-1: Ninth & Central - Sunset 115 kV Open @ 9CE				
Metro - Sunset 115 kV			96.5	95.9
Metro - Third and Hatch 115 kV	97.5	96.7	**104.2**	**102.9**
N-1: Airway Heights - Devils Gap 115 kV Open @ AIR + N-1: Ninth & Central - Third & Hatch 115 kV				
Ross Park - Third and Hatch 115 kV			97.8	97.8
N-1: Airway Heights - Devils Gap 115 kV Open @ AIR + N-1: Sunset - Westside 115 kV Open @ WES				
College and Walnut - Westside 115 kV (Fort Wright - Westside)	**101.8**	**102.4**		
Metro - Sunset 115 kV	**105.2**	**105.6**	**103.3**	**104**
Ross Park - Third and Hatch 115 kV	96.1	96.9	99.9	**101.1**
N-1: Airway Heights - Devils Gap 115 kV Open @ DGP + N-1: Beacon - Ninth & Central #1 115 kV				
Ross Park - Third and Hatch 115 kV				95.1
N-1: Airway Heights - Devils Gap 115 kV Open @ DGP + N-1: Beacon - Ninth & Central #2 115 kV				
Ross Park - Third and Hatch 115 kV				95.6
N-1: Airway Heights - Devils Gap 115 kV Open @ DGP + N-1: College & Walnut - Westside 115 kV				
Ross Park - Third and Hatch 115 kV	95.5	96.3	98.1	99.5
Sunset - Westside 115kV (Garden Spring - Spokane Waste-To-Energy Tap)	95.7	96.2		
N-1: Airway Heights - Devils Gap 115 kV Open @ DGP + N-1: College & Walnut - Westside 115 kV Open @ C&W				
Ross Park - Third and Hatch 115 kV	95.9	96.7	98.6	99.9
N-1: Airway Heights - Devils Gap 115 kV Open @ DGP + N-1: College & Walnut - Westside 115 kV Open @ WES				
Metro - Third and Hatch 115 kV	98.8	98.7	**103.1**	**102.9**
Ross Park - Third and Hatch 115 kV	**103.3**	**104.2**	**106.2**	**107.5**
Sunset - Westside 115kV (Garden Spring - Spokane Waste-To-Energy Tap)	99	99.4		
N-1: Airway Heights - Devils Gap 115 kV Open @ DGP + N-1: Metro - Sunset 115 kV				

	HS_BASE	HS_IRV_TRNT	HS_HLD	HS_COMP
Sunset - Westside 115kV (Garden Spring - Spokane Waste-To-Energy Tap)	97.9	98.3		95.6
N-1: Airway Heights - Devils Gap 115 kV Open @ DGP + N-1: Ninth & Central - Sunset 115 kV Open @ 9CE				
Metro - Sunset 115 kV	99.7	99.3	**103**	**102.4**
Metro - Third and Hatch 115 kV	**102.3**	**101.5**	**109.6**	**108.2**
Sunset - Westside 115kV (Garden Spring - Spokane Waste-To-Energy Tap)	95.5	95.8		
N-1: Airway Heights - Devils Gap 115 kV Open @ DGP + N-1: Ninth & Central - Third & Hatch 115 kV				
Ross Park - Third and Hatch 115 kV			**100.1**	**100.1**
N-1: Airway Heights - Devils Gap 115 kV Open @ DGP + N-1: Northwest - Westside 115 kV				
College and Walnut - Westside 115 kV (Fort Wright - Westside)		95.3		
Sunset - Westside 115kV (Garden Spring - Spokane Waste-To-Energy Tap)	95.2	95.6		
N-1: Airway Heights - Devils Gap 115 kV Open @ DGP + N-1: Sunset - Westside 115 kV Open @ WES				
College and Walnut - Westside 115 kV (Fort Wright - Westside)	**105**	**105.6**	96.2	97.2
Metro - Sunset 115 kV	**111.8**	**112.2**	**109.8**	**110.4**
Ross Park - Third and Hatch 115 kV	98.7	99.5	**102.7**	**103.9**
N-1: Airway Heights - Devils Gap 115 kV Open @ DGP + PSF: Metro 115 kV				
Sunset - Westside 115kV (Garden Spring - Spokane Waste-To-Energy Tap)	96.4	96.9		
N-1: Beacon - Ninth & Central #1 115 kV + N-1: College & Walnut - Westside 115 kV Open @ C&W				
Ross Park - Third and Hatch 115 kV		95.5	97.2	98.8
N-1: Beacon - Ninth & Central #1 115 kV + N-1: College & Walnut - Westside 115 kV Open @ WES				
Ross Park - Third and Hatch 115 kV	**102.1**	**103.2**	**105.1**	**106.7**
N-1: Beacon - Ninth & Central #1 115 kV + N-1: Sunset - Westside 115 kV Open @ WES				
Ross Park - Third and Hatch 115 kV	96.6	97.7	**100.4**	**101.9**
N-1: Beacon - Ninth & Central #2 115 kV + N-1: College & Walnut - Westside 115 kV Open @ C&W				
Ross Park - Third and Hatch 115 kV	95	96.2	97.8	99.4
N-1: Beacon - Ninth & Central #2 115 kV + N-1: College & Walnut - Westside 115 kV Open @ WES				
Ross Park - Third and Hatch 115 kV	**102.6**	**103.8**	**105.7**	**107.3**
N-1: Beacon - Ninth & Central #2 115 kV + N-1: Sunset - Westside 115 kV Open @ WES				
Ross Park - Third and Hatch 115 kV	97.2	98.2	**100.8**	**102.3**
N-1: Beacon - Ross Park 115 kV + N-1: College & Walnut - Westside 115 kV Open @ WES				
Francis & Cedar - Northwest 115 kV	95.5	96.1		
Northwest - Westside 115 kV	95.2	95.7		
N-1: Beacon - Ross Park 115 kV + N-1: Francis & Cedar - Ross Park 115 kV Open @ F&C				
Ninth and Central - Third and Hatch 115 kV (Latah Tap - Third and Hatch)			96.4	
N-1: Beacon - Ross Park 115 kV + N-1: Ninth & Central - Sunset 115 kV Open @ 9CE				
Ninth and Central - Third and Hatch 115 kV (Latah Tap - Third and Hatch)	**107.4**	**106**	**102.4**	98.5
N-1: Bell - Northeast 115 kV Open @ BEL + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**129.6**			
N-1: Bell - Northeast 115 kV Open @ NE + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**160.7**			
N-1: Bell - Westside 230 kV + N-1: College & Walnut - Westside 115 kV Open @ WES				
Ross Park - Third and Hatch 115 kV				95.5

	HS_BASE	HS_IRV_TRNT	HS_HLD	HS_COMP
N-1: Bell - Westside 230 kV + N-1: Ninth & Central - Sunset 115 kV Open @ 9CE				
Metro - Third and Hatch 115 kV	124.5	124	119.4	117.8
N-1: Boulder - Irvin #1 115 kV Open @ BLD + N-1: Opportunity - Otis Orchards 115 kV Open @ OTI				
Boulder - Irvin #2 115 kV		95.3		
N-1: Boulder - Irvin #2 115 kV + N-1: Opportunity - Otis Orchards 115 kV Open @ OTI				
Boulder - Irvin #1 115 kV (Boulder - Spokane Industrial Park)		97.6		96.9
N-1: College & Walnut - Westside 115 kV + N-1: Ninth & Central - Sunset 115 kV Open @ 9CE				
Metro - Third and Hatch 115 kV	101	100.3	105.3	104.4
Ross Park - Third and Hatch 115 kV				95.9
N-1: College & Walnut - Westside 115 kV + N-1: Sunset - Westside 115 kV Open @ SUN				
Ross Park - Third and Hatch 115 kV	95	96	96	97.6
N-1: College & Walnut - Westside 115 kV + N-1: Sunset - Westside 115 kV Open @ WES				
Francis & Cedar - Northwest 115 kV	109.2	109.9		
Metro - Third and Hatch 115 kV	109.9	110.1	112.3	112.6
Northwest - Westside 115 kV	105.8	106.4		
Ross Park - Third and Hatch 115 kV	115.9	116.9	117	118.5
N-1: College & Walnut - Westside 115 kV Open @ C&W + N-1: Ninth & Central - Sunset 115 kV Open @ 9CE				
Metro - Third and Hatch 115 kV	103.8	103.2	107.7	106.8
Ross Park - Third and Hatch 115 kV			95.4	96.6
N-1: College & Walnut - Westside 115 kV Open @ C&W + N-1: Ninth & Central - Third & Hatch 115 kV				
Ross Park - Third and Hatch 115 kV	104.9	105	107.7	108
N-1: College & Walnut - Westside 115 kV Open @ C&W + N-1: Northwest - Westside 115 kV				
Sunset - Westside 115kV (Garden Spring - Spokane Waste-To-Energy Tap)	99	99.5		
N-1: College & Walnut - Westside 115 kV Open @ C&W + N-1: Sunset - Westside 115 kV				
Francis & Cedar - Northwest 115 kV		95.4		
Ross Park - Third and Hatch 115 kV	96.1	97.1	96.8	98.4
N-1: College & Walnut - Westside 115 kV Open @ C&W + N-1: Sunset - Westside 115 kV Open @ SUN				
Ross Park - Third and Hatch 115 kV		95.3	95.4	97.1
N-1: College & Walnut - Westside 115 kV Open @ C&W + N-1: Sunset - Westside 115 kV Open @ WES				
Francis & Cedar - Northwest 115 kV	102.9	103.7		
Metro - Third and Hatch 115 kV	110	110.2	112.3	112.6
Northwest - Westside 115 kV	100.8	101.4		
Ross Park - Third and Hatch 115 kV	115.2	116.2	116.4	118
N-1: College & Walnut - Westside 115 kV Open @ WES + N-1: Francis & Cedar - Northwest 115 kV				
Sunset - Westside 115kV (Garden Spring - Spokane Waste-To-Energy Tap)	100.1	100.7		
N-1: College & Walnut - Westside 115 kV Open @ WES + N-1: Metro - Third & Hatch 115 kV				
Sunset - Westside 115kV (Garden Spring - Spokane Waste-To-Energy Tap)	103.7	104.1	102.3	103
N-1: College & Walnut - Westside 115 kV Open @ WES + N-1: Ninth & Central - Sunset 115 kV Open @ 9CE				
Metro - Third and Hatch 115 kV	117.8	117.2	122.1	121.2
Ross Park - Third and Hatch 115 kV	100.2	100.9	103.1	104.3
N-1: College & Walnut - Westside 115 kV Open @ WES + N-1: Ninth & Central - Sunset 115 kV Open @ SUN				
Ross Park - Third and Hatch 115 kV				95.1
N-1: College & Walnut - Westside 115 kV Open @ WES + N-1: Ninth & Central - Third & Hatch 115 kV				
Ross Park - Third and Hatch 115 kV	113.9	114	117	117.3
N-1: College & Walnut - Westside 115 kV Open @ WES + N-1: Northwest - Westside 115 kV				

	HS_BASE	HS_IRV_TRNT	HS_HLD	HS_COMP
Sunset - Westside 115 kV (Spokane Waste-To-Energy Tap - Westside)	95.6	96.2		
Sunset - Westside 115kV (Garden Spring - Spokane Waste-To-Energy Tap)	**105.9**	**106.5**		95
N-1: College & Walnut - Westside 115 kV Open @ WES + N-1: Ross Park - Third & Hatch 115 kV				
Ninth and Central - Third and Hatch 115 kV (Latah Tap - Third and Hatch)	95.3		97.7	97
Sunset - Westside 115kV (Garden Spring - Spokane Waste-To-Energy Tap)		95.3		
N-1: College & Walnut - Westside 115 kV Open @ WES + N-1: Sunset - Westside 115 kV				
Francis & Cedar - Northwest 115 kV	**104.2**	**105**		
Northwest - Westside 115 kV	**101.7**	**102.3**		
Ross Park - Third and Hatch 115 kV	**105**	**106**	**105.8**	**107.3**
N-1: College & Walnut - Westside 115 kV Open @ WES + N-1: Sunset - Westside 115 kV Open @ SUN				
Ross Park - Third and Hatch 115 kV	**103.2**	**104.2**	**104.3**	**105.9**
N-1: College & Walnut - Westside 115 kV Open @ WES + N-1: Sunset - Westside 115 kV Open @ WES				
Francis & Cedar - Northwest 115 kV	**112.6**	**113.3**		
Metro - Third and Hatch 115 kV	**126.9**	**127**	**129.3**	**129.6**
Northwest - Westside 115 kV	**108.6**	**109.2**		
Ross Park - Third and Hatch 115 kV	**125.4**	**126.4**	**126.7**	**128.2**
N-1: College & Walnut - Westside 115 kV Open @ WES + T-1: Bell #6 230/115 kV				
Francis & Cedar - Northwest 115 kV	95.2		97.8	
Northwest - Westside 115 kV			97	
N-1: Francis & Cedar - Northwest 115 kV + N-1: Francis & Cedar - Ross Park 115 kV Open @ ROS				
Beacon - Francis & Cedar 115 kV (Beacon - Bell Tap)	97.9	97.9		
Beacon - Francis & Cedar 115 kV (Bell Tap -Waikiki)	**126.2**	**126.2**		
N-1: Francis & Cedar - Northwest 115 kV + N-1: Sunset - Westside 115 kV Open @ WES				
College and Walnut - Westside 115 kV (Fort Wright - Westside)	**112.4**	**113.2**	98.1	98.5
N-1: Francis & Cedar - Ross Park 115 kV Open @ F&C + N-1: Northwest - Westside 115 kV				
Beacon - Francis & Cedar 115 kV (Bell Tap -Waikiki)	**112.8**	**112.8**		
N-1: Francis & Cedar - Ross Park 115 kV Open @ F&C + N-1: Sunset - Westside 115 kV Open @ WES				
College and Walnut - Westside 115 kV (Fort Wright - Westside)	96.7	97.4		
N-1: Francis & Cedar - Ross Park 115 kV Open @ ROS + N-1: Northwest - Westside 115 kV				
Beacon - Francis & Cedar 115 kV (Beacon - Bell Tap)	**132.8**	**132.8**		
Beacon - Francis & Cedar 115 kV (Bell Tap -Waikiki)	**171.2**	616.1996		
Beacon - Francis & Cedar 115 kV (Francis & Cedar - Waikiki)	**102.6**	**102.6**		
Bell - Francis & Cedar 115 kV (Francis & Cedar - Waikiki)			98.6	98.4
N-1: Irvin - Opportunity 115 kV + N-1: Ninth & Central - Opportunity 115 kV Open @ 9CE				
Opportunity - Otis Orchard 115 kV (Liberty Lake - Otis Orchard)	98.7	98.7	98.7	98.7
N-1: Irvin - Opportunity 115 kV + N-1: Opportunity - Otis Orchards 115 kV Open @ OTI				
Ninth and Central - Opportunity 115 kV (Nelson Tap - Ninth and Central)	99.8	99.8	99.8	99.8
N-1: Metro - Sunset 115 kV + N-1: Sunset - Westside 115 kV Open @ WES				
Ninth and Central - Sunset 115kV (Glenrose Tap - Southeast)	98	97.8	**100.2**	**100**
N-1: Ninth & Central - Sunset 115 kV + N-1: Sunset - Westside 115 kV Open @ WES				
Metro - Sunset 115 kV	99.3	99	**101.2**	**101**
N-1: Ninth & Central - Sunset 115 kV Open @ 9CE + T-1: Westside #1 230/115 kV				
Metro - Third and Hatch 115 kV	96.5	95.7	98	96.5

	HS_BASE	HS_IRV_TRNT	HS_HLD	HS_COMP
N-1: Ninth & Central - Sunset 115 kV Open @ 9CE + T-1: Westside #2 230/115 kV				
Metro - Third and Hatch 115 kV	96.1	95.3	97.7	96.2
N-1: Ninth & Central - Sunset 115 kV Open @ SUN + N-1: Ninth & Central - Third & Hatch 115 kV				
Ross Park - Third and Hatch 115 kV			96.5	95.8
N-1: Ninth & Central - Sunset 115 kV Open @ SUN + N-1: Sunset - Westside 115 kV Open @ WES				
Metro - Sunset 115 kV	98.8	98.6	**100.9**	**100.7**
Ross Park - Third and Hatch 115 kV				95.1
N-1: Ninth & Central - Third & Hatch 115 kV + N-1: Sunset - Westside 115 kV Open @ WES				
Ross Park - Third and Hatch 115 kV	**100.6**	**100.6**	**104.6**	**104.8**
N-1: Northwest - Westside 115 kV + N-1: Sunset - Westside 115 kV Open @ SUN				
College and Walnut - Westside 115 kV (Fort Wright - Westside)		95.2		
N-1: Northwest - Westside 115 kV + N-1: Sunset - Westside 115 kV Open @ WES				
College and Walnut - Westside 115 kV (College and Walnut - Fort Wright)	99.7	**100.5**		
College and Walnut - Westside 115 kV (Fort Wright - Westside)	**120.7**	**121.4**	**104.7**	**105.1**
N-1: Ross Park - Third & Hatch 115 kV + N-1: Sunset - Westside 115 kV Open @ WES				
College and Walnut - Westside 115 kV (Fort Wright - Westside)	**105.6**	**106.4**	**102.4**	**103.7**
N-1: Sunset - Westside 115 kV Open @ WES + N-1: Metro - Third & Hatch 115 kV				
College and Walnut - Westside 115 kV (Fort Wright - Westside)	**114.2**	**114.6**	**112.6**	**113.4**
N-1: Sunset - Westside 115 kV Open @ WES + PSF: Metro 115 kV				
Ninth and Central - Sunset 115kV (Glenrose Tap - Southeast)	97.8	97.6	**100.1**	99.9
N-1: Sunset - Westside 115 kV Open @ WES + T-1: Beacon #1 230/115 kV				
College and Walnut - Westside 115 kV (Fort Wright - Westside)		95.6		
N-1: Sunset - Westside 115 kV Open @ WES + T-1: Beacon #2 230/115 kV				
College and Walnut - Westside 115 kV (Fort Wright - Westside)		95.4		
N-1: Sunset - Westside 115 kV Open @ WES + T-1: Bell #6 230/115 kV				
College and Walnut - Westside 115 kV (Fort Wright - Westside)	98.5	97.9		
Francis & Cedar - Northwest 115 kV	95.7		99	
Northwest - Westside 115 kV	95.3		98.1	
A7				
N-1: Boulder - Irvin #1 115 kV + N-2: Boulder - Otis Orchards #1 115 kV & Boulder - Otis Orchards #2 115 kV				
Boulder - Irvin #2 115 kV		99		98.5
N-1: Boulder - Irvin #2 115 kV + N-2: Boulder - Otis Orchards #1 115 kV & Boulder - Otis Orchards #2 115 kV				
Boulder - Irvin #1 115 kV (Boulder - Spokane Industrial Park)	**100.7**	**106.5**	99.8	**106**
N-1: Boulder - Otis Orchards #1 115 kV + N-2: Ramsey - Rathdrum #1 115 kV & Ramsey - Rathdrum #3 115 kV				
Boulder - Otis Orchards #2 115 kV	**104.1**	**104.8**	**103.8**	**104.5**
N-1: Boulder - Otis Orchards #1 115 kV Open @ OTI + N-2: Ramsey - Rathdrum #1 115 kV & Ramsey - Rathdrum #3 115 kV				
Boulder - Otis Orchards #2 115 kV	**103.2**	**103.9**	**102.9**	**103.6**
N-1: College & Walnut - Westside 115 kV Open @ WES + N-2: Bell - Coulee #3 230 kV & Bell - Westside 230 kV				
Ross Park - Third and Hatch 115 kV				95.3

	HS_BASE	HS_IRV_TRNT	HS_HLD	HS_COMP
N-1: College & Walnut - Westside 115 kV Open @ WES + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Metro - Third and Hatch 115 kV	111.8	111.8	107	106.6
Ross Park - Third and Hatch 115 kV	97.1	97.7	98.6	100
N-1: Francis & Cedar - Ross Park 115 kV Open @ ROS + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Francis & Cedar 115 kV (Bell Tap -Waikiki)	109.3	109.5		
Bell - Francis & Cedar 115 kV (Francis & Cedar - Waikiki)			97.5	102.3
Metro - Third and Hatch 115 kV	134.1	134.1	109.4	107.2
Ross Park - Third and Hatch 115 kV	118.2	118.9	102.7	102.3
N-1: Irvin - Opportunity 115 kV + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Metro - Third and Hatch 115 kV	107	107	97.9	96.9
Ross Park - Third and Hatch 115 kV	96.2	96.4		95.2
N-1: Ninth & Central - Opportunity 115 kV Open @ OPT + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	95			
Metro - Third and Hatch 115 kV	107.2	107.1	97.8	96.8
Ross Park - Third and Hatch 115 kV	98.7	98.6	96.9	96.9
N-1: Ninth & Central - Sunset 115 kV + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	96.2	96.5		
Metro - Third and Hatch 115 kV	137.6	137.3	122.6	120.8
Ross Park - Third and Hatch 115 kV	97.6	98.3		95.1
N-1: Ninth & Central - Sunset 115 kV Open @ 9CE + N-2: Bell - Coulee #3 230 kV & Bell - Westside 230 kV				
Metro - Third and Hatch 115 kV	122.7	122.3	118	116.5
N-1: Ninth & Central - Sunset 115 kV Open @ 9CE + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	109.1	109.4		
Bell - Francis & Cedar 115 kV (Francis & Cedar - Waikiki)				97.3
Metro - Sunset 115 kV	104.9	104.7	95.2	
Metro - Third and Hatch 115 kV	1041.3171	1039.6434	154.2	152.4
Ninth and Central - Third and Hatch 115 kV (Latah Tap - Third and Hatch)	104.6	103.7		
Ross Park - Third and Hatch 115 kV	113.9	114.5	109.1	110
N-1: Ninth & Central - Sunset 115 kV Open @ SUN + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	99.5	99.8		
Metro - Third and Hatch 115 kV	135.9	135.6	119.9	118.2
Ross Park - Third and Hatch 115 kV	103.2	103.8	99.6	100.5
N-1: Ninth & Central - Third & Hatch 115 kV + N-2: Bell - Coulee #3 230 kV & Bell - Westside 230 kV				
Ross Park - Third and Hatch 115 kV	104.2	104.4	104	103.9
N-1: Ninth & Central - Third & Hatch 115 kV + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	110	110.1		
Ross Park - Third and Hatch 115 kV	132	132.2	124.7	124.6
N-1: Northwest - Westside 115 kV + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Metro - Third and Hatch 115 kV	110.3	110.3	107.5	108
Ross Park - Third and Hatch 115 kV	98.5	99.2	101.3	103.4
N-1: Opportunity - Otis Orchards 115 kV Open @ OTI + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Metro - Third and Hatch 115 kV	106.7	106.7	97.6	96.8
Ross Park - Third and Hatch 115 kV		95.3		
N-1: Post Falls - Ramsey 115 kV Open @ RAM + N-2: Beacon - Rathdrum 230 kV & Boulder - Lancaster 230 kV				
Boulder - Rathdrum 115kV (Pleasant - Idaho Rd)	102.7	104.1	102.2	103.7
N-1: Post Falls - Ramsey 115 kV Open @ RAM + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Metro - Third and Hatch 115 kV	106.6	106.6	97.6	96.8
N-1: Post Falls - Ramsey 115 kV Open @ RAM + N-2: Boulder - Otis Orchards #1 115 kV & Boulder - Otis Orchards #2 115 kV				
Boulder - Irvin #1 115 kV (Boulder - Spokane Industrial Park)		95.1		

	HS_BASE	HS_IRV_TRNT	HS_HLD	HS_COMP
N-1: Ross Park - Third & Hatch 115 kV + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Ninth and Central - Third and Hatch 115 kV (Latah Tap - Third and Hatch)	**114.5**	**114.2**	**104.7**	**103.4**
N-1: Sunset - Westside 115 kV Open @ WES + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Metro - Third and Hatch 115 kV	**112.1**	**112.1**	**106**	**105.4**
Ross Park - Third and Hatch 115 kV	98.7	99.4	99.4	**100.6**
N-2: Beacon - Boulder 230 kV & Boulder - Irvin #2 115 kV + N-2: Boulder - Otis Orchards #1 115 kV & Boulder - Otis Orchards #2 115 kV				
Boulder - Irvin #1 115 kV (Boulder - Spokane Industrial Park)		98.6		98
N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV + N-1: Bell – Highland 115 kV				
Metro - Third and Hatch 115 kV			**108**	**106.9**
Ross Park - Third and Hatch 115 kV			96.5	97.5
N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV + N-1: Bell - Francis & Cedar 115 kV				
Beacon - Ross Park 115 kV			**101**	**101.3**
Metro - Third and Hatch 115 kV			**109**	**109**
N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV + N-1: Bell - Northeast 115 kV				
Bell - Francis & Cedar 115 kV (Francis & Cedar - Waikiki)				95.9
Metro - Third and Hatch 115 kV			96.4	95.5
N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV + N-1: Metro - Third & Hatch 115 kV				
Bell - Francis & Cedar 115 kV (Francis & Cedar - Waikiki)				97
Francis & Cedar - Ross Park 115 kV (Lyons and Standard - Ross Park)	98.8	98.8		
Ninth and Central - Sunset 115kV (Glenrose Tap - Southeast)	**105**	**104.8**		
N-2: Boulder - Otis Orchards #1 115 kV & Boulder - Otis Orchards #2 115 kV + T-1: Bell #6 230/115 kV				
Boulder - Irvin #1 115 kV (Boulder - Spokane Industrial Park)		97.9		95.7
NA				
RES: N-2 (ROW): Bell - Westside 230 kV and Coulee - Westside 230 kV and Nine Mile - Westside 115 kV				
Beacon - Ross Park 115 kV	95	95.4		
Metro - Third and Hatch 115 kV	**108.4**	**108.4**		
SSEE-2b				
N-2 (ROW): Bell - Westside 230 kV and Coulee - Westside 230 kV and Nine Mile - Westside 115 kV				
Metro - Third and Hatch 115 kV	**105.3**	**105.3**		
N-2 (ROW): College & Walnut - Westside 115 kV and Sunset - Westside 115 kV				
Francis & Cedar - Northwest 115 kV	**100.8**	**101.7**		
Northwest - Westside 115 kV	98.9	99.6		
Ross Park - Third and Hatch 115 kV	96.7	97.7	98.8	**100.4**
SSEE-2c				
SUB: Beacon 230 & 115 (AVA)				
College and Walnut - Westside 115 kV (Fort Wright - Westside)	**108.8**	**105.4**	**104.2**	**103.4**
Francis & Cedar - Northwest 115 kV	**129.4**	**126.2**		
Francis & Cedar - Ross Park 115 kV (Francis & Cedar - Lyons and Standard)			**110.9**	**109.6**
Northwest - Westside 115 kV	**122.5**	**120**		
Sunset - Westside 115kV (Garden Spring - Spokane Waste-To-Energy Tap)	98.2	95.8	96.2	95.6
SUB: Bell 500, 230 & 115 (BPA)				
Boulder - Trentwood 115 kV (Boulder - Spokane Industrial Park)		**101.1**		**109.4**

Table 37: 2028 Heavy Summer Results

5.2. 2028 Heavy Winter Results

	HW_BASE	HW_IRV_TRNT	HW_HLD	HW_COMP
P2				
BF: A600 Beacon North & South 115 kV				
Northwest - Westside 115 kV	**104.6**	**105**		
BF: R427 Beacon North & South 230 kV				
BELL S2 (40088) -> BELL BPA (40087) CKT 6 at BELL S2	**101.1**	97.9	99.9	
P6				
N-1: Beacon - Bell #1 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Northeast 115 kV	**112.4**			
N-1: Beacon - Northeast 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**145.7**			
N-1: Bell - Northeast 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**109.2**			
T-1: Beacon #1 230/115 kV + T-1: Beacon #2 230/115 kV				
BELL S2 (40088) -> BELL BPA (40087) CKT 6 at BELL S2	95.1			
T-1: Beacon #1 230/115 kV + T-1: Bell #6 230/115 kV				
Beacon #2 230/115 kV	98.4			
T-1: Beacon #2 230/115 kV + T-1: Bell #6 230/115 kV				
Beacon #1 230/115 kV	**110.8**	**104**	**104.9**	
A6				
N-1: Addy - Bell 115 kV Open @ ADD + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	97.6			
N-1: Airway Heights - Devils Gap 115 kV Open @ DGP + N-1: Sunset - Westside 115 kV Open @ WES				
Metro - Sunset 115 kV	**100.8**	**101.2**	99.4	
N-1: Bell - Northeast 115 kV Open @ BEL + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**109**			
N-1: Bell - Northeast 115 kV Open @ NE + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**125.8**			
N-1: College & Walnut - Westside 115 kV + N-1: Sunset - Westside 115 kV Open @ WES				
Northwest - Westside 115 kV	99.9	**100.7**		
Ross Park - Third and Hatch 115 kV		95.6	95.8	
N-1: College & Walnut - Westside 115 kV Open @ C&W + N-1: Sunset - Westside 115 kV Open @ WES				
Northwest - Westside 115 kV	95.5	96.3		
Ross Park - Third and Hatch 115 kV		95.1		
N-1: College & Walnut - Westside 115 kV Open @ WES + N-1: Sunset - Westside 115 kV				
Northwest - Westside 115 kV	95.7	96.5		
N-1: College & Walnut - Westside 115 kV Open @ WES + N-1: Sunset - Westside 115 kV Open @ WES				
Metro - Third and Hatch 115 kV	95	95.2	96.6	
Northwest - Westside 115 kV	**102.3**	**103.1**		
Ross Park - Third and Hatch 115 kV	**101.7**	**102.8**	**103.7**	
N-1: Francis & Cedar - Ross Park 115 kV Open @ ROS + N-1: Northwest - Westside 115 kV				
Beacon - Francis & Cedar 115 kV (Bell Tap -Waikiki)	95.8	95.8		
A7				
G-1: Long Lake Hydro Units 1-4 + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	95.5	95.9		
N-1: 3TM Bell - Boundary #3 230 kV + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	97.8	98.3		
N-1: 3TM Bell - Boundary #3 230 kV Open @ BOUN + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	95.3	95.8		
N-1: Addy - Bell 115 kV Open @ BELL + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV		95.2		

	HW_BASE	HW_IRV_TRNT	HW_HLD	HW_COMP
N-1: Addy - Devils Gap 115 kV + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	96.4	96.8		
N-1: Addy - Devils Gap 115 kV Open @ ADD + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	**103.3**	**103.7**		
N-1: Addy - Devils Gap 115 kV Open @ DGP + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	96.4	96.8		
N-1: Airway Heights - Devils Gap 115 kV Open @ DGP + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV		95.3		
N-1: Beacon - Francis & Cedar 115 kV + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	**105.8**	**106.2**		
N-1: Beacon - Ninth & Central #1 115 kV + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	**103.8**	**104.4**		
N-1: Beacon - Ninth & Central #2 115 kV + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	**103.5**	**104.1**		
N-1: Beacon - Ross Park 115 kV + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Francis & Cedar 115 kV (Bell Tap -Waikiki)	95.8	96.1		
Beacon - Ninth and Central #2 115 kV	97	98.3		
Ninth and Central - Third and Hatch 115 kV (Latah Tap - Third and Hatch)	**111.1**	**110.9**		
N-1: Bell - Northeast 115 kV + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	96.3	96.4		
N-1: Devils Gap - Nine Mile 115 kV + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	95.3	95.7		
N-1: Nine Mile - Westside 115 kV + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	95.3	95.7		
N-1: Nine Mile - Westside 115 kV Open @ NMS + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	97.3	97.7		
N-1: Nine Mile - Westside 115 kV Open @ WES + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	96.3	96.7		
N-1: Ninth & Central - Opportunity 115 kV Open @ OPT + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	96.4	96.3		
N-1: Ninth & Central - Sunset 115 kV + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	**100**	**100.4**		
Metro - Third and Hatch 115 kV	**104.5**	**104.3**		
N-1: Ninth & Central - Sunset 115 kV Open @ 9CE + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	**111.7**	**112**		
Metro - Sunset 115 kV	98.2	98.1		
Metro - Third and Hatch 115 kV	**126.4**	**126.2**	**112.8**	
N-1: Ninth & Central - Sunset 115 kV Open @ SUN + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	**102.9**	**103.2**		
Metro - Third and Hatch 115 kV	**103.3**	**103.1**		
N-1: Ninth & Central - Third & Hatch 115 kV + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	**112**	**112.2**		
Ross Park - Third and Hatch 115 kV	**104.1**	**104.3**	98.3	
N-2: Bell - Boundary #3 230 kV & Addy - Bell 115 kV + N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV				
Beacon - Ross Park 115 kV	95.9	96.2		
N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV + N-1: Benewah - Latah Jct 115 kV Open @ BEN				

	HW_BASE	HW_IRV_TRNT	HW_HLD	HW_COMP
Beacon - Ross Park 115 kV		95.3		
N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV + T-1: Addy #3 230/115 kV				
Beacon - Ross Park 115 kV	98.4	98.8		
N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV + T-1: Beacon #1 230/115 kV				
Beacon #2 230/115 kV	97.8	98.2		
BELL S2 (40088) -> BELL BPA (40087) CKT 6 at BELL S2			**101**	
N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV + T-1: Beacon #2 230/115 kV				
Beacon #1 230/115 kV	**110**	**110.5**	**105.6**	
BELL S2 (40088) -> BELL BPA (40087) CKT 6 at BELL S2			**100.9**	
N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV + T-1: Bell #6 230/115 kV				
Beacon - Ross Park 115 kV			95.1	
Beacon #1 230/115 kV	**105.9**	**102.3**	**106.1**	
N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV + T-1: Little Falls #1 115/4 kV				
Beacon - Ross Park 115 kV		95.3		
N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV + T-1: Nine Mile #1 115/13.8 kV				
Beacon - Ross Park 115 kV	95.1	95.5		
SSEE-2b				
N-2 (ROW): Bell - Westside 230 kV and Coulee - Westside 230 kV and Nine Mile - Westside 115 kV				
Beacon - Ross Park 115 kV	95.3	95.7		
NA				
RES: N-2 (ROW): Bell - Westside 230 kV and Coulee - Westside 230 kV and Nine Mile - Westside 115 kV				
Beacon - Ross Park 115 kV	96.3	96.7		
SSEE-2c				
SUB: Beacon 230 & 115 (AVA)				
Northwest - Westside 115 kV	**109.6**	**107.6**		

Table 38: 2028 Heavy Winter Results

5.3. 2028 Heavy Spring Results

	HSP_BASE	HSP_IRV_TRNT	HSP_HLD	HSP_COMP
P6				
N-1: Airway Heights - Devils Gap 115 kV + N-1: Highland – Nine Mile 115 kV				
Addy - Devils Gap 115 kV (Devils Gap - Long Lake Tap)			112.4	112.4
N-1: Airway Heights - Devils Gap 115 kV + N-1: Nine Mile - Westside 115 kV				
Addy - Devils Gap 115 kV (Devils Gap - Long Lake Tap)	112.4	112.4		
N-1: Beacon - Bell #1 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Northeast 115 kV	116.9			
Bell - Northeast 115 kV (Waikiki Tap - Northeast)	99.7			
N-1: Beacon - Northeast 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	150.1			
N-1: Bell - Northeast 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	119.4			
A6				
N-1: Addy - Bell 115 kV Open @ ADD + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	108.7			
N-1: Airway Heights - Devils Gap 115 kV + N-1: Highland - Nine Mile 115 kV Open @ NM				
Addy - Devils Gap 115 kV (Devils Gap - Long Lake Tap)			112.4	112.4
N-1: Airway Heights - Devils Gap 115 kV + N-1: Highland - Nine Mile 115 kV Open @ WAK				
Addy - Devils Gap 115 kV (Devils Gap - Long Lake Tap)			106.4	106.4
N-1: Airway Heights - Devils Gap 115 kV + N-1: Nine Mile - Westside 115 kV Open @ NMS				
Addy - Devils Gap 115 kV (Devils Gap - Long Lake Tap)	112.4	112.4	112.4	112.4
N-1: Airway Heights - Devils Gap 115 kV + N-1: Nine Mile - Westside 115 kV Open @ WES				
Addy - Devils Gap 115 kV (Devils Gap - Long Lake Tap)	106.4	106.4		
N-1: Airway Heights - Devils Gap 115 kV Open @ AIR + N-1: Highland - Nine Mile 115 kV				
Addy - Devils Gap 115 kV (Devils Gap - Long Lake Tap)			103.1	103.1
N-1: Airway Heights - Devils Gap 115 kV Open @ AIR + N-1: Highland - Nine Mile 115 kV Open @ NM				
Addy - Devils Gap 115 kV (Devils Gap - Long Lake Tap)			103.1	103.1
N-1: Airway Heights - Devils Gap 115 kV Open @ AIR + N-1: Highland - Nine Mile 115 kV Open @ WAK				
Addy - Devils Gap 115 kV (Devils Gap - Long Lake Tap)			97.1	97.1
N-1: Airway Heights - Devils Gap 115 kV Open @ AIR + N-1: Nine Mile - Westside 115 kV				
Addy - Devils Gap 115 kV (Devils Gap - Long Lake Tap)	103.1	103.1		
N-1: Airway Heights - Devils Gap 115 kV Open @ AIR + N-1: Nine Mile - Westside 115 kV Open @ NMS				
Addy - Devils Gap 115 kV (Devils Gap - Long Lake Tap)	103.1	103.1	103.1	103.1
N-1: Airway Heights - Devils Gap 115 kV Open @ AIR + N-1: Nine Mile - Westside 115 kV Open @ WES				
Addy - Devils Gap 115 kV (Devils Gap - Long Lake Tap)	97.1	97.1		
N-1: Airway Heights - Devils Gap 115 kV Open @ DGP + N-1: Highland - Nine Mile 115 kV				
Addy - Devils Gap 115 kV (Devils Gap - Long Lake Tap)			112.4	112.4
N-1: Airway Heights - Devils Gap 115 kV Open @ DGP + N-1: Highland - Nine Mile 115 kV Open @ NM				
Addy - Devils Gap 115 kV (Devils Gap - Long Lake Tap)			112.4	112.4
N-1: Airway Heights - Devils Gap 115 kV Open @ DGP + N-1: Highland - Nine Mile 115 kV Open @ WAK				
Addy - Devils Gap 115 kV (Devils Gap - Long Lake Tap)			106.4	106.4
N-1: Airway Heights - Devils Gap 115 kV Open @ DGP + N-1: Nine Mile - Westside 115 kV				
Addy - Devils Gap 115 kV (Devils Gap - Long Lake Tap)	112.4	112.4		
N-1: Airway Heights - Devils Gap 115 kV Open @ DGP + N-1: Nine Mile - Westside 115 kV Open @ NMS				
Addy - Devils Gap 115 kV (Devils Gap - Long Lake Tap)	112.4	112.4	112.4	112.4

	HSP_BASE	HSP_IRV_TRNT	HSP_HLD	HSP_COMP
N-1: Airway Heights - Devils Gap 115 kV Open @ DGP + N-1: Nine Mile - Westside 115 kV Open @ WES				
Addy - Devils Gap 115 kV (Devils Gap - Long Lake Tap)	**106.4**	**106.4**		
N-1: Bell - Northeast 115 kV Open @ BEL + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**119.2**			
N-1: Bell - Northeast 115 kV Open @ NE + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**133.5**			
A7				
N-1: Bell - Lancaster 230 kV + N-2: Beacon - Rathdrum 230 kV & Boulder - Lancaster 230 kV				
Boulder - Rathdrum 115kV (Boulder - Moab)	**108.9**	**110.8**	**108.7**	**110.6**
Boulder - Rathdrum 115kV (Idaho Rd - Rathdrum)	99.8	**101.2**	99.6	**101**
Boulder - Rathdrum 115kV (Moab - Pleasant)	**112.4**	**114.3**	**112.1**	**114**
Boulder - Rathdrum 115kV (Pleasant - Idaho Rd)	**121.1**	**123**	**120.9**	**122.7**
N-1: Post Falls - Ramsey 115 kV + N-2: Beacon - Rathdrum 230 kV & Boulder - Lancaster 230 kV				
Boulder - Rathdrum 115kV (Pleasant - Idaho Rd)	95.3	97.7		97.3
N-1: Post Falls - Ramsey 115 kV Open @ RAM + N-2: Beacon - Rathdrum 230 kV & Boulder - Lancaster 230 kV				
Boulder - Rathdrum 115kV (Pleasant - Idaho Rd)	97.8	**100**	97.3	99.6

Table 39: 2028 Heavy Spring Results

5.4. 2033 Heavy Summer Results

	HS_BASE	HS_IRV_TRNT	HS_HLD	HS_COMP
P1				
T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**101.9**			
Northwest - Westside 115 kV				
P2				
BF: A370 Bell S1 & S2 230 kV				
Beacon - Bell #1 115 kV	99.8			
BF: A388 Bell S2 & S3 230 kV				
Francis & Cedar - Northwest 115 kV	96.1			
Northwest - Westside 115 kV	97.4	95.1		
BF: A600 Beacon North & South 115 kV				
Francis & Cedar - Northwest 115 kV	**114.3**	**114.6**		
Northwest - Westside 115 kV	**111.8**	**112.1**		
BF: R427 Beacon North & South 230 kV				
Bell - Northeast 115 kV (Bell - Waikiki Tap)	**102.2**	**109.3**		
BELL S2 (40088) -> BELL BPA (40087) CKT 6 at BELL S2	**102**	98.9	98.3	96.1
Francis & Cedar - Northwest 115 kV	**113.2**	**114.1**		
Northwest - Westside 115 kV	**110.8**	**111.5**		
BUS: Bell S2 230 kV				
Beacon - Bell #1 115 kV	**100.6**			
P6				
N-1: 3TM Bell - Boundary #3 230 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**113.7**			
Beacon - Northeast 115 kV	**103.6**			
N-1: Beacon - Bell #1 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Northeast 115 kV	**164.1**			
Bell - Northeast 115 kV (Bell - Waikiki Tap)	**103.3**			
Bell - Northeast 115 kV (Waikiki Tap - Northeast)	**132**			
N-1: Beacon - Bell #4 230 kV + N-1: Beacon - Bell #5 230 kV				
Francis & Cedar - Northwest 115 kV	**100.1**	**100.8**		
Northwest - Westside 115 kV	**100.1**	**100.7**		
N-1: Beacon - Bell #4 230 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**100.3**			
Francis & Cedar - Northwest 115 kV	95.8			
Northwest - Westside 115 kV	96.9			
N-1: Beacon - Bell #5 230 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**100.2**			
Francis & Cedar - Northwest 115 kV	96.2			
Northwest - Westside 115 kV	97.3	95.5		
N-1: Beacon - Boulder 230 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**101.8**			
N-1: Beacon - Francis & Cedar 115 kV + N-1: Northwest - Westside 115 kV				
Francis & Cedar - Ross Park 115 kV (Lyons and Standard - Ross Park)	**105.4**	**105.4**		
N-1: Beacon - Francis & Cedar 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**101.9**			
N-1: Beacon - Irvin #1 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**102**			
Northwest - Westside 115 kV				
N-1: Beacon - Irvin #2 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**102.9**			
N-1: Beacon - Ninth & Central #1 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**102**			
N-1: Beacon - Ninth & Central #2 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**102.2**			
N-1: Beacon - Northeast 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**211.3**		97.7	

	HS_BASE	HS_IRV_TRNT	HS_HLD	HS_COMP
N-1: Beacon - Ross Park 115 kV + N-1: Bell - Northeast 115 kV				
Northwest - Westside 115 kV	95.1	95.6		
N-1: Beacon - Ross Park 115 kV + N-1: College & Walnut - Westside 115 kV				
Francis & Cedar - Northwest 115 kV	97.8	98.5		
Northwest - Westside 115 kV	98.3	98.8		
N-1: Beacon - Ross Park 115 kV + N-1: Northwest - Westside 115 kV				
Beacon - Francis & Cedar 115 kV (Bell Tap -Waikiki)	95.6	95.7		
N-1: Beacon - Ross Park 115 kV + N-1: Ross Park - Third & Hatch 115 kV				
Francis & Cedar - Northwest 115 kV		95.2		
Northwest - Westside 115 kV	96.7	96.8		
N-1: Beacon - Ross Park 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**102.3**			
Francis & Cedar - Northwest 115 kV	95.4			
Northwest - Westside 115 kV	96.6	95.4		
N-1: Bell - Creston 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**113.3**			
Beacon - Northeast 115 kV	**103.2**			
N-1: Bell - Lancaster 230 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**101.9**			
N-1: Bell - Northeast 115 kV + N-1: College & Walnut - Westside 115 kV				
Francis & Cedar - Northwest 115 kV		95.6		
Northwest - Westside 115 kV	96.1	96.6		
N-1: Bell - Northeast 115 kV + T-1: Beacon #1 230/115 kV				
Northwest - Westside 115 kV		95.4		
N-1: Bell - Northeast 115 kV + T-1: Beacon #2 230/115 kV				
Northwest - Westside 115 kV		95.3		
N-1: Bell - Northeast 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**142.9**			
Northwest - Westside 115 kV	96.1			
N-1: Bell - Taft 500 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**101.6**			
N-1: College & Walnut - Post Street 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**101.8**			
N-1: College & Walnut - Westside 115 kV + N-1: Garden Springs - Westside 115kV				
Francis & Cedar - Northwest 115 kV	**102.7**	**103.5**		
Northwest - Westside 115 kV	**101.8**	**102.4**		
N-1: College & Walnut - Westside 115 kV + T-1: Beacon #1 230/115 kV				
Francis & Cedar - Northwest 115 kV	96.9	97.6		
Northwest - Westside 115 kV	97.5	98		
N-1: College & Walnut - Westside 115 kV + T-1: Beacon #2 230/115 kV				
Francis & Cedar - Northwest 115 kV	96.8	97.5		
Northwest - Westside 115 kV	97.4	97.9		
N-1: College & Walnut - Westside 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**101.8**			
Francis & Cedar - Northwest 115 kV	**104.7**	**102.4**		
Northwest - Westside 115 kV	**103.9**	**102**		
N-1: Francis & Cedar - Northwest 115 kV + N-1: Garden Springs - Westside 115kV				
College and Walnut - Westside 115 kV (Fort Wright - Westside)	95.5	96.2		
N-1: Francis & Cedar - Northwest 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**100.5**			
N-1: Francis & Cedar - Ross Park 115 kV + N-1: Northwest - Westside 115 kV				
Beacon - Francis & Cedar 115 kV (Bell Tap -Waikiki)	**121.2**	**121.2**		

	HS_BASE	HS_IRV_TRNT	HS_HLD	HS_COMP
N-1: Francis & Cedar - Ross Park 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	102.2			
N-1: Nine Mile - Westside 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	101.1			
N-1: Ninth & Central - Opportunity 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	102.6			
N-1: Ninth & Central - Sunset 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	102.8			
N-1: Ninth & Central - Third & Hatch 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	102			
N-1: Northwest - Westside 115 kV + N-1: Francis & Cedar - Highland 115 kV				
Francis & Cedar - Ross Park 115 kV (Lyons and Standard - Ross Park)			105.4	105.4
N-1: Northwest - Westside 115 kV + N-1: Garden Springs - Westside 115kV				
College and Walnut - Westside 115 kV (Fort Wright - Westside)	104	104.7		
N-1: Northwest - Westside 115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	100.2			
College and Walnut - Westside 115 kV (Fort Wright - Westside)	95.6			
T-1: Addy #3 230/115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	115.9			
Beacon - Northeast 115 kV	105.4			
T-1: Beacon #1 230/115 kV + T-1: Beacon #2 230/115 kV				
Bell - Northeast 115 kV (Bell - Waikiki Tap)		105.5		
BELL S2 (40088) -> BELL BPA (40087) CKT 6 at BELL S2	95.8			
Francis & Cedar - Northwest 115 kV	105.4	106.2		
Northwest - Westside 115 kV	104.5	105.2		
T-1: Beacon #1 230/115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	98.8			
Beacon #2 230/115 kV	108.2	101.4	100.6	96.9
Boulder – Trentwood 115kV (Boulder – Spokane Industrial Park)		95.8		
Francis & Cedar - Northwest 115 kV	107.1	102.5		
Northwest - Westside 115 kV	106	102.3		
T-1: Beacon #2 230/115 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	97.7			
Beacon #1 230/115 kV	110.5	103.6	102.8	99.1
Boulder – Trentwood 115kV (Boulder – Spokane Industrial Park)		95.9		
Francis & Cedar - Northwest 115 kV	107.1	102.4		
Northwest - Westside 115 kV	106	102.2		
T-1: Bell #1 500/230 kV + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	98.3			
T-1: Bell #6 230/115 kV + N-1: Bell - Bluebird 230 kV				
Beacon - Bell #1 115 kV	101.8			
T-1: Bell #6 230/115 kV + N-1: Bluebird - Coulee 230 kV				
Beacon - Bell #1 115 kV	100.2			
T-1: Bell #6 230/115 kV + N-1: Garden Springs - Westside 115kV				
Beacon - Bell #1 115 kV	101.6			
Francis & Cedar - Northwest 115 kV	96.9			
Northwest - Westside 115 kV	97.7	95.9		
T-1: Bell #6 230/115 kV + N-1: Irvin - Trentwood 115 kV				
Beacon - Bell #1 115 kV		101.9		
A6				
N-1: 3TM Bell - Boundary #1 230 kV Open @ BELL + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	99.8			

	HS_BASE	HS_IRV_TRNT	HS_HLD	HS_COMP
N-1: 3TM Bell - Boundary #1 230 kV Open @ BOUN + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	98.4			
N-1: Addy - Bell 115 kV Open @ ADD + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**140.8**			
Beacon - Northeast 115 kV	**126.1**			
Francis & Cedar - Northwest 115 kV				
Northwest - Westside 115 kV	96.3			
N-1: Addy - Devils Gap 115 kV Open @ ADD + N-1: Garden Springs - Melville 115kV Open @ GDN				
Airway Heights - Garden Springs 115kV (FLN-GDN)			95.5	
N-1: Airway Heights - Devils Gap 115 kV Open @ AIR + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**100.5**			
Northwest - Westside 115 kV			95.8	
N-1: Appleway - Rathdrum 115 kV Open @ RAT + N-1: Ramsey - Rathdrum #1 115 kV Open @ RAT				
Coeur dAlene 15th Street - Dalton 115kV	99.5	**100.2**	99.4	**100.1**
N-1: Beacon - Ross Park 115 kV + N-1: College & Walnut - Westside 115 kV Open @ C&W				
Northwest - Westside 115 kV		95.1		
N-1: Beacon - Ross Park 115 kV + N-1: College & Walnut - Westside 115 kV Open @ WES				
Francis & Cedar - Northwest 115 kV	**101**	**101.6**		
Northwest - Westside 115 kV	**100.9**	**101.4**		
N-1: Bell - Northeast 115 kV + N-1: College & Walnut - Westside 115 kV Open @ WES				
Francis & Cedar - Northwest 115 kV	96.9	97.6		
Northwest - Westside 115 kV	97.7	98.3		
N-1: Boulder - Otis Orchards #2 115 kV + N-1: Post Falls - Ramsey 115 kV Open @ RAM				
Boulder - Otis Orchards #1 115kV (Boulder - Barker Road)		95.5		95.2
N-1: College & Walnut - Westside 115 kV + N-1: Garden Springs - Westside 115kV Open @ GDN				
Francis & Cedar - Northwest 115 kV	**106.5**	**107.3**		
Northwest - Westside 115 kV	**104.8**	**105.5**		
N-1: College & Walnut - Westside 115 kV + N-1: Garden Springs - Westside 115kV Open @ WEST				
Francis & Cedar - Northwest 115 kV	**101.8**	**102.6**		
Northwest - Westside 115 kV	**101.1**	**101.7**		
N-1: College & Walnut - Westside 115 kV Open @ C&W + N-1: Garden Springs - Westside 115kV				
Francis & Cedar - Northwest 115 kV	95.8	96.6		
Northwest - Westside 115 kV	96.3	96.9		
N-1: College & Walnut - Westside 115 kV Open @ C&W + N-1: Garden Springs - Westside 115kV Open @ GDN				
Francis & Cedar - Northwest 115 kV	99.6	**100.4**		
Northwest - Westside 115 kV	99.3	99.9		
N-1: College & Walnut - Westside 115 kV Open @ C&W + N-1: Garden Springs - Westside 115kV Open @ WEST				
Francis & Cedar - Northwest 115 kV		95.7		
Northwest - Westside 115 kV	95.6	96.2		
N-1: College & Walnut - Westside 115 kV Open @ C&W + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	**101.5**			
Francis & Cedar - Northwest 115 kV	99.6	97.3	**102.7**	
Northwest - Westside 115 kV	99.8	97.9	**102.4**	
N-1: College & Walnut - Westside 115 kV Open @ WES + N-1: Garden Springs - Westside 115kV				
Francis & Cedar - Northwest 115 kV	**105.5**	**106.3**		
Northwest - Westside 115 kV	**104.2**	**104.8**		
N-1: College & Walnut - Westside 115 kV Open @ WES + N-1: Garden Springs - Westside 115kV Open @ GDN				
Francis & Cedar - Northwest 115 kV	**109.3**	**110.1**		
Northwest - Westside 115 kV	**107.2**	**107.8**		

	HS_BASE	HS_IRV_TRNT	HS_HLD	HS_COMP
N-1: College & Walnut - Westside 115 kV Open @ WES + N-1: Garden Springs - Westside 115kV Open @ WEST				
Francis & Cedar - Northwest 115 kV	104.6	105.4		
Northwest - Westside 115 kV	103.5	104.1		
N-1: College & Walnut - Westside 115 kV Open @ WES + N-1: Metro - Sunset 115 kV				
Francis & Cedar - Northwest 115 kV	96.1	96.8		
Northwest - Westside 115 kV	96.9	97.5		
N-1: College & Walnut - Westside 115 kV Open @ WES + T-1: Beacon #1 230/115 kV				
Francis & Cedar - Northwest 115 kV	99.2	99.9		
Northwest - Westside 115 kV	99.3	99.9		
N-1: College & Walnut - Westside 115 kV Open @ WES + T-1: Beacon #2 230/115 kV				
Francis & Cedar - Northwest 115 kV	99.1	99.8		
Northwest - Westside 115 kV	99.3	99.8		
N-1: College & Walnut - Westside 115 kV Open @ WES + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	101.4			
Francis & Cedar - Northwest 115 kV	106.9	104.6	109.6	99.2
Northwest - Westside 115 kV	105.7	103.8	108	99.5
N-1: Dalton - Rathdrum 115 kV + N-1: Ramsey - Rathdrum #1 115 kV Open @ RAT				
Appleway - Rathdrum 115 kV (Avondale - Rathdrum)	95.4	96	95.3	95.9
N-1: Francis & Cedar - Northwest 115 kV + N-1: Francis & Cedar - Ross Park 115 kV Open @ ROS				
Beacon - Francis & Cedar 115 kV (Beacon - Bell Tap)	105.5	105.5		
Beacon - Francis & Cedar 115 kV (Bell Tap -Waikiki)	136.1	136.1		
N-1: Francis & Cedar - Northwest 115 kV + N-1: Garden Springs - Westside 115kV Open @ GDN				
College and Walnut - Westside 115 kV (Fort Wright - Westside)	98.7	99.3		
N-1: Francis & Cedar - Ross Park 115 kV Open @ F&C + N-1: Northwest - Westside 115 kV				
Beacon - Francis & Cedar 115 kV (Bell Tap -Waikiki)	121.5	121.5		
N-1: Francis & Cedar - Ross Park 115 kV Open @ F&C + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	101.6			
N-1: Francis & Cedar - Ross Park 115 kV Open @ ROS + N-1: Northwest - Westside 115 kV				
Beacon - Francis & Cedar 115 kV (Beacon - Bell Tap)	143.4	143.4		
Beacon - Francis & Cedar 115 kV (Bell Tap -Waikiki)	184.9	184.9		
Beacon - Francis & Cedar 115 kV (Francis & Cedar - Waikiki)	110.8	110.8		
Bell - Francis & Cedar 115 kV (Francis & Cedar - Waikiki)				105.5
FRANCEDR (48127)	0.941	0.941		
LYONSTND (48219)	0.9387	0.9387		
Northwes (48279)	0.9388	0.9389		
N-1: Francis & Cedar - Ross Park 115 kV Open @ ROS + T-1: Bell #6 230/115 kV				
Beacon - Bell #1 115 kV	101.7			
Francis & Cedar - Northwest 115 kV			103.9	
Northwest - Westside 115 kV			103.8	
T-1: Bell #6 230/115 kV + N-1: Garden Springs - Westside 115kV Open @ GDN				
Beacon - Bell #1 115 kV	101.8			
Francis & Cedar - Northwest 115 kV	99.8	97.6	103.6	
Northwest - Westside 115 kV	100	98.2	103.1	
T-1: Bell #6 230/115 kV + N-1: Garden Springs - Westside 115kV Open @ WEST				
Beacon - Bell #1 115 kV	101.9			
Francis & Cedar - Northwest 115 kV	96.6		100.5	
Northwest - Westside 115 kV	97.4	95.6	100.7	
A7				
N-1: Boulder - Irvin #2 115 kV + N-2: Boulder - Otis Orchards #1 115 kV & Boulder - Otis Orchards #2 115 kV				
Boulder - Irvin #1 115 kV (Boulder - Spokane Industrial Park)		96.6		95.6

	HS_BASE	HS_IRV_TRNT	HS_HLD	HS_COMP
N-2: Bell - Westside 230 kV & Coulee - Westside 230 kV + T-1: Beacon #2 230/115 kV				
Beacon #1 230/115 kV	98.3	98.7	96.1	96.3
SSEE-2b				
N-2 (ROW): Bell - Taft 500 kV and Bell - Lancaster 230 kV and Beacon - Rathdrum 230 kV and Boulder - Lancaster 230 kV				
Boulder - Rathdrum 115kV (Pleasant - Idaho Rd)	98.9	**100.3**	98.6	**100**
N-2 (ROW): College & Walnut - Westside 115kV and Garden Springs - Westside 115kV				
Francis & Cedar - Northwest 115 kV	**102.7**	**103.5**		
Northwest - Westside 115 kV	**101.8**	**102.4**		
SSEE-2c				
SUB: Beacon 230 & 115 (AVA)				
Francis & Cedar - Northwest 115 kV	**120**	**117.8**		
Northwest - Westside 115 kV	**116.4**	**114.7**		
SUB: Bell 500, 230 & 115 (BPA)				
Francis & Cedar - Northwest 115 kV	**103**	**118.9**		
Northwest - Westside 115 kV	**102.4**	**115.3**		

Table 40: 2033 Heavy Summer Results

6. Stakeholder Acknowledgment

The Avista stakeholders listed in Table 41 have acknowledged they were informed and consulted during the development of the proposed project.

Function	Name	Date
Substation Engineering	Brian Chain	1/26/2024
Transmission Engineering	Ken Sweigart	1/26/2024
Distribution Engineering	Cesar Godinez	1/26/2024
Protection Engineering	Kevin Damron	1/26/2024
Project Delivery	Katie Prugh	1/26/2024
SCADA/EMS	Craig Figart	1/26/2024
Transmission Operations	Rich Hydzik	11/7/2023
Distribution Operations	N/A	
Network Engineering	Mike Lang	11/7/2023

Table 41: Avista Stakeholder Acknowledgement