



Alberta Electric System Operator

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Conceptual System Plan

Cluster 2

Grid Planning & System Projects

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1. Introduction

The AESO developed this conceptual system plan to help market participants understand the transmission system developments under consideration for the purpose of accommodating the Cluster 2 project intake. This is not an exhaustive list of all projects – the AESO is pursuing projects not discussed herein for various reasons, and they are discussed in the 2025 Long-Term Transmission Plan.

With recent changes to the Transmission Regulation, the AESO's grid planning approach is shifting from pursuing a congestion-free grid to implementing transmission upgrades when the benefits outweigh the costs, or when they are required by reliability standards or legislation. Congestion may be present on the grid when it is more economically efficient than adding transmission capacity. Generators may experience curtailment, depending on their location and system conditions.

The purpose of the developments identified in this conceptual system plan is not to accommodate all Cluster 2 projects with no congestion, but to support the reliability and affordability of the Alberta Interconnected Electric System (AIES) while providing a reasonable opportunity for new projects to access the system.

We considered options such as adding new transmission lines, increasing the capability of existing transmission lines, and optimizing network topology when developing this conceptual system plan. We have provided descriptions and rationale for projects that could potentially be justified under the Optimal Transmission Planning framework, on the basis that they might:

- Be required to comply with Alberta Reliability Standards (ARS)
- Have benefits exceeding their costs

On this basis, developments aligned with the Long-Term Transmission Plan (LTP) and the Long-Term Outlook (LTO) were prioritized.

We have not completed the economic or engineering analysis that would be required to confirm the need for projects presented herein. At this stage, we are merely presenting reasonable options to progress further through the analytical framework of Optimal Transmission Planning. Whether the projects ultimately come to fruition depends on:

- The outcome of further engineering and economic analysis.
- Which customer projects progress further through the connection process, and when.

Project developers should not assume or rely on the eventual construction of the potential projects presented herein when making commercial decisions.

2. Conceptual System Plan

2.1 Fox Creek Reinforcement

2.1.1 Development Plan

Add a 240 kV line connecting Little Smoky 813S – Fox Creek 741S – Bickerdike 39S. It could be single-circuit or double-circuit.

2.1.2 Purpose

The addition of the 240 kV path from Little Smoky to Bickerdike relieves loading on the existing Fox Creek path and reinforces the overall 240 kV backbone in the Northwest region by forming a loop. With increasing generation development interest, the upper Northwest region could become a new generation center, resulting in substantial changes to power flow patterns, including on the Fox Creek path. This development could significantly enhance capacity and reliability, better supporting the region's energy needs.

2.2 Grande Prairie Reinforcement

2.2.1 Development Plan

Add a double-circuit 240kV line connecting Little Smoky 813S – Big Mountain 845S – Dobbs 2061S (Dobbs 2061S is under construction).

2.2.2 Purpose

This 240 kV line would both increase inflow or outflow capacity for the Grande Prairie area and reinforce the existing Grande Prairie 144 kV loop, limiting the amount of load on radial during outages. This enhancement could alleviate projected constraints, increase capacity to accommodate customer projects, and improve system resiliency.

2.3 Central East Transfer-Out (CETO) Conductor Rating Increase

2.3.1 Development Plan

Increase the rating of CETO (double-circuit 240 kV transmission line connecting Gaetz 87S and Tinchebray 972S) by using conductors with higher thermal ratings. (This project is underway: CETO is under construction, and it will have higher ratings.)

2.3.2 Purpose

CETO is designed to increase the system's capacity to transfer power out of the Central East region, reduce operational complexity (by reducing reliance on RAS), and facilitate generator connections. Higher ratings provide additional flexibility, adding capacity for generation growth in the region.

2.4 Calgary South Transmission Reinforcement

2.4.1 Development Plan

Add a double-circuit 240 kV line connecting Sarcee 42S and SS-65.

2.4.2 Purpose

The new circuit creates a 240 kV loop in South Calgary. Reinforcing the 240 kV backbone around South Calgary can alleviate overloads caused by increasing inflows from renewable generators in the South while enabling growth in Calgary.

2.5 Southwest Transmission Development (SWTD)

2.5.1 Development Plan

Add a 500 kV line connecting Bennett 520S – Milo 356S – Newell 2075S. Alternatives may include:

- Double-circuit 500 kV
- Double-circuit 240 kV

2.5.2 Purpose

This development supports renewable generator development in the South by strengthening the connection between EATL and WATL, mitigating the heavy loading of 924L/927L and significantly increasing overall transfer capability. It can increase the potential utilization of EATL and WATL and improve system resiliency.

2.6 Southeast Transmission Development (SETD)

2.6.1 Development Plan

Add a double-circuit 240 kV line from Whitla 251S to Newell 2075S. Additional project elements may include:

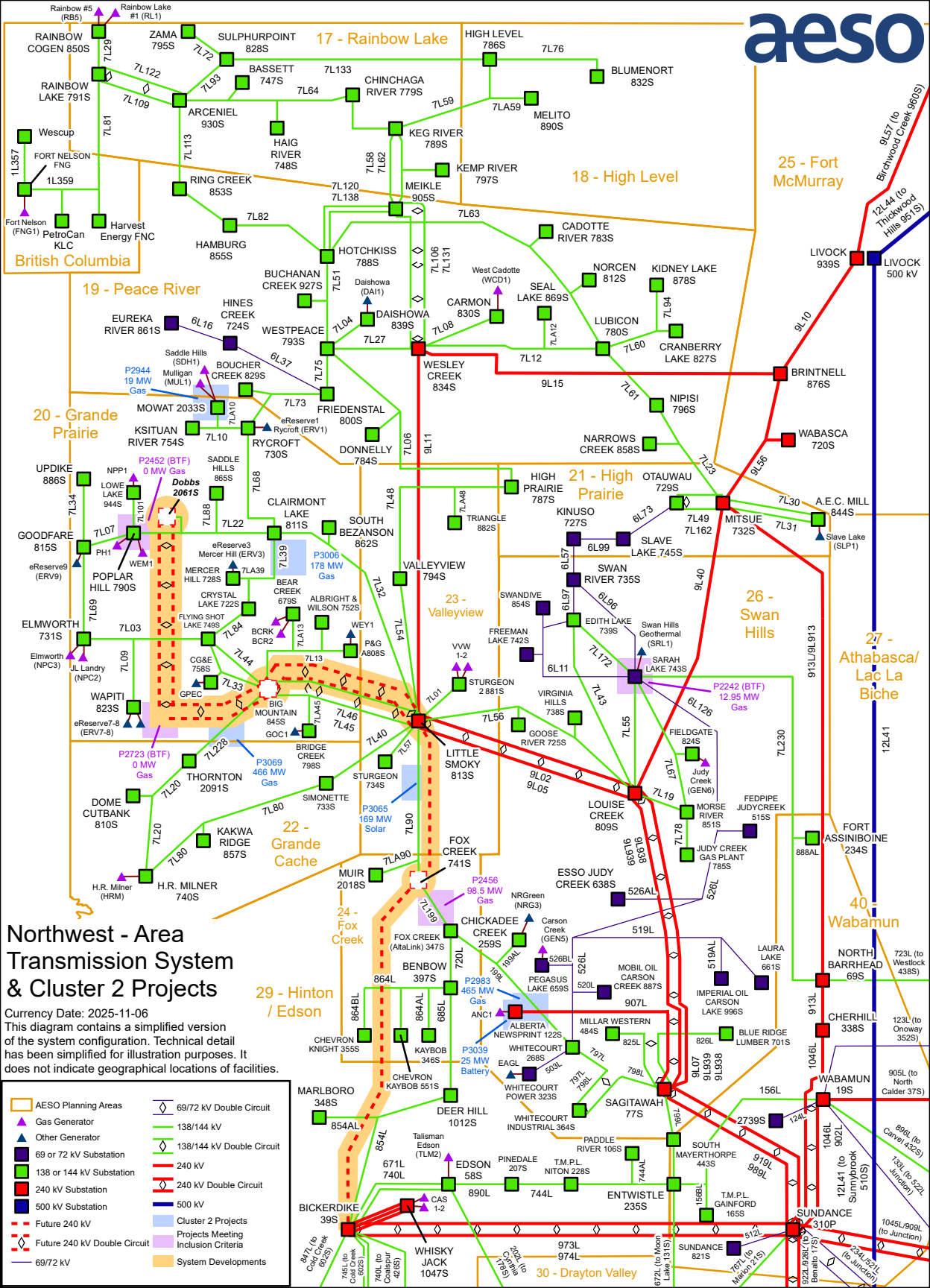
- A synchronous condenser or grid-forming battery energy storage system (BESS) in the Medicine Hat area.
- A 240/138kV substation in the Vauxhall area, along the new 240 kV line, to establish an additional connection point with the existing 138 kV network.

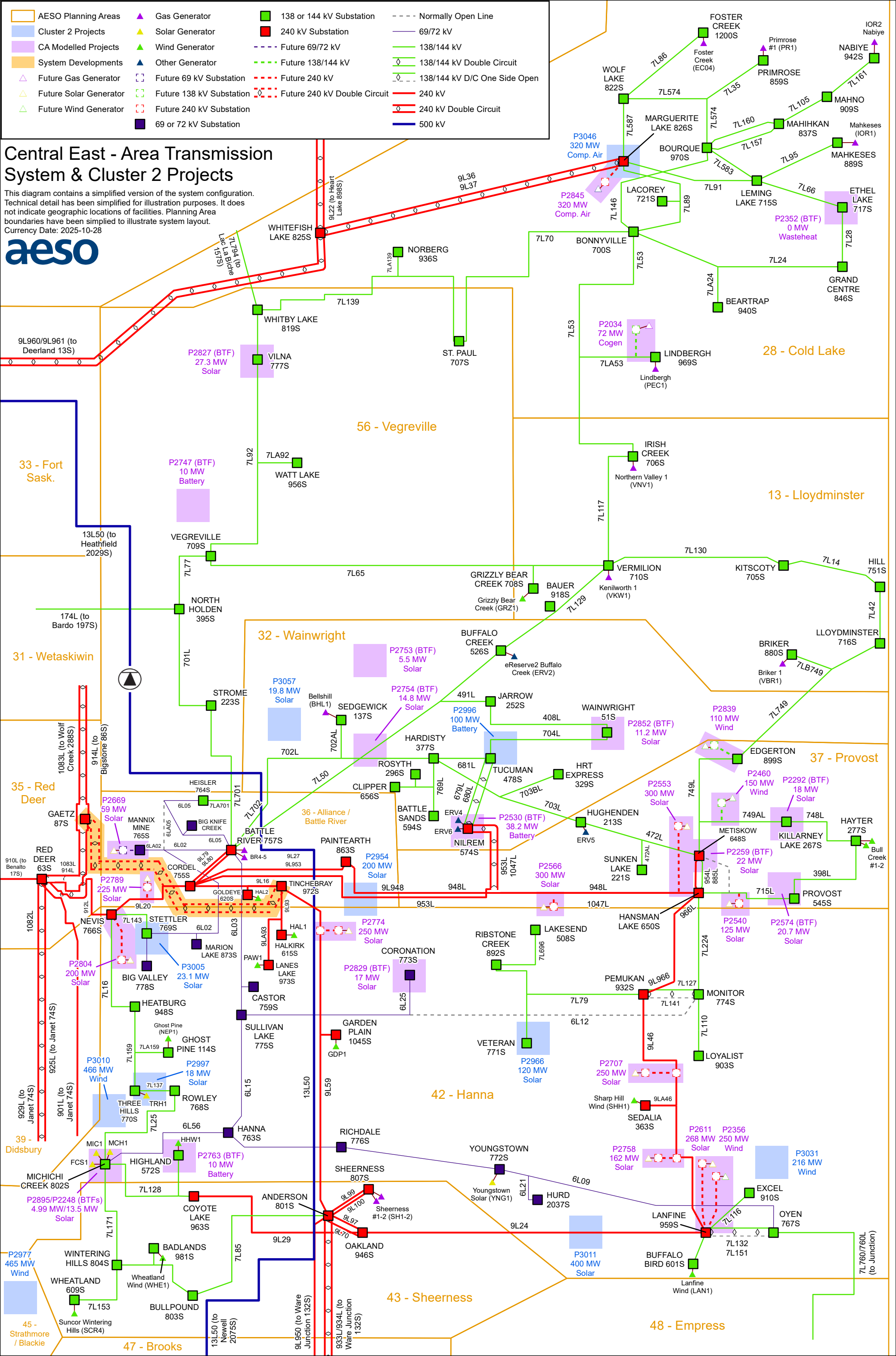
2.6.2 Purpose

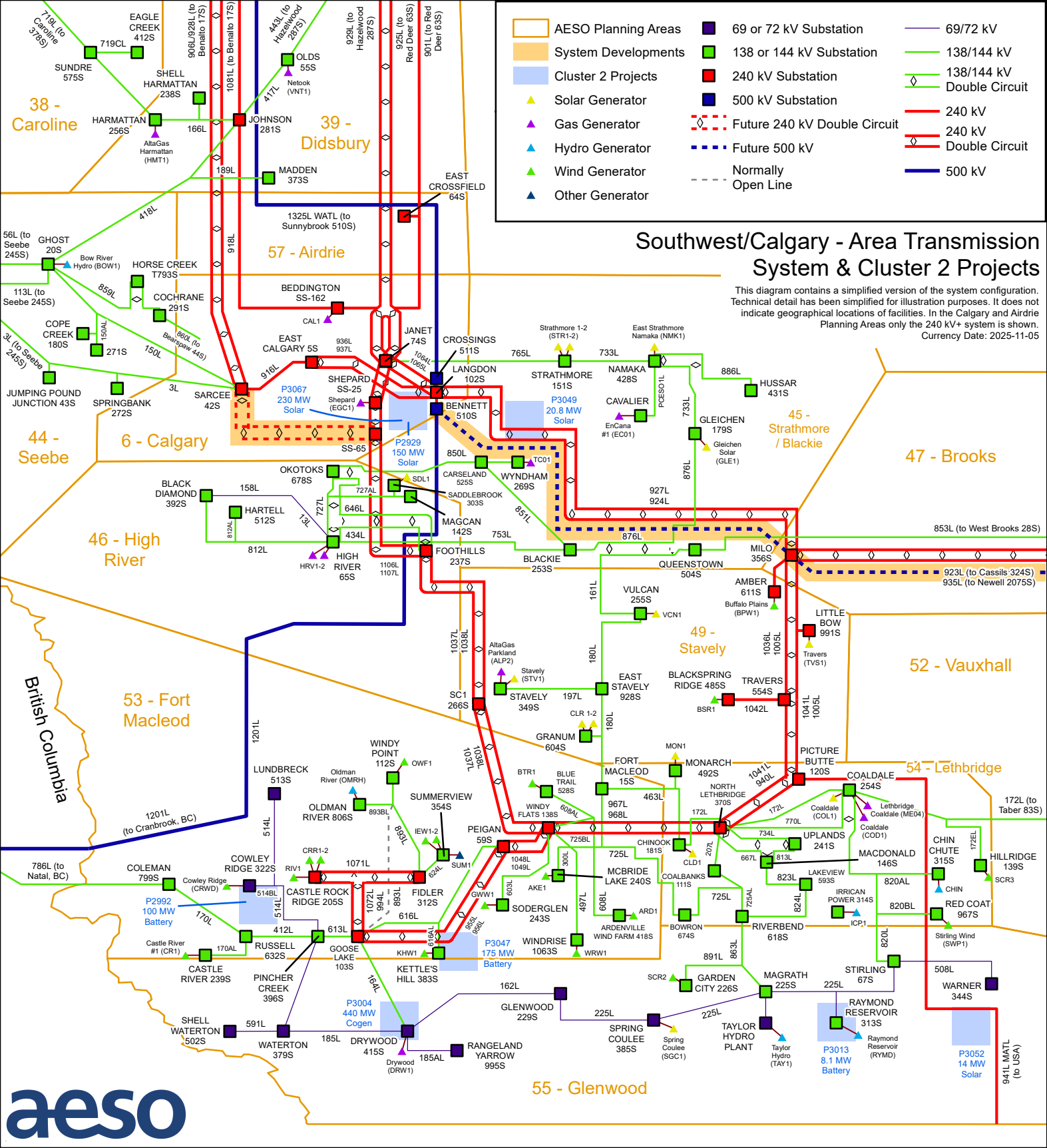
The new circuit forms a loop together with the existing CBW path. This development improves transfer-out capability for renewables in the Southeast, provides interconnection opportunities, and addresses the risk of double-circuit contingencies. The added voltage support equipment improves system strength and stability. The additional substation alleviates loading on the existing 138 kV system in the Lethbridge, Vauxhall, and Empress areas, including 172L and 658L.

3. System Plan SLD

See attached pages.







This diagram contains a simplified version of the system configuration. Technical detail has been simplified for illustration purposes. It does not indicate geographical locations of facilities. Currency Date: 2025-08-20

