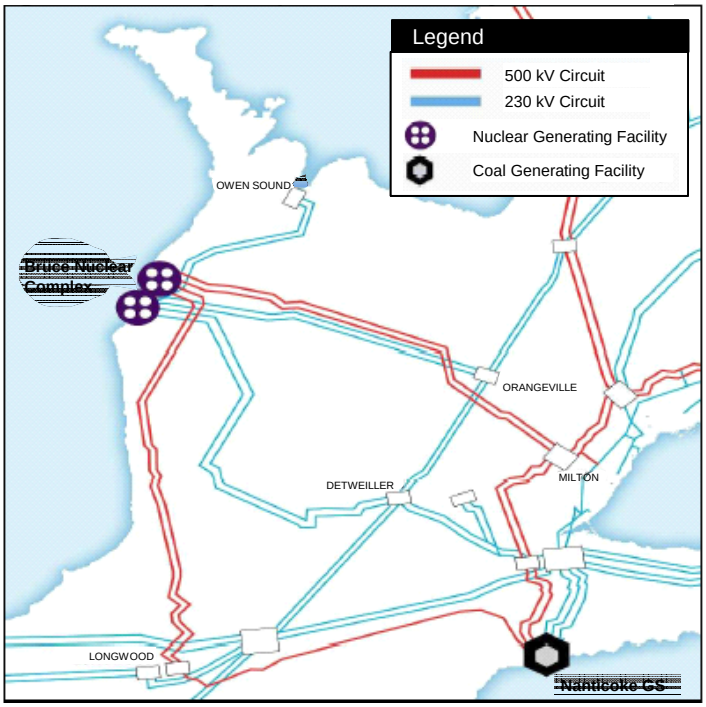
PROJECT LOCATION AND EXISTING TRANSMISSION SYSTEM

1.0 PROJECT LOCATION

The transmission project described in Exhibit B, Tab 2, Schedule 1 is located in southwestern Ontario. The transmission elements of this project extend from the Bruce Power Complex on the eastern shore of Lake Huron (north of Kincardine) to west of Orangeville in Dufferin County, and continue to Hydro One's Milton Switching Station (SS) in the western Greater Toronto Area (GTA). The route passes through four counties and one regional municipality (Bruce, Grey, Wellington, Dufferin, and Halton, respectively) and eleven municipalities (Kincardine, Brockton, Hanover, West Grey, Southgate, Wellington North, Erin, East Luther Grand Valley, East Garafraxa, Halton Hills and Milton). A detailed map of the project location and the existing transmission facilities is provided in Exhibit B, Tab 1, Schedule 2.



Source: OPA

2.0 EXISTING TRANSMISSION FACILITIES IN SOUTHWESTERN ONTARIO

Southwestern Ontario is the area of southern Ontario that lies to the west of the GTA and Barrie. This area has a number of large generating stations such as Bruce, Nanticoke, Lambton (and Beck in the Niagara area) with a total of approximately 15,000 MW of generation. The area also includes major load centers such as Hamilton, Windsor and Kitchener-Waterloo-Cambridge-Guelph. Table 1 summarizes generation, peak demand and interconnection capability in southwestern Ontario during the summer of 2005.

Table 1: Generation, Load and Interconnection Capacities in SW Ontario (2005)

Generation (MW)		**Loads (MW)**	
Bruce	5,060	Windsor/Essex	1,000
Nanticoke	3,945	Sarnia	800
Lambton	1,972	London	750
Beck	2,006	KWCG	1,400
Windsor area gas	739	Hamilton	1,300
Sarnia	510	Woodstock/Ingersoll	195
Other	746	Brantford/Brant	250
		Niagara	1,020
		Other	2,100
Total Generation	14,978	Total Load	8,815
Interconnections Capability			
Michigan		**New York at Niagara**	
Import - Summer	1,550	Import - Summer	1,300
Export - Summer	1,950	Export - Summer	1,300
Import – Winter	1,750	Import – Winter	1,650
Export - Winter	2,200	Export - Winter	1,950

Source: OPA, Ontario's IPSP Discussion Paper #5

The transmission assets in southwestern Ontario connect the major generation and load centers in the region to the interconnected grid. Almost half of the generating capacity in the region supplies the energy needs of other parts of the province. Furthermore, the Bruce Power Complex currently provides approximately 20% of the Province's peak power needs. The transmission facilities in this area are designed and placed to support this concentration of generation capacity, respecting physical constraints such as system and voltage stability, and thermal limits. This is a tightly interconnected system, where the availability and performance of each major element (especially the 500 kV facilities) can affect the integrity of the entire network and neighbouring jurisdictions.

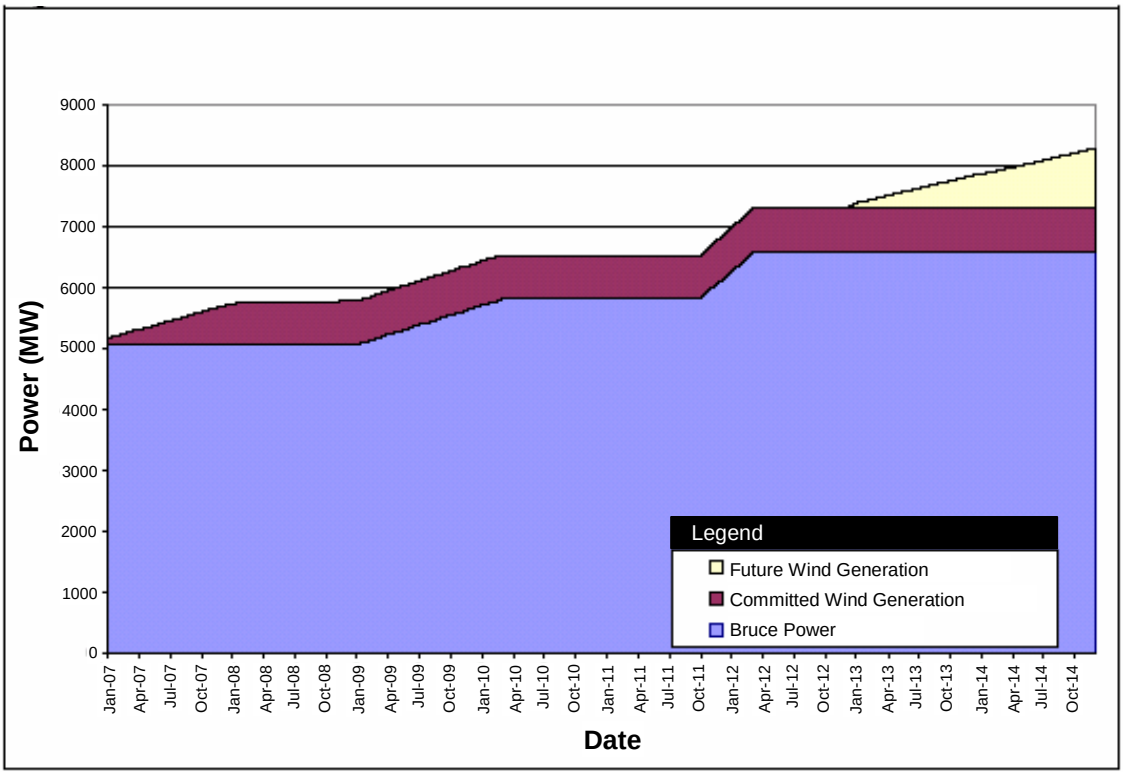
2.1 Generation Resources in the Bruce Area

The generation capacity at the Bruce Power Complex currently totals 5,060 MW, i.e., four 890 MW nuclear units at Bruce B and two 750 MW units at Bruce A operating at maximum capacity. By 2009, an additional 725 MW of committed wind generation through the Provincial Government's renewable energy initiatives will bring the total generation capacity in the Bruce area to 5,785 MW. In 2009 Bruce Power is expected to return to service two 750 MW units at Bruce A that are currently being refurbished under Provincial Government contract. At the same time, Bruce Power is expected to remove one of the operating 750 MW units from service for an extended maintenance outage. By 2012, scheduled maintenance work at the Bruce Power Complex will be completed and the total committed generation in the Bruce area will increase to 7,285 MW.

As part of the development of the Integrated Power System Plan (IPSP), the OPA's Transmission Discussion Paper No. 5 (pages 39-53) indicates that there is considerable potential for additional renewable generation, particularly wind generation, in the Bruce area. Another 1,000 MW of wind generation is expected, for a total of about 8,300 MW

in this area (refer to Exhibit B, Tab 6, Schedule 5, Appendix 5). Figure 1 illustrates OPA's forecast generation in the Bruce area from 2007 to 2014.

Figure 1: Bruce Area Available Generation (2007 – 2014)



Source: OPA, Ontario's IPSP Discussion Paper #5

2.2 Transmission Resources in Southwestern Ontario

The generation from Bruce Power Complex and the existing Bruce area wind generation are currently incorporated into the grid via 500 kV and 230 kV transmission lines as follows:

- The 500 kV Bruce x Milton SS and Claireville TS double-circuit tower line, B561M and B560V;
- The 500 kV Bruce x Longwood TS double-circuit tower line, B562L and B563L;

- The 230 kV Bruce x Orangeville TS double-circuit tower line, B4V and B5V;
- The 230 kV Bruce x Detweiler TS double-circuit tower line, B22D and B23D; and,
- The 230 kV Bruce x Owen Sound TS double-circuit tower line, B27S and B28S.

Major 500 kV facilities in southwestern Ontario include 500 kV transformer or switching stations at the Bruce Power Complex, Milton SS, Longwood TS (west of London), Nanticoke GS (east of Port Dover), and Middleport TS (east of Brantford). A detailed map of the existing transmission facilities is provided in Exhibit B, Tab 1, Schedule 2.

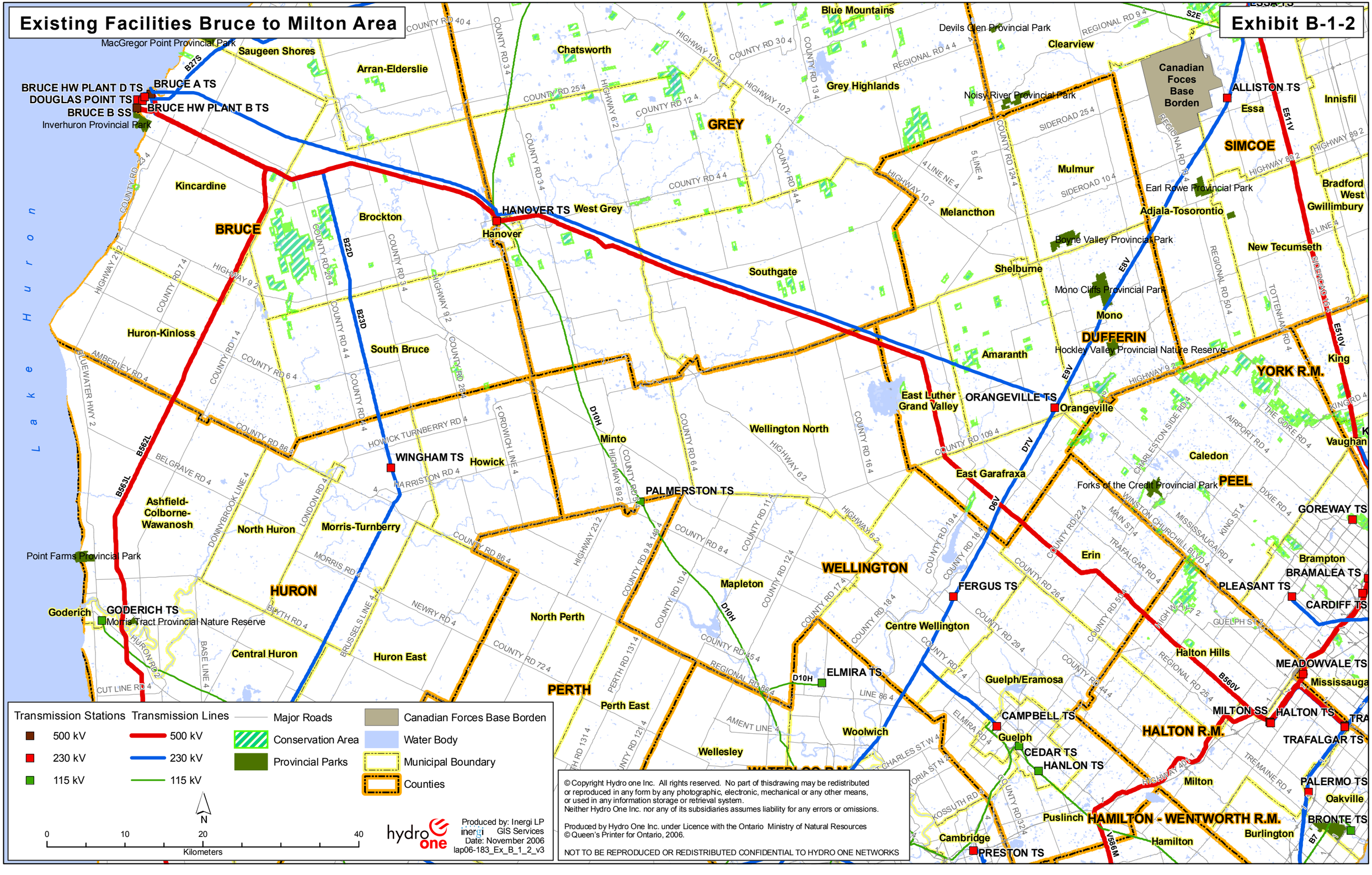
Depending on the load, generation and import patterns, these circuits have about 5,000 MW of transmission capacity to deliver the output from the Bruce Power Complex and the existing wind generation. The maximum transmission capacity is based on applicable reliability standards (Northeastern Power Coordinating Council ("NPCC"), North American Electric Reliability Council ("NERC")) and the planning assumption that with all remaining circuits in-service, the power system performance should satisfy required criteria and guidelines following the loss of any of the double-circuit lines (first contingency).

In summary, the present-day transmission system has the capability to transmit the currently available generation from the Bruce area, but is not sufficient to transmit the additional generation that is committed and planned for the area.

MAP OF EXISTING FACILITIES

Existing Facilities Bruce to Milton Area

Exhibit B-1-2



NEED FOR PROPOSED FACILITIES

1.0 BACKGROUND

As set out in its Transmission Licence, Hydro One must comply with the requirements of the Transmission System Code ("TSC") and various regulatory bodies. The need for the proposed facilities is based on these requirements including maintenance of acceptable voltages, keeping equipment operating within established ratings, and maintaining system stability, during both normal operation and under recognized contingency conditions on the transmission system. These requirements of government and industry regulatory authorities include those of NPCC, NERC, and the Ontario Energy Board ("OEB").

2.0 NEED FOR THE PROJECT

Under the *Electricity Act, 1998 (the "Act"),* the OPA has the responsibility for long-term power system planning in Ontario. In accordance with the Act, the OPA is required to periodically develop an IPSP. As part of the IPSP development work, the OPA has identified the transmission system need in southwestern Ontario and in particular for the Bruce area. The OPA's Analysis of Need and supporting information (collectively, "the OPA Materials") including a letter dated March 23, 2007 advising Hydro One to seek the necessary approvals for a new 500kV line to increase the transmission transfer capability from the Bruce to the GTA are attached in Exhibit B, Tab 6, Schedule 5. This Section 92 application relies on the OPA's identification of need.

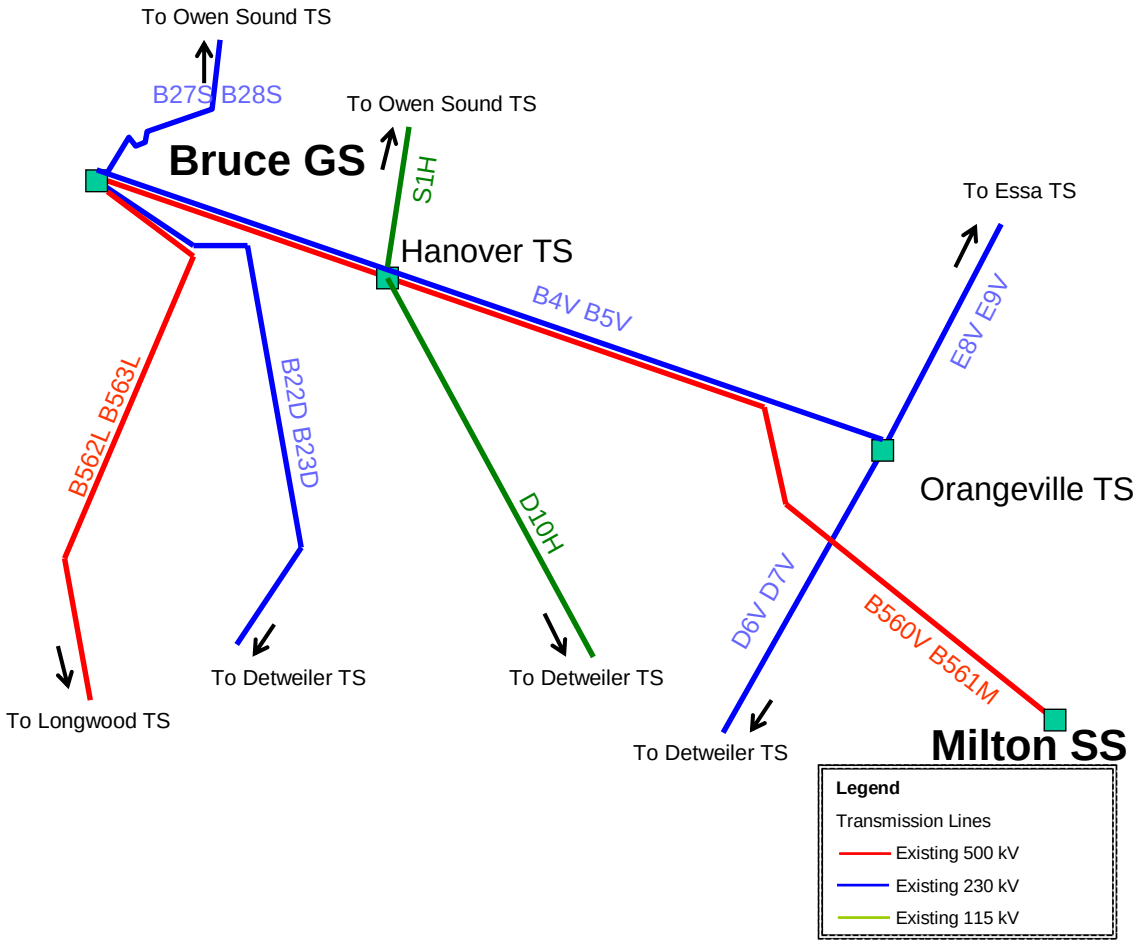
Hydro One concurs with the OPA's determination that there is a need to increase the long-term transmission capacity out of the Bruce area as quickly as possible. As indicated in the OPA Materials, the present transmission system has the capability to transmit about 5,000 MW of the generation from the Bruce area. Given the amount of

additional nuclear and wind generation capacity committed, the OPA estimates that the total generation available will be about 5,800 MW by 2009, and 7,300 MW by 2012. With the additional wind generation opportunities also identified by the OPA in the area, the total generation in the area could reach 8,300 MW, for a shortfall in transmission capacity of about 3,300 MW.

Given the expected shortfall between transmission capability and forecast available generating capacity in the Bruce area, the OPA has determined that there is a need to reinforce the transmission system out of the Bruce area as early as possible both to permit full deployment of the committed generating resources and to enable the development of potential new renewable energy resources in the Bruce area consistent with Government policies and directives (see Exhibit B, Tab 6, Schedule 5, Appendices 8 to 12).

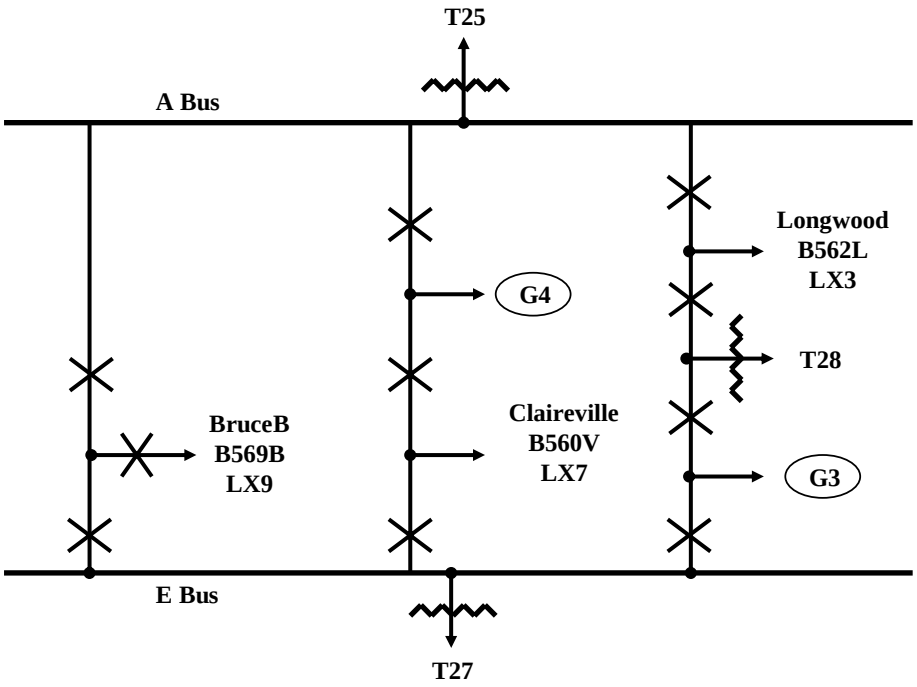
EXISTING FACILITIES:

BRUCE X MILTON SCHEMATIC DIAGRAM



EXISTING FACILITIES:

500 kV BRUCE A TS SCHEMATIC DIAGRAM

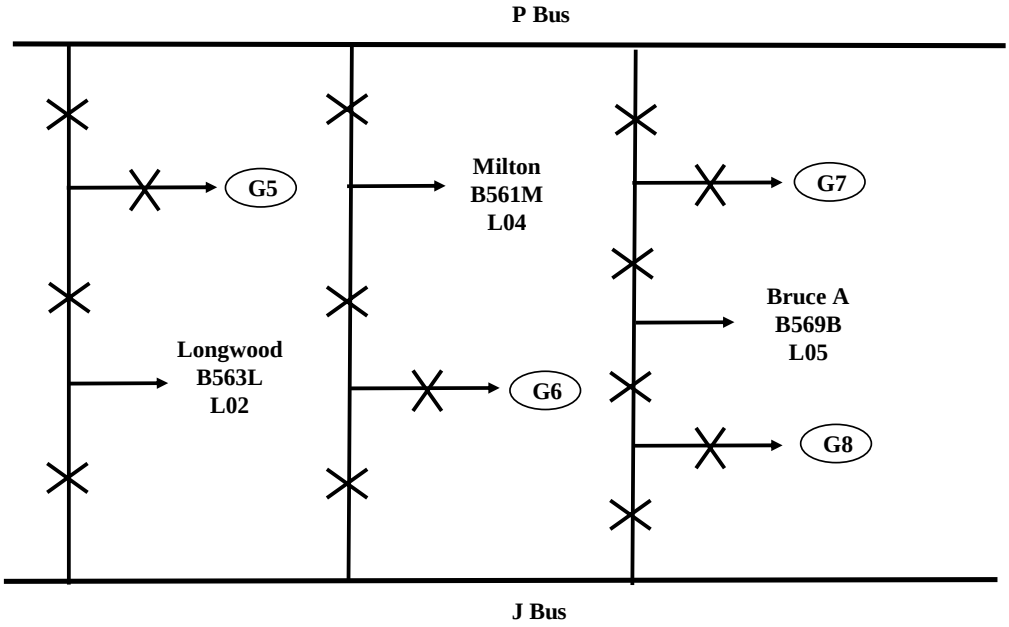


Legend:

- G — Generator
- 500 kV Circuit Breaker
- 500 kV Circuit Termination
- 500 kV Transformer Termination

EXISTING FACILITIES:

500 kV BRUCE B SS SCHEMATIC DIAGRAM

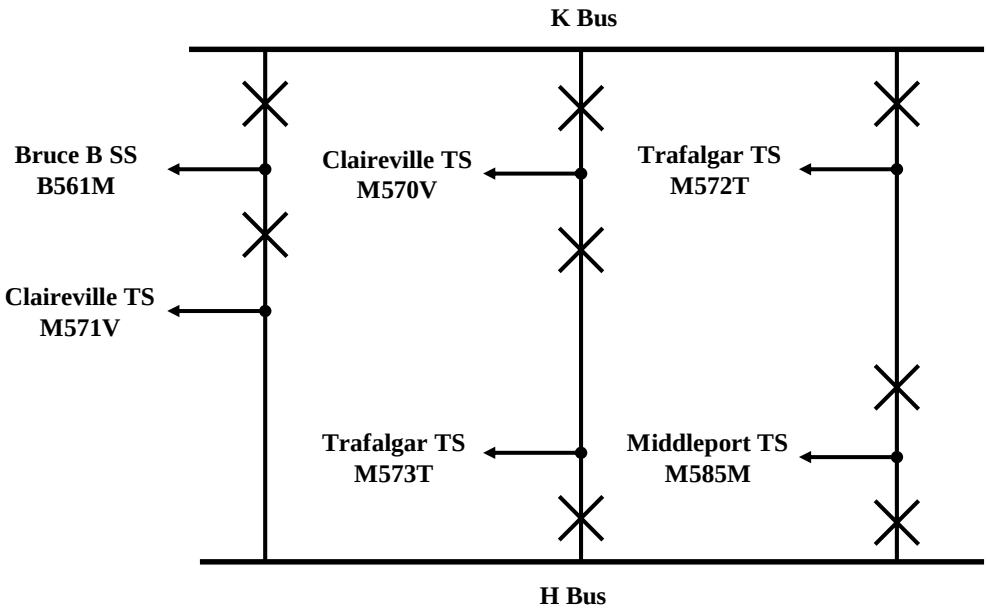


Legend:

- G — Generator
- 500 kV Circuit Breaker
- 500 kV Circuit Termination

EXISTING FACILITIES:

500 kV MILTON SS SCHEMATIC DIAGRAM



Legend:

- G — Generator
- 500 kV Circuit Breaker
- 500 kV Circuit Termination