

Mistry, Natasha (MTO)

From: Lively, Jacqueline (MTO)
Sent: August-30-16 11:37 AM
To: Levene, Steven (MTO)
Cc: Adams, Krista (MTO); Kutisker-Jacobson, Laura (MTO); Amirali, Abid (MTO)
Subject: MOE/Hydro Note - Research on Energy Requirements
Attachments: Hydro One Next Steps Note - Aug 30.docx

Follow Up Flag: Follow up
Flag Status: Completed

Hi Steven,

On June 16, David and the HSR team met with Hydro One and MOE to discuss the potential for HSR to run contiguous to the hydro corridor between KW and London. As you know, David is interested in this particular alignment. In addition to David's questions for Hydro One/MOE, there were also some questions for us on ROW width, energy requirements, and the height of contact wires/catenaries for HSR in the corridor.

We agreed to go back and research these items in advance of a future follow-up meeting. The attached note outlines a summary of the next steps that were agreed upon and includes the high-level research that we would like to share.

Would your team be able to review the note for us from a technical perspective? Any edits or feedback would be greatly appreciated.

Please let me know if you have any questions.

Thank you,

Jackie

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MEMO: Hydro One and Ministry of Energy Meeting with the Special Advisor for HSR

Summary of Next Steps

- On June 16, 2016 the Special Advisor met with Hydro One and the Ministry of Energy to discuss the potential for a high speed rail line to run contiguous to the hydro corridor between Kitchener-Waterloo and London.

Based on the discussion, the following next steps were agreed upon:

- **MTO**
 - Research on High Speed Rail specifications:
 - Width of Right-of-Way (ROW);
 - Height of contact wire and catenary; and,
 - Energy requirements.
 - Will coordinate another meeting with Hydro One and MOE, for further discussion on the proposed HSR corridor between KW and London.
 - Will share any section of the Special Advisor's Final Report that deals with energy needs with Hydro One.
- **Hydro One**
 - To inform MTO of the mitigating measures and real estate needs to relevant easements on the hydro corridor.
 - Based on MTO research, Hydro One will develop conceptual considerations.
- **MOE**
 - Feeding into MOE's Long Term Energy Plan, will consider how to incorporate HSR into the Plan.

Summary of MTO Research: HSR Specifications

- ROW requirements: width of 26 – 30 metres required for double-tracked corridor.
- Catenary height: approx. 18 feet (5.4 m).
- Energy requirements: annual HSR system-wide requirement of 165,477, 460 KwH, and a 60-year system-wide requirement of 9,928,647,300 KwH.

Considerations

- The ROW and energy figures above are based on estimates from internal work conducted for HSR in Ontario. Please see Appendix A for additional research on ROW and energy requirements for California HSR.
- Catenary specifications are based on publicly available information for the California High Speed Rail system.
- The figures above are estimates only and may change subject to a detailed Environmental Assessment of the corridor.

MEMO: Hydro One and Ministry of Energy Meeting with the Special Advisor for HSR

Appendix A: Detailed Review of HSR Corridor Specifications

ROW Requirements

- The typical ROW for the proposed Toronto – Windsor alignment width is approximately 26m.
- According to the Engineering Criteria Report for the California High Speed Rail, HSR track built at-grade requires approximately 50 ft (15.2 m) for a single track, therefore two one-directional tracks would require approximately 30.4 m.
- Given this information, a range of 26m to 30m is likely reasonable.
- Other factors such as topography, soils, groundwater levels, noise receptors, cut-and-fill slopes, drainage, retaining walls, service roads, utilities, operating speeds, and construction methods also influence the extent of the required ROW width. (Source: U.S. Department of Transportation, “California High Speed Train: Program Environmental Impact Report/Environmental Impact Statement, Engineering Report”, January 2004; http://www.hsr.ca.gov/docs/programs/eir-eis/statewide_techrptEngineer_rpt.pdf)

Catenary Height

- Catenaries are defined as an assembly of overhead wires consisting of, as a minimum, a messenger wire, carrying vertical hangers that support a solid contact wire which is the contact interface with operating electric train. This is a key part of the Overhead Contact System, which delivers the required energy to operate a high speed rail system.
- According to the California High Speed Train Technical Memorandum, the contact wire shall be installed and maintained at a minimum height of 17'- 5" (5309 mm) on sections of dedicated track. (Source: California High Speed Train Project Technical Memorandum, prepared by Parsons Brinckerhoff for the California High Speed Rail Authority, 2010; http://www.hsr.ca.gov/docs/programs/eir_memos/Proj_Guidelines_TM3_2_1R01.pdf)

Energy Requirements

- Based on international examples, an annual system-wide requirement for the Toronto-Windsor HSR corridor would be approximately 165,477, 460 kWh, and a 60-year system-wide requirement would be 9,928,647,300 kWh.
- According to the California High Speed Train Technical Memorandum, the traction power supply system for the California HSR system will be a 2x25 kV – 60 Hz system (i.e., 25 kV-0-25 kV) utilizing a 25 kV catenary and a negative (-25 kV) longitudinal feeder together with autotransformers spaced approximately every 5 miles (8 km) along the ROW. (Source: California High Speed Train Project Technical Memorandum, prepared by Parsons Brinckerhoff for the California High Speed Rail Authority, 2010; http://www.hsr.ca.gov/docs/programs/eir_memos/Proj_Guidelines_TM3_2_1R01.pdf)