

**MINISTRY OF PUBLIC SAFETY AND SOLICITOR GENERAL
EMERGENCY MANAGEMENT BC
BRIEFING NOTE FOR INFORMATION**

TO: Parliamentary Secretary Jennifer Rice

ISSUE: Update on the Ocean Networks Canada Earthquake Early Warning System

BACKGROUND:

Earthquake Early Warning and Seismic Monitoring

- Earthquake Early Warning (EEW) systems can provide a few to tens of seconds of warning to initiate protective actions to reduce the impacts of an earthquake such as preventing cars from entering bridges and tunnels, allowing people to drop, cover, and hold on, stabilizing patients undergoing medical operations, or to ensure the automatic shut down and isolation of industrial systems.
- EEW is enabled by seismic monitoring (SM) systems that record seismic activity and its effects on buildings and infrastructure. EEW systems typically consist of an array of seismic sensors connected to a data centre that detect the first waves of an earthquake and can issue a notification before the damaging secondary waves arrive (Attachment 1).
- Several organizations have SM systems in BC, including Natural Resources Canada (NRCan), University of BC (UBC), Ministry of Transportation and Infrastructure (MOTI), Ocean Networks Canada (ONC), and private companies. Some of these systems include an EEW component.

Ocean Networks Canada Earthquake Early Warning System

- In March 2016, the Province granted \$5 million to ONC to develop an EEW system for the Cascadia Subduction Zone, which was further leveraged through ONC obtaining a \$2 million investment from the Canadian Safety and Security Program.
- The project connected existing sensors (mostly from NRCan) and established new sensor stations at 35 land-based and 8 offshore sites adjacent to the Cascadia Subduction Zone. It also developed software and algorithms, undertook testing with end users, and shared data with the Pacific Northwest Seismic Network.
- The system detected and provided internal notification for 18 real earthquake events between September 2018 and July 2019.
- Project work was completed in July 2019, with close out in October 2020.
- In March 2020, the Province provided a grant of \$1.7 million (40%), matching funding obtained from the Canada Foundation for Innovation (60%), to support the commissioning of the system as well as an initial phase of operations for two years.
- The March 2023 deliverable of the current project will be an operating EEW system that has undergone a phase of commissioning with testing and peer review and is integrated with the national EEW system being developed by NRCan.

- Recent activities in the project have focused on coordination with NRCan, maintaining existing sensor sites, and making enhancements to the system.
- ONC has also been undertaking testing with ProTrans (operates the Canada Line) and has been working with TransMountain Fortis BC, and the District of Oak Bay, who have been receiving notifications and viewing tests.
- Peer review of the system is scheduled to start September 22 – 23, 2021.
- The Province and ONC agreed that operations of the ONC system under the current grant will not include use of it for warning third parties (including the public) unless a further agreement is reached.
- The project is delayed by at least 6 months due to the COVID-19 pandemic and challenges accessing ONC sensors and devices at NRCan sites.
- s.13

Relationship with Natural Resources Canada

- Many of the sensors and devices installed or leveraged by ONC are situated at sites owned and operated by the Federal Government.
- ONC had previously developed an implementation arrangement to clarify roles and responsibilities for work on these sites while developing the system.
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- Concerns have also been raised by NRCan about some elements of the ONC system and related work including:
 - Impacts to NRCan sensors from ONC devices at federal sites (resolved).
 - Acknowledgement of the contributions from NRCan in supporting development of the system and the use of federal sensor sites (resolved).
 - s.15
- EMBC staff has facilitated multiple meetings between ONC and NRCan in 2020 to help address the concerns.

Linkages to the National EEW Program

- NRCan is currently developing a national EEW system and part of it will be implemented within coastal areas of BC, scheduled to be operational in s.13 2024.
- ONC and NRCan have been exploring an innovation proposal that could allow ONC to obtain funding from NRCan to incorporate algorithms that they developed, as part of the \$5 million BC-funded project, into the national EEW system. In August, ONC advised EMBC staff that they were considering s.16
- s.16

s.16

Liability Concerns

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Future of the system

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- EMBC has advised ONC that a business case that clearly demonstrates the economic, social, and public safety benefits of additional warning time beyond that which will already be provided by the national EEW system would be beneficial.
- EMBC staff continues to work with NRCan and ONC to eliminate all technical barriers to the potential integration of the ONC and national EEW systems.
- On October 20, a 1.5-hour meeting is scheduled with Parliamentary Secretary Rice, Deputy Minister Richards, and ONC. It is recommended that staff attend that meeting to provide context around the ongoing discussions with NRCan.

INDIGENOUS PEOPLES CONSIDERATIONS:

- Within the initial project, ONC engaged with Pacheedaht First Nations about beta-testing the system, but no test was undertaken.
- Indigenous communities or organizations may consider obtaining notifications from the ONC system when it is fully operational^{s.16}

s.16

OTHER MINISTRIES IMPACTED/CONSULTED:

- FLNRORD, GeoBC – Sharing of geodetic sensor components.
- MOTI – BC SIMS, SM & EEW capabilities.
- MAH, BC Housing – Involved in the National EEW program.

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REVIEWED BY:

	Initials	Date
DM	TR	Sept 14/21
ADM	DP	Sept 13/21
ED	JI	Sep. 8/21
Pgm Dir/Mgr	AG	Sep. 7/21

Attachment(s)

Attachment 1 – Illustrations of EEW systems

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Figure 1 – typical EEW system (Image courtesy of NRCan)

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Figure 2 – ONC EEW System (image courtesy of ONC)