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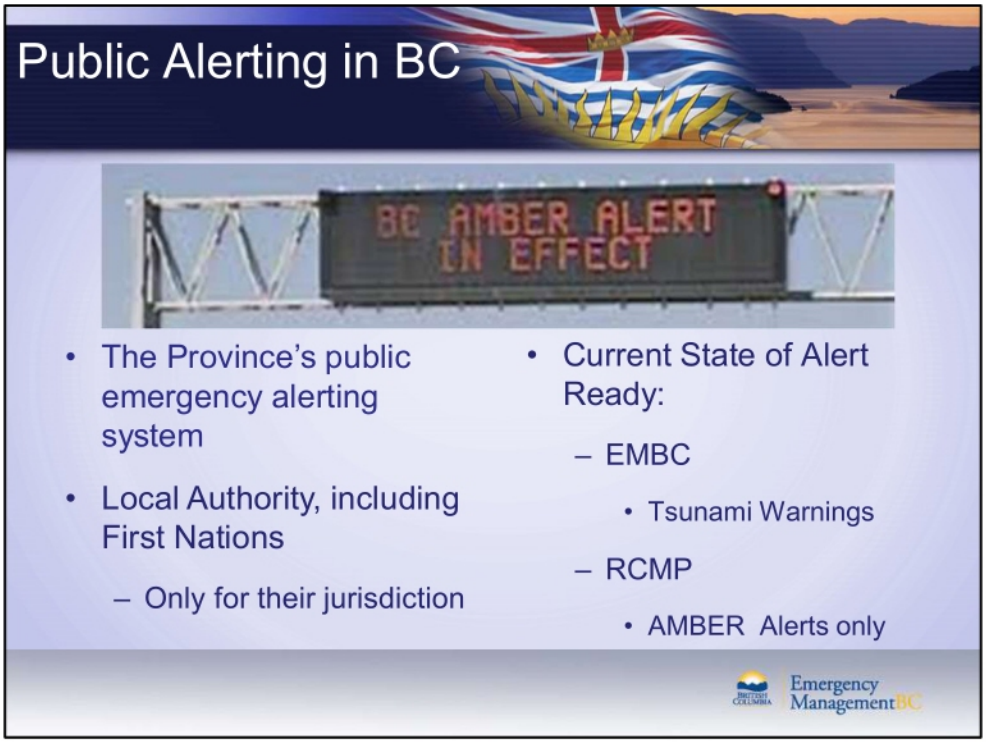
Hello! My name is Ross Mammel and I am the Manager of Public Alerting for Emergency Management British Columbia. I would like to acknowledge the opportunity I have to live, work, and play on the traditional territory of the W̱SÁNEĆ people. Here, in the traditional territory of the **Musqueam, Tsleil-Waututh, and Squamish** people it is an honour to join you today. Thank you for this chance shares.13 with you.

General Admin
Fire Escapes
First aid
AED?

Please note: we have allotted time for questions at the end of this presentation so please jot them down and we should have time to address them then.

(Photo: Unsplash – Thomas Ehling @frenchmagician)



Alerting in BC, as all other Emergency Management Activities is governed by Acts and Regulations and managed through BCEMS

As you all probably know events that happen locally are dealt with locally with EMBC as the lead coordinating agency.

EMBC will issue Tsunami warnings:
Local authorities may issue secondary Tsunami alerts with more detailed or specific local instructions.

Only the **RCMP** will issue AMBER alerts: Local authorities will not have access to AMBER alert capability.

Environment Canada also distribute alerts via Alert Ready. A recent example would be the tornados in the Ottawa and Gatineau areas.

Alert Issuers include Local Authorities

- Defined by the Emergency Program Act which includes Local Governments (Cities and Regional Districts) and

- First Nations under the *first nations support agreement*.
- Alert Issuers may also include corporate entities authorized by the above but this addition is yet to be determined. *(3)*

Local authorities may only alert inside their boundaries unless an agreement with the another effected local authority is in place and registered with EMBC public alerting program.

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The first line of communication to impacted communities and populations can be through public alerting. s.13
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For reference and to assist with questions:
Broadcasting Regulatory Policy (CRTC 2014-444 and corresponding orders), (Government of Canada, 2014).

The Emergency Program Act and the Emergency Program Act Regulation (schedule 2) outlines the responsibilities of Government and Ministers in the event of an Emergency. The coordination and fulfillment of these responsibilities is managed through the structure in the British Columbia Emergency Management System, often referred to as "BCEMS".

Events that happen locally are dealt with locally

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EMBC is the lead coordinating agency

- EMBC is the lead coordinating agency in the provincial government for all emergency management activities.
- EMBC provides executive coordination, strategic planning and multi-agency

facilitation.
- EMBC works with local governments, First Nations, federal departments, industry, non-government organizations and volunteers to support emergency management.

Emergency events of provincial significance and impact are rare but they have the potential to cause widespread loss of life and damage.

- EMBC is uniquely positioned to provide emergency alerts to the BC public for these large-scale, cross-jurisdictional event like earthquakes and tsunamis because of their cross regional scope and potential disastrous scale of events.
- EMBC may receive unique information as a central coordinating agency, and it is important this information is shared to those that need it.

What is an Emergency Public Alert?

*"Emergency Public Alert" is defined in the National Alert Aggregation and Dissemination (NAAD) System Authorized User Agreements as an "Alert Message issued by an Authorized Government Agency or an Authorized User in respect of an imminent or unexpected threat to life caused by severe weather disturbances, natural disasters or other emergencies that meets the criteria for immediate distribution in the Standards." *(2)*

PENS
EMBC utilizes PENS, to notify local authorities, First Nations, agencies, and media contacts, to distribute tsunami alerts and to determine whether their emergency plan needs to be activated and to what level.

Alert Ready
Alert Ready, the national system, as mandated by the Broadcasting Regulatory Policy, is used today for a few Broadcast Immediate instances.

Page 005 of 258 to/à Page 006 of 258

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What this means is when disaster strikes or an emergency is declared, it is critical that the public is provided with timely, consistent, and accurate messaging to protect public safety.

Local Authorities are required to maintain an emergency management organization and prepared emergency plans. However, these plans and their alerting systems are not currently aligned with Alert Ready, the National program.

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Studies and After Action Reviews have shown people rate the importance of information on par with food and water in the wake of a large scale emergency. That information needs to be trusted or believable, preferably both for it to reduce confusion or panic and to assist the public in acting appropriately to reduce the chance of harm. I will talk more about that later.

There are two kinds of alerts – Broadcast Immediate and Information Alerts.

SOREM
Senior Officials Responsible for Emergency Management has established a definitive list of Alert Message types permitted for **immediate** broadcast by last mile distributors – radio, television, and LTE smart phones – based on a list of event codes and their respective severity, urgency, and certainty values.

A collection of event types and associated **urgency**, **severity**, and **certainty** conditions, have been identified by SOREM as having an imminent or expected threat to life. Classified as broadcast immediate, alerting officials will be able to distribute and present these alerts to the public as soon as possible, even if it will disrupt the programming of last mile distributors .

Broadcast Immediate, Broadcast Intrusive and BI alerts? It can be confusing.
These are basically the same thing. Broadcast Immediate alerts indicate a situation where there is an imminent or unexpected threat to life. Broadcast Intrusive means they interrupt normal processes. They feed an alert through your LTE smart phone and are fed to radio and television operators and intrude on their regular broadcast.

What are Information alerts?
- Indicate a situation that is not imminently life threatening
- Do not intrude on regular broadcast.
- Not a "wireless public alert"
- Could be received through an App on a smartphone
- Fed to open data sources for them to pick up and distribute to the public at the earliest opportunity but will not automatically interrupt regular processes like a BI alert will. For example, the AlertBC App could be set to distribute all alerts in your area or just to select alerts. Broadcasters may pick up the alert as a news item. Information alerts are
- Valuable, especially if managed well. We will address this in the training component of AlertBC.

Broadcast Immediate Alerts and Information alerts are different tools for different jobs. BI is very disruptive and could even be dangerous if it causes panic or recommends the wrong action. The goal is to reduce and manage the risks, while increasing the value of this information. BI is, therefore, saved for very limited situations.

For reference and to assist with questions:
National Public Alerting System
Broadcast Immediate Events List

https://npas.ca/clf/broadcast-immediate-events-list/

Fire:

Urban Fire

An urban fire threatens multiple residential and/or commercial properties.

Industrial Fire

A large fire in an industrial building or complex that poses a threat to human health.

Wildfire

A wildfire involves natural combustibles, such as grass, brush and trees.

Forest Fire

A Forest fire is a wildfire or prescribed fire that is burning in forested areas, grass or alpine/tundra vegetation and poses a threat to human safety.

Natural:

Tornado

A tornado is a vortex of a violently rotating winds, often forming a funnel shaped cloud that is capable of damaging property and injuring people.

Flash Flood

Often occurring from river ice jams and excessive unexpected rainfall, a flash flood is the sudden onset of water causing immediate flooding. This event presents a unique danger to life and safety as there is little or no warning that this event will occur.

Earthquake

An earthquake is a sudden release of energy in the Earth's crust that creates seismic waves that can cause substantial damage, especially in urban environments.

Hurricane

A hurricane is violent storm comprised of intense winds and, heavy rain, potentially causing a storm surge, floods, coastal erosion or landslides.

Biological:

Biological

A potentially dangerous and poisonous substance that is usually very unstable and can be easily transferred between living organisms.

Chemical

A chemical substance that, if misused or released, could result in serious injury or death.

Radiological

With sufficient concentration, a radiological substance.

Drinking Water Contamination

When water quality is negatively affected and a boil-water advisory may be raised, cautioning use by the public.

Explosive:

Explosive
A potentially dangerous substance or device that may explode.

Environmental:
Air Quality
A decrease in air quality is caused by an elevated particulate count in the atmosphere that can negatively affect visibility or the health of individuals.
Falling Object
Natural or human-made materials at risk of falling, which may threaten people or property.

Terrorist:
Terrorist Threat
The use of violence or threats of violence by individuals or groups against civilians or infrastructure.

Civil:
Civil Emergency
A civil emergency occurs when humans cause a disruption of services or require varying levels of support, law enforcement or attention.
Animal Danger
When a wild or domesticated animal poses a threat to human life or property.
Amber Alert
An Amber Alert is issued by police services when a child has been abducted and it is believed that his/her life is in grave danger. An Amber Alert provides the public with immediate and up-to-date information about the abduction and solicits the public's help in the safe and swift return of the child.
911 Service
A 911 service alert happens when there is a disruption or outage of telecommunication services between the public and emergency responders.

Alert Ready Admin
Test Message
A test message may be issued for either public awareness or technical testing purposes.

Senior Officials Responsible for Emergency Management (SOREM): A forum of Federal/Provincial/Territorial (F/P/T) officials responsible for coordinating a strategy for emergency management in Canada, and for providing guidance and advice on how to enhance emergency management in Canada. SOREM includes representatives from provincial and territorial emergency management organizations and Public Safety Canada.
SOREM Public Alerting Layer: A CAP layer developed by SOREM for the Canadian public

alerting community.

Broadcast Immediate Events List: A collection of event types and associated CAP urgency, severity and certainty conditions, that have been identified by the *Senior Officials Responsible for Emergency Management* as having an imminent or unexpected threat to life, that alerting officials wish to be distributed and presented to the public as soon as possible, even if it means disrupting the programming of last mile distributors. The current version of this list is available at www.alerts.pelmorex.com/techinfo/.
Broadcast Immediate (BI) Alert: An audience alert message that aligns with the Broadcast Immediate Events List. BI should not be confused with Broadcast Intrusive - a similar term used by Environment and Climate Change Canada, who should be consulted on its current definition.
Broadcast Immediate Parameter (BIP): The parameter which indicates whether an alert meets the BI criteria for distribution by broadcasters and BDUs.

1. Broadcast Immediate Alerts
1.1 The Broadcast Immediate Parameter, as defined in the SOREM Public Alerting Layer [ref.: Appendix C] shall be used to indicate when an alert is BI.

1.2. LMDs are not required to validate a BI alert against the "Broadcast Immediate Events List" as long as a valid BI indicator is included in the alert message.

1.3. LMDs should inspect all incoming CAP messages, regardless of whether they are indicated as BI or not. This is because CAP messages which are issued to update or replace active BI alerts may not be indicated as BI, since these new messages may not meet the BI criteria. As such, if LMDs were to only take action for BI alerts, they may continue to distribute an alert to the public after it has been cancelled by the alerting authority. Furthermore, multiple BI alerts may be issued for a single emergency event, as the geographic area affected by the emergency may change or expand with time. In such a case, the existing BI alert may be updated and a CAP message issued with additional geographic areas added. These updates contain no new information for the public in the geographic areas that have been previously alerted; hence a given updated BI alert may not be pertinent for a particular LMD (e.g. if the new geographic areas are outside the LMD's area of interest), underlining the importance that LMDs inspect all incoming CAP messages, regardless of their frequency or BI status.

Page 012 of 258

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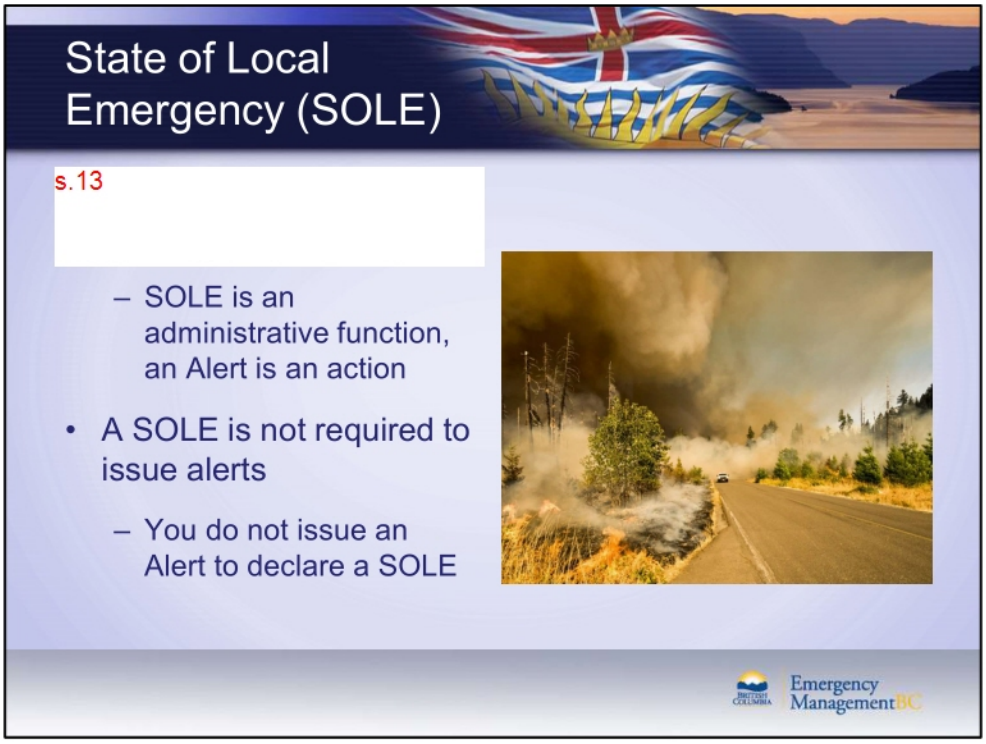
For reference and to assist with questions:

Urgency (in: cap. \ alertInfo. \ urgency. Code)
The code denoting the urgency of the subject event of the alert message (REQUIRED)
(1) The <urgency>, <severity>, and <certainty> elements collectively distinguish less emphatic from more emphatic messages.
(2) Code Values:
"Immediate" - Responsive action SHOULD be taken immediately
"Expected" - Responsive action SHOULD be taken soon (within next hour)
"Future" - Responsive action SHOULD be taken in the near future

“Past” - Responsive action is no longer required
“Unknown” - Urgency not known

Severity (in cap. \ alertInfo. \ severity. Code)
The code denoting the severity of the subject event of the alert message (REQUIRED)
(1) The <urgency>, <severity>, and <certainty> elements collectively distinguish less emphatic from more emphatic messages.
(2) Code Values:
“Extreme” - Extraordinary threat to life or property
“Severe” - Significant threat to life or property
“Moderate” - Possible threat to life or property
“Minor” – Minimal to no known threat to life or property
“Unknown” - Severity unknown

Certainty (in cap. \ alertInfo. \ certainty. Code)
The code denoting the certainty of the subject event of the alert message (REQUIRED)
(1) The <urgency>, <severity>, and <certainty> elements collectively distinguish less emphatic from more emphatic messages.
(2) Code Values:
“Observed” – Determined to have occurred or to be ongoing
“Likely” - Likely (p > ~50%)
“Possible” - Possible but not likely (p <= ~50%)
“Unlikely” - Not expected to occur (p ~ 0)
“Unknown” - Certainty unknown
(3) For backward compatibility with CAP 1.0, the deprecated value of “Very Likely” SHOULD be treated as equivalent to “Likely”.



A state of local emergency (**SOLE)** is declared when a local authority requires access to the powers granted under the act. It is important to note that SOLE is not on the event list as it is not an event. A SOLE ties to the cause not the effect.

It is important to understand that a SOLE is **not** required to issue an alert.

A SOLE is an legal document that allows the local government to address the risk from the hazard. Alerting is an action taken as a response to mitigate the risk of a hazard.

For reference and to assist with questions:

What is a declaration of a state of local emergency?

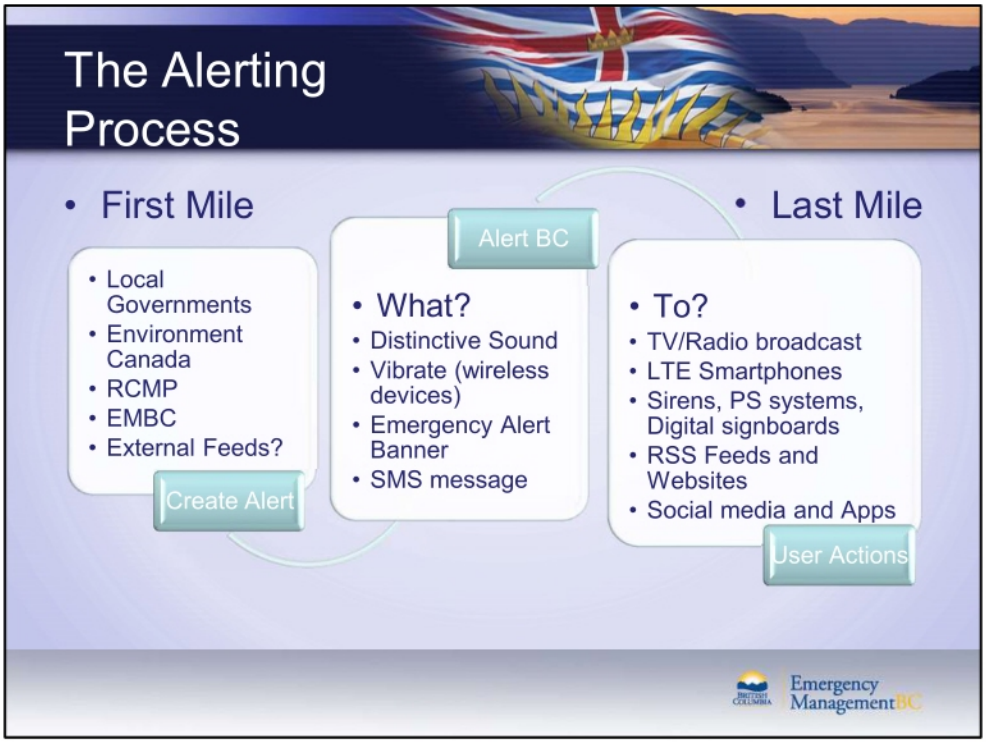
This is a temporary emergency authority measure authorized by the *Emergency Program Act*. A declaration of a state of local emergency has to be initiated by either a local government bylaw or order and is valid for a period of seven days.

"Declaring a state of local emergency enables local authorities in the Province of British Columbia to exercise the emergency powers listed in the *Emergency Program Act*. The emergency powers are utilized by the local authority to order the evacuation of residents from their homes, prohibit travel and enter private property when an emergency threatens lives, property, or the environment within the local authority's jurisdiction.

Local authority emergency program staff and elected officials must be prepared to declare a state of local emergency in response to an emergency or disaster at a moment's notice. Therefore, local authority emergency plans must clearly and concisely outline the process for declaring a state of local emergency, as well as managing the application and use of the emergency powers."(1)

(1) https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/local-government/eoc-forms/embc_declaring_state_of_local_emergency_dec_2017_final.pdf

(2) Photo: Unsplash – Marcus Kauffman @marcus_kauffman



Lets talk for a few minutes about the alerting process.

First mile distributors are
- Reliant on the internet.
- Connectivity can be within the Local Governments' purview.
- s.13

As I said earlier, Local Governments create alerts, other than the general tsunami alerts, weather alerts, and Amber alerts, for their own area and territory. We are hoping to add an early earthquake warning to the automated alerts in the next year.

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Is anyone wondering what External Feeds are? *If so use this!*

EMBC as been working to create more automated means of alerting those at risk of potentially catastrophic events. An example of this is the soon to be implemented **Early Earthquake Warning System**. The information for these alerts is received through sensors and could provide time to prepare.

There is an ext4ernal feed that transmits directly to Alert Ready on a case by case basis and at the sole discretion of EMBC

The benefits of earthquake early warning can be quite wide.

Rapid alerts that signal incoming earthquake ground shaking can

- reduce deaths,
- injuries and
- property losses.

Even a few seconds of warning are enough time to take protective and preventative measures, such as:

- triggering trains to slow down
- stopping bridge and tunnel traffic
- halting landings for incoming air traffic
- opening bay doors at fire and ambulance halls
- allowing surgeons to stop delicate procedures
- allowing people to Drop, Cover and Hold On before the shaking starts.

From another perspective, municipal level alerting systems could be utilized to generate alerts s.13

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Emergency BI alerts, on radio, television and compatible LTE smartphones, begin with a **distinct sound**, known as the Canadian Alert Attention Signal. Emergency alerts sent to compatible wireless devices will also cause the phone to **vibrate**.

On compatible LTE smartphones, the emergency alert will display an **"EMERGENCY ALERT" banner**, followed by text that describes the situation and provides instructions on

- What actions to take and
- Where to find more information
- At the top of each emergency alert, the issuing government agency will be clearly indicated.
- Please note that different devices and software load and act differently.

Radio waves

- Don't recognize jurisdictional boundaries and, by design, the system will always reach beyond the specified area.
- As consequence, last mile distributors will deliberately **over alert** to ensure coverage of the area selected.
- All last mile distributors will have a different level of reach but all will alert beyond the boundaries.
- s.13
-

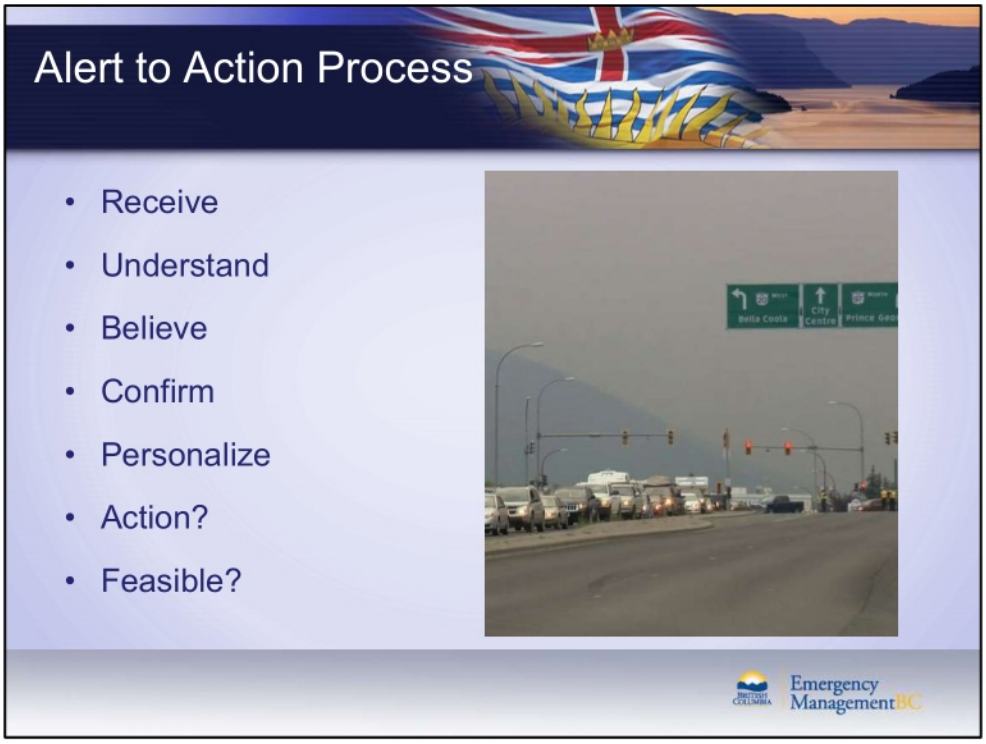
For reference and to assist with questions:

Text from http://www.oceannetworks.ca/innovation-centre/smart-ocean-systems/earthquake-early-warning

Where does the message go?

The National Alert Aggregation and Dissemination (**NAAD**) System – The Alert Ready system

- collects public alerting messages from Authorized Government Agencies (AGA) and
- makes them available to Last Mile Distributors (LMD) such as
    - radio and television stations, as well as cable and satellite TV companies for display to Canadians.



Successful emergency alerting happens when the greatest number of public-at-risk is sufficiently informed with the information needed to take action. Many studies show that most alert recipients don't automatically take action when alerted – recipients usually follow a series of steps **before** they decide to take action. In order to maximize the value of emergency alerting, every step of this Alert to Action process must be supported by the Alerting Framework. If the framework supports the entire process, studies show that a significantly greater number of people will act as recommended.

Multi-track messaging tries to reach as many people as possible.

- The goal is to get over 20% of the population informed then allow peer to peer and re-broadcast to further multiply the effect.
- With as little as 5% of intended audience reached, the public will begin to move.

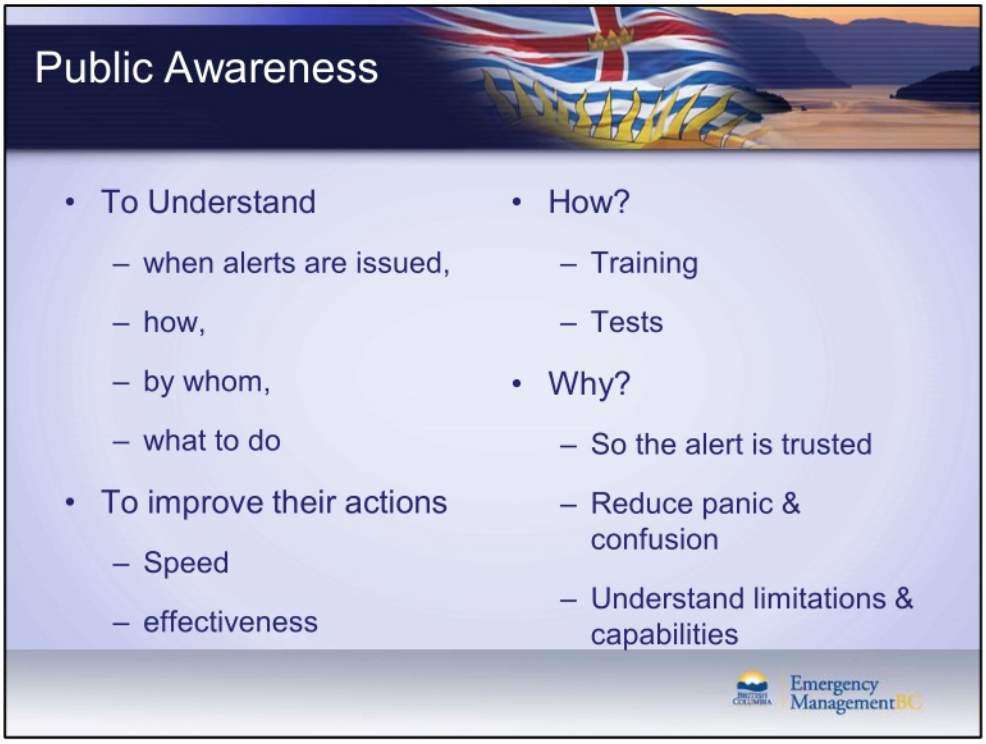
A member of the public's Alert to Action process is reflected in the slide:

1. They receive the message
2. Next it may take a few moments to understand the message, especially if they are already traumatized
3. Then they need to believe the message is credible. Good messaging with links to credible websites will help this process.
4. Many will confirm (or acknowledge) the message (from another source) if necessary
5. They often need to personalize the message; to determine the message

applies to them
6. Once they have assessed the message they will then determine whether action is required
7. They also need to determine whether action is feasible

As you can see, the **more information** provided with the **least number of words** will assist people to make **good decisions** and save lives.

Image Credit: Global News



Public Awareness will be important. They will require education to understand when alerts are issued, how, by whom, what to do etc.

This all **improves**
- speed and
- effectiveness of the alert to action process.

Training and Tests, are all very important. They help
- Reduce panic,
- Reduce confusion and
- Help the public understand the limitations (and capabilities) of the alerting system. They typically think the systems are better than they are.

Where does the message go?
NAADS, the Alert Ready system
- collects public alerting messages from Authorized Government Agencies (AGA) and
- makes them available to the Last Mile Distributors (LMD) we have already spoken about for display to Canadians.

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Last Mile Distributors

Alerting s.13 reaches out to those within the areas covered by that specific Last Mile Distributor.

- Some will have a much further reach than others and, as we already talked about,
- The boundaries are not very specific.
- Therefore it is important to note that an alert, created with s.13 is just one of, hopefully, many tools available to you.
- It has value but, if overused, that effectiveness will be diminished.

For example, if we were to live test s.13 often, when we send a real alert it may be ignored by some. Remember the "Never Cry Wolf" story?

Example

- I want to reiterate, s.13 is one of many tools available. It may not help in all instances. One example is the RCMP Amber alert. The Amber Alert is sent out via Alert Ready and it has shock value. However, they don't use it for minor updates. The alerts retain their value and the information is more effective with the public. They pay attention because they are not getting extraneous alerts.

- In the example shown in the slide, which is a tsunami alert for Haida Gwaii, the local communities would have other ways of informing their citizens of safe roads or shelters. These may include information alerts but they could also use other tools

that suit that community.

The May 9th Alert Ready test results showed that some people did not receive an alert from their carrier on their wireless device.

This could be due to **compatibility**, which may be dependent on many factors including

- the **handset** and
- the **software version** on the device, or
- whether they were **connected to an LTE network**.
- It's also possible that **outdated smartphone software** is a factor.

We have been working closely with Pelmorex, the company that manages Alert Ready, the federal government, other provinces and territories, and the wireless providers to identify and resolve the issue.

The intent of this test, and others that will follow, is to ensure that the expanded public alerting system works as intended and reaches as many people as possible. Testing provides an opportunity to address issues with the system before a real emergency.

The provinces and territories have agreed on the date for the issuance of a second, all-channel (wireless and broadcast) public awareness test message in 2018. In BC it will be on November 28, 2018. at 13:55 hrs (local time). The time may vary in other provinces. Please note that only EMBC creates test alerts. Local Authorities will not have that ability as they are strictly controlled.

Photo from Brishti Basa, Victoria Buzz - http://www.victoriabuzz.com/2018/05/about-half-the-phones-in-bc-did-not-get-todays-emergency-alert/
Emailed her at brishti@victoriabuzz.com *for permission – granted!*

Page 028 of 258

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In order for emergency alerts to be received on a wireless device, **the device must be**:

- Wireless public alerting compatible;
- Connected to an LTE (or 4G) cellular network at the time the emergency alert is issued; and
- Within the emergency alert area.

People can visit the new alertready.ca site to learn if their devices are compatible.

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Fort McMurray (starting May 1, 2016) is a great example of ways the provincial entity can provide assistance. The Alberta Emergency Management Association took over after the first alert (http://emergencyalert.alberta.ca/alerts/2016/05/3698.html) and issued all subsequent alerts as the community EMO was overwhelmed and was evacuating as the event developed. They do this, if required, for communities who may not have alert issuers trained (or feeling competent) or unable due to other factors to issue an alert in the moment. They use the expression “On behalf of”.

Page 031 of 258

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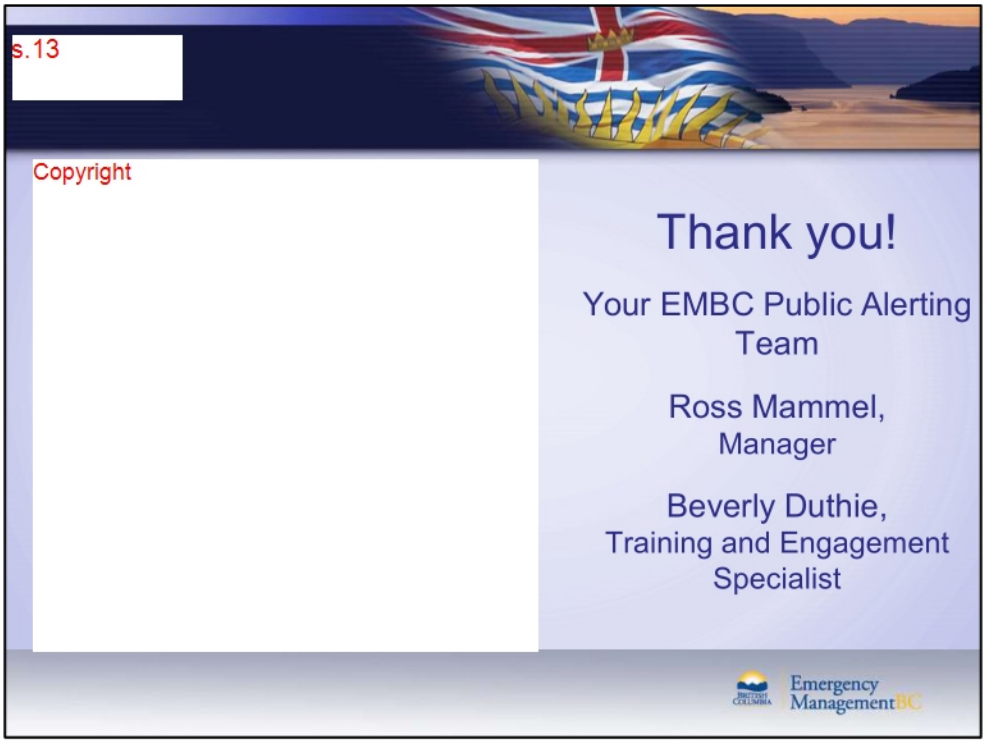
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Copyright
Thank you!
Your EMBC Public Alerting Team
Ross Mammel, Manager
Beverly Duthie, Training and Engagement Specialist
Emergency ManagementBC

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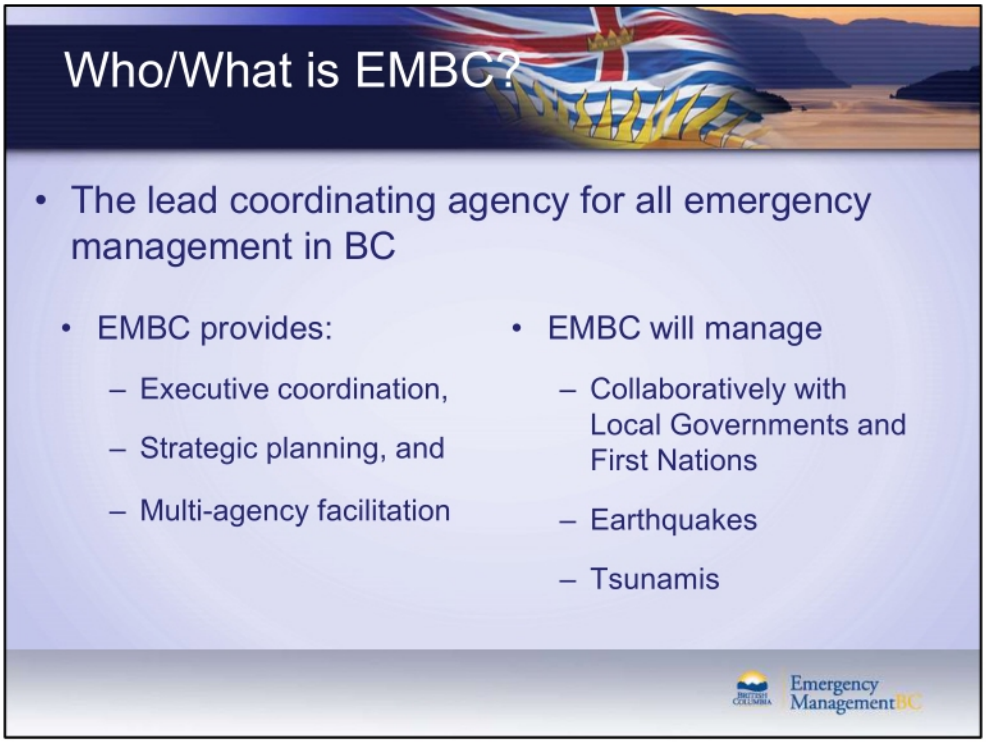
Hello! My name is Ross Mammel and I am the Manager of Public Alerting for Emergency Management British Columbia. I would like to acknowledge the opportunity I have to live, work, and play on the traditional territory of the W̱SÁNEĆ people. Here, in the traditional territory of the *(BC9-1-1)* **Musqueam** *(EMBCC)* **Musqueam, Tsleil-Waututh, and Squamish** people it is an honour to join you today. Thank you for this chance share[s.13] with you.

General Admin
Fire Escapes
First aid
AED?

Please note: we have allotted time for questions at the end of this presentation so please jot them down and we should have time to address them then.

(Photo: Unsplash – Thomas Ehling @frenchmagician)



Governed by Acts and Regulations

The Emergency Program Act and the Emergency Program Act Regulation (schedule 2) outlines the responsibilities of Government and Ministers in the event of an Emergency.

Managed through BCEMS

The coordination and fulfillment of these responsibilities is managed through the structure in the British Columbia Emergency Management System, often referred to as "BCEMS".

Events that happen locally are dealt with locally

Why? Because Local Governments have a better understanding of community needs, hazards, risks, and have the relationships within the community.

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EMBC is the lead coordinating agency

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- EMBC provides executive coordination, strategic planning and multi-agency facilitation.
- EMBC works with provincial ministries and agencies, local governments, First Nations, federal departments, industry, non-government organizations and volunteers to support emergency management.

Emergency events of provincial significance and impact are rare but they have the potential to cause widespread loss of life and damage.

- EMBC is uniquely positioned to initiate emergency alerts to the BC public for these large-scale, cross-jurisdictional events.
- Examples of these larger events are earthquakes and tsunamis because of their cross regional scope and potential disastrous scale of events.
- EMBC may receive unique information as a central coordinating agency, and it is important this information is shared to those that need it.

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For reference and to assist with questions

(1) Emergency Program Act
Local authority emergency organization
6
(1) Subject to sections 8 (2), 13 (2) and 14 (3), a local authority is at all times responsible for the direction and control of the local authority's emergency response.

(2) Subject to subsection (2.1), a local authority must prepare or cause to be prepared local emergency plans respecting preparation for, response to and recovery from

emergencies and disasters.

(2.1) For the purposes of subsection (2), a local authority that is the board of a regional district must ensure that it has one local emergency plan that applies, or 2 or more local emergency plans that in the aggregate apply, to all of the electoral areas within the regional district.

(3) A local authority that is a municipal council or the board of a regional district must establish and maintain an emergency management organization to develop and implement emergency plans and other preparedness, response and recovery measures for emergencies and disasters and, for that purpose,

(a) if the local authority is a municipal council, the municipal council must establish and maintain an emergency management organization with responsibility for the whole of the municipality, and

(b) if the local authority is the board of a regional district, the board of the regional district must establish and maintain
(i) one emergency management organization with responsibility for all of the electoral areas within the regional district, or
(ii) 2 or more emergency management organizations that in the aggregate have responsibility for all of the electoral areas within the regional district.

(3.1) Without limiting subsection (3), a local authority that is a municipal council or the board of a regional district may

(a) appoint committees the local authority considers necessary or desirable to advise and assist the local authority, and

(b) appoint a coordinator for each emergency management organization established by it under subsection (3).

(3.2) The minister may, by order, establish one or both of the following:

(a) if a local authority has not complied with subsections (2) and (2.1), the date by which the local emergency plan or plans required under those subsections must be prepared, with power to establish, for the board of a regional district, different dates for the preparation of local emergency plans for different electoral areas within the regional district;

(b) if a local authority has not complied with subsection (3), the date by which the emergency management organization or organizations required under that subsection

must be established, with power to establish, for the board of a regional district, different dates for the establishment of emergency management organizations for different electoral areas within the regional district.

(4) A local authority may, in writing, delegate any of its powers and duties under this Act to the committee, emergency management organization or coordinator referred to in subsection (3), except the power to make a declaration of a state of local emergency.

http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_96111_01#section6

(2) (Pelmorex Official Document:
Support for "Broadcast Immediately" Alerts
s.15; s.16

(3) Emergency Program Act
Division 3 – Declaration of Local Emergency
Declaration of state of local emergency
12 *(1) A local authority or, if a local authority consists of more than one person, the head of the local authority, may, at any time that the local authority or the head of the local authority, as the case may be, is satisfied that an emergency exists or is imminent in the jurisdictional area for which the local authority has responsibility, declare a state of local emergency relating to all or any part of the jurisdictional area.*

(2) A declaration of a state of local emergency under subsection (1) must identify the nature of the emergency and the part of the jurisdictional area in which it exists or is imminent, and the declaration must be made
(a) by bylaw or resolution if made by a local authority, or
(b) by order, if made by the head of a local authority.

(3) The head of a local authority must, before making a declaration under subsection (1), use best efforts to obtain the consent of the other members of the local authority to the declaration and must, as soon as practicable after making a declaration under subsection (1), convene a meeting of the local authority to assist in directing the response to the emergency.

(4) Immediately after making a declaration of a state of local emergency, the local authority or the head of the local authority, as the case may be, must
(a) forward a copy of the declaration to the minister, and

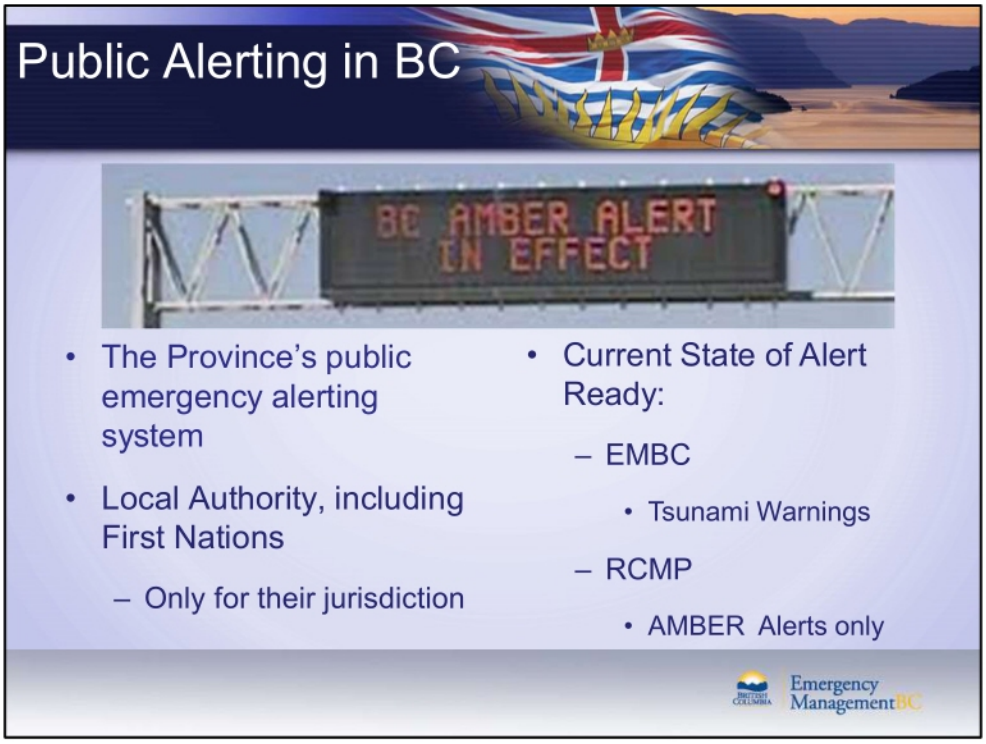
(b) cause the details of the declaration to be <u>published</u> by a means of communication that the local authority or the head of the local authority, as the case may be, considers most likely to make the contents of the declaration known to the population of the affected area.

(5) Subject to section 14 (3), a declaration of a state of local emergency expires 7 days from the date it is made unless it is earlier cancelled by the minister, the Lieutenant Governor in Council, the local authority or the head of the local authority.

(6) Despite subsection (5), the local authority may, with the approval of the minister or the Lieutenant Governor in Council, extend the duration of a declaration of a state of local emergency for periods of not more than 7 days each.

(7) Subsections (2) and (4) apply to each extension under subsection (6) of the duration of a declaration of a state of local emergency.

Statement from Minister (get from Jordan)



The first line of communication to impacted communities and populations can be through public alerting. s.13

s.13

PENS

EMBC utilizes PENS, to notify local authorities, First Nations, agencies, and media contacts, to distribute tsunami alerts and to determine whether their emergency plan needs to be activated and to what level.

Alert Ready

Alert Ready, the national system, as mandated by the Broadcasting Regulatory Policy, is used today for a few Broadcast Immediate instances.

EMBC is prepared to use Alert Ready to distribute Tsunami Warnings.

The **RCMP** has access to distribute Amber Alerts.

Environment Canada also distribute alerts via Alert Ready. A recent example would be the tornados in the Ottawa and Gatineau areas.

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Alert Issuers Includes Local Authorities

- Defined by the Emergency Program Act which includes Local Governments (Cities and Regional Districts) and
- First Nations under the *first nations support agreement*.
- *RCMP for amber alerts*
- *EMBC for Tsunami*

For reference and to assist with questions:
Broadcasting Regulatory Policy (CRTC 2014-444 and corresponding orders), (Government of Canada, 2014).

Page 041 of 258 to/à Page 042 of 258

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There are two kinds of alerts – Broadcast Immediate and Information Alerts.

SOREM
Senior Officials Responsible for Emergency Management has established a definitive list of Alert Message types permitted for **immediate** broadcast by last mile distributors – radio, television, and LTE smart phones – based on a list of event codes and their respective severity, urgency, and certainty values.

A collection of event types and associated **urgency**, **severity**, and **certainty** conditions, have been identified by SOREM as having an imminent or expected threat to life. Classified as broadcast immediate, alerting officials will be able to distribute and present these alerts to the public as soon as possible, even if it will disrupt the programming of last mile distributors .

Broadcast Immediate, Broadcast Intrusive and BI alerts? It can be confusing.
These are all the same thing. These alerts, indicating a situation where there is an imminent or unexpected threat to life, interrupt normal processes. They feed an alert through your LTE smart phone and are fed to radio and television operators and intrude on their regular broadcast.

BI
- Broadcast Immediate if you are the real person acting on behalf of a local authority

and creating an alert.

- Broadcast Intrusive if you are receiving the alert. These alerts override the current programming whether the media is radio, TV, your Cellular Provider, or Digital Road Signs.

What are Information alerts?

- Indicate a situation that is not imminently life threatening
- Do not intrude on regular broadcast.
- Not a "wireless public alert"
- Could be received through an App on a smartphone
- Fed to open data sources
  for them to pick up and distribute to the public at the earliest opportunity but will not automatically interrupt regular processes like a BI alert will. For example, the AlertBC App could be set to distribute all alerts in your area or just to select alerts. Broadcasters may pick up the alert as a news item. Information alerts are
- Valuable, especially if managed well. We will address this in the training component of AlertBC.

Broadcast Immediate Alerts and Information alerts are different tools for different jobs. BI is very disruptive and could even be dangerous if it causes panic or recommends the wrong action. The goal is to reduce and manage the risks, while increasing the value of this information. BI is, therefore, saved for very limited situations.

For reference and to assist with questions:
National Public Alerting System
Broadcast Immediate Events List

https://npas.ca/clf/broadcast-immediate-events-list/

Fire:
Urban Fire
An urban fire threatens multiple residential and/or commercial properties.
Industrial Fire
A large fire in an industrial building or complex that poses a threat to human health.
Wildfire
A wildfire involves natural combustibles, such as grass, brush and trees.
Forest Fire
A Forest fire is a wildfire or prescribed fire that is burning in forested areas, grass or alpine/tundra vegetation and poses a threat to human safety.

Natural:

Tornado

A tornado is a vortex of a violently rotating winds, often forming a funnel shaped cloud that is capable of damaging property and injuring people.

Flash Flood

Often occurring from river ice jams and excessive unexpected rainfall, a flash flood is the sudden onset of water causing immediate flooding. This event presents a unique danger to life and safety as there is little or no warning that this event will occur.

Earthquake

An earthquake is a sudden release of energy in the Earth's crust that creates seismic waves that can cause substantial damage, especially in urban environments.

Hurricane

A hurricane is violent storm comprised of intense winds and, heavy rain, potentially causing a storm surge, floods, coastal erosion or landslides.

Biological:

Biological

A potentially dangerous and poisonous substance that is usually very unstable and can be easily transferred between living organisms.

Chemical

A chemical substance that, if misused or released, could result in serious injury or death.

Radiological

With sufficient concentration, a radiological substance.

Drinking Water Contamination

When water quality is negatively affected and a boil-water advisory may be raised, cautioning use by the public.

Explosive:

Explosive

A potentially dangerous substance or device that may explode.

Environmental:

Air Quality

A decrease in air quality is caused by an elevated particulate count in the atmosphere that can negatively affect visibility or the health of individuals.

Falling Object

Natural or human-made materials at risk of falling, which may threaten people or property.

Terrorist:

Terrorist Threat
The use of violence or threats of violence by individuals or groups against civilians or infrastructure.

Civil:
Civil Emergency
A civil emergency occurs when humans cause a disruption of services or require varying levels of support, law enforcement or attention.
Animal Danger
When a wild or domesticated animal poses a threat to human life or property.
Amber Alert
An Amber Alert is issued by police services when a child has been abducted and it is believed that his/her life is in grave danger. An Amber Alert provides the public with immediate and up-to-date information about the abduction and solicits the public's help in the safe and swift return of the child.
911 Service
A 911 service alert happens when there is a disruption or outage of telecommunication services between the public and emergency responders.

Alert Ready Admin
Test Message
A test message may be issued for either public awareness or technical testing purposes.

Senior Officials Responsible for Emergency Management (SOREM): A forum of Federal/Provincial/Territorial (F/P/T) officials responsible for coordinating a strategy for emergency management in Canada, and for providing guidance and advice on how to enhance emergency management in Canada. SOREM includes representatives from provincial and territorial emergency management organizations and Public Safety Canada.
SOREM Public Alerting Layer: A CAP layer developed by SOREM for the Canadian public alerting community.

Broadcast Immediate Events List: A collection of event types and associated CAP urgency, severity and certainty conditions, that have been identified by the *Senior Officials Responsible for Emergency Management* as having an imminent or unexpected threat to life, that alerting officials wish to be distributed and presented to the public as soon as possible, even if it means disrupting the programming of last mile distributors. The current version of this list is available at www.alerts.pelmorex.com/techinfo/.
Broadcast Immediate (BI) Alert: An audience alert message that aligns with the Broadcast Immediate Events List. BI should not be confused with Broadcast Intrusive - a similar term used by Environment and Climate Change Canada, who should be consulted on its current definition.

Broadcast Immediate Parameter (BIP): The parameter which indicates whether an alert meets the BI criteria for distribution by broadcasters and BDUs.

1. Broadcast Immediate Alerts

1.1 The Broadcast Immediate Parameter, as defined in the SOREM Public Alerting Layer [ref.: Appendix C] shall be used to indicate when an alert is BI.

1.2. LMDs are not required to validate a BI alert against the "Broadcast Immediate Events List" as long as a valid BI indicator is included in the alert message.

1.3. LMDs should inspect all incoming CAP messages, regardless of whether they are indicated as BI or not. This is because CAP messages which are issued to update or replace active BI alerts may not be indicated as BI, since these new messages may not meet the BI criteria. As such, if LMDs were to only take action for BI alerts, they may continue to distribute an alert to the public after it has been cancelled by the alerting authority. Furthermore, multiple BI alerts may be issued for a single emergency event, as the geographic area affected by the emergency may change or expand with time. In such a case, the existing BI alert may be updated and a CAP message issued with additional geographic areas added. These updates contain no new information for the public in the geographic areas that have been previously alerted; hence a given updated BI alert may not be pertinent for a particular LMD (e.g. if the new geographic areas are outside the LMD's area of interest), underlining the importance that LMDs inspect all incoming CAP messages, regardless of their frequency or BI status.

What this means is when disaster strikes or an emergency is declared, it is critical that the public is provided with timely, consistent, and accurate messaging to protect public safety.

Local Authorities are required to maintain an emergency management organization and prepared emergency plans. However, these plans and their alerting systems are not currently aligned with Alert Ready, the National program.

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Studies and After Action Reviews have shown people rate the importance of information on par with food and water in the wake of a large scale emergency. That information needs to be trusted or believable, preferably both for it to reduce confusion or panic and to assist the public in acting appropriately to reduce the chance of harm. I will talk more about that later.

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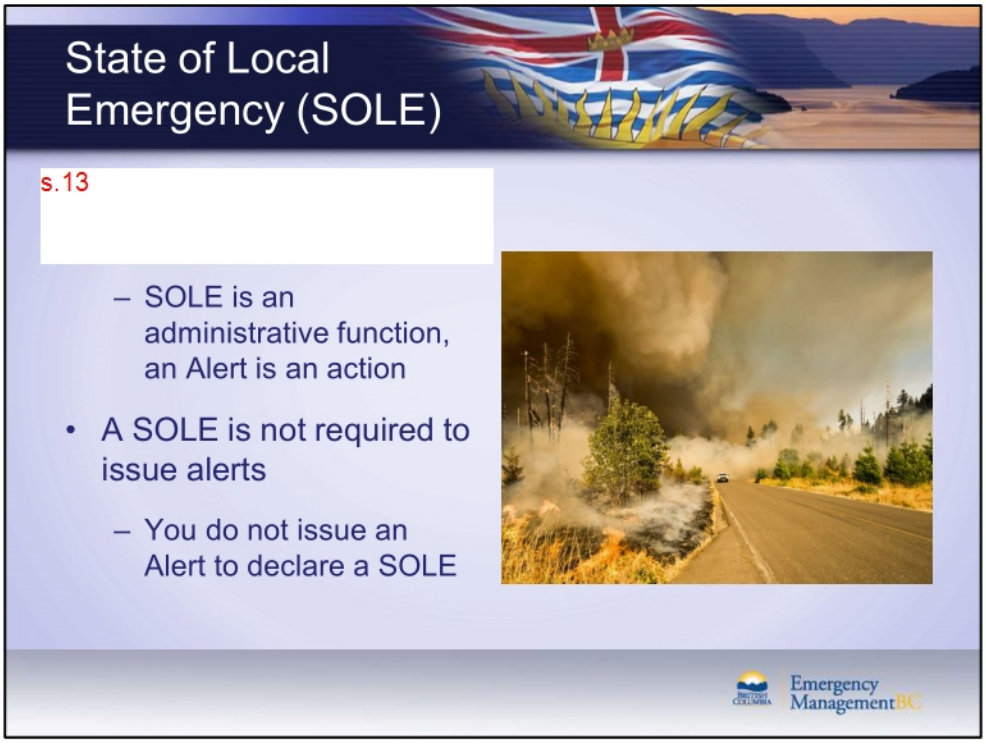
For reference and to assist with questions:

Urgency (in: cap. \ alertInfo. \ urgency. Code)
The code denoting the urgency of the subject event of the alert message (REQUIRED)
(1) The <urgency>, <severity>, and <certainty> elements collectively distinguish less emphatic from more emphatic messages.
(2) Code Values:
"Immediate" - Responsive action SHOULD be taken immediately
"Expected" - Responsive action SHOULD be taken soon (within next hour)
"Future" - Responsive action SHOULD be taken in the near future

“Past” - Responsive action is no longer required
“Unknown” - Urgency not known

Severity (in cap. \ alertInfo. \ severity. Code)
The code denoting the severity of the subject event of the alert message (REQUIRED)
(1) The <urgency>, <severity>, and <certainty> elements collectively distinguish less emphatic from more emphatic messages.
(2) Code Values:
“Extreme” - Extraordinary threat to life or property
“Severe” - Significant threat to life or property
“Moderate” - Possible threat to life or property
“Minor” – Minimal to no known threat to life or property
“Unknown” - Severity unknown

Certainty (in cap. \ alertInfo. \ certainty. Code)
The code denoting the certainty of the subject event of the alert message (REQUIRED)
(1) The <urgency>, <severity>, and <certainty> elements collectively distinguish less emphatic from more emphatic messages.
(2) Code Values:
“Observed” – Determined to have occurred or to be ongoing
“Likely” - Likely (p > ~50%)
“Possible” - Possible but not likely (p <= ~50%)
“Unlikely” - Not expected to occur (p ~ 0)
“Unknown” - Certainty unknown
(3) For backward compatibility with CAP 1.0, the deprecated value of “Very Likely” SHOULD be treated as equivalent to “Likely”.



A state of local emergency (**SOLE)** is declared when a local authority requires access to the powers granted under the act. It is important to note that SOLE is not on the event list as it is not an event. A SOLE ties to the cause not the effect.

It is important to understand that a SOLE is **not** required to issue an alert.

A SOLE is an legal document that allows the local government to address the risk from the hazard. Alerting is an action taken as a response to mitigate the risk of a hazard.

For reference and to assist with questions:

What is a declaration of a state of local emergency?

This is a temporary emergency authority measure authorized by the *Emergency Program Act*. A declaration of a state of local emergency has to be initiated by either a local government bylaw or order and is valid for a period of seven days.

"Declaring a state of local emergency enables local authorities in the Province of British Columbia to exercise the emergency powers listed in the *Emergency Program Act*. The emergency powers are utilized by the local authority to order the evacuation of residents from their homes, prohibit travel and enter private property when an emergency threatens lives, property, or the environment within the local authority's jurisdiction.

Local authority emergency program staff and elected officials must be prepared to declare a state of local emergency in response to an emergency or disaster at a moment's notice. Therefore, local authority emergency plans must clearly and concisely outline the process for declaring a state of local emergency, as well as managing the application and use of the emergency powers."(1)

(1) https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/local-government/eoc-forms/embc_declaring_state_of_local_emergency_dec_2017_final.pdf

(2) Photo: Unsplash – Marcus Kauffman @marcus_kauffman

Last Mile Distributors

Alerting s.13 reaches out to those within the areas covered by the specific Last Mile Distributor.

- Some will have a much further reach than others.
- The boundaries are not very specific.
- Therefore it is important to note that an alert, created with s.13 is just one of, hopefully, many tools available to you.
- It has value but, if overused, that effectiveness will be diminished.

Over Alerting

For example, if we were to live test s.13 often, when we send a real alert it may be ignored by some. Remember the "Never Cry Wolf" story?

Example

- I want to reiterate, s.13 is one of many tools available. It may not help in all instances. One example is the RCMP Amber alert. The Alert is sent out via Alert Ready and it has shock value. However, they don't use it for minor updates. The alters retain their value and the information is more effective with the public. They pay attention because they are not getting extraneous alerts.

- In the example shown in the slide, which is a tsunami alert for Haida Gwaii, the local communities would have other ways of informing their citizens of safe roads or

shelters. These may include information alerts and other tools that suit that community.

Where does the message go?

The National Alert Aggregation and Dissemination (**NAAD**) System – The Alert Ready system

- collects public alerting messages from Authorized Government Agencies (AGA) and
- makes them available to Last Mile Distributors (LMD) such as
    - radio and television stations, as well as cable and satellite TV companies for display to Canadians.

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Multi-track messaging tries to reach as many people as possible.

- The goal is to get over 20% of the population informed then allow peer to peer and re-broadcast to further multiply the effect.
- With as little as 5% of intended audience reached, the public will begin to move.

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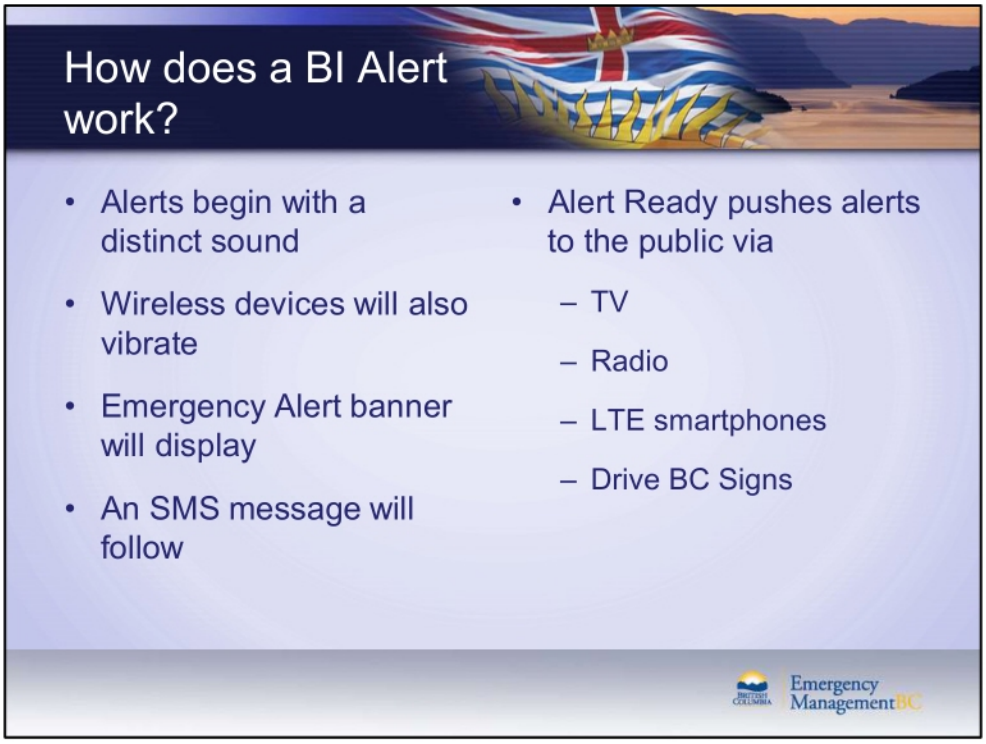
(Photo – Unsplash: Ben Koo @Benkuo)

First mile distributors are

- Reliant on the internet.
- Connectivity is within the Local Governments' purview.
- s.13

Radio waves

- Don't recognize jurisdictional boundaries and, by design, the system will always reach beyond the specified area.
- As consequence, last mile distributors will deliberately **over alert** to ensure coverage of the area selected.
- All last mile distributors will have a different level of reach but all will alert beyond the boundaries.
- s.13
-



Emergency alerts, on radio, television and compatible LTE smartphones, begin with a **distinct sound**, known as the Canadian Alert Attention Signal. Emergency alerts sent to compatible wireless devices will also cause the phone to **vibrate**.

On compatible LTE smartphones, the emergency alert will display an **"EMERGENCY ALERT" banner**, followed by text that describes the situation and provides instructions on

- What actions to take and
- Where to find more information
- At the top of each emergency alert, the issuing government agency will be clearly indicated.
- Please note that different devices and software load and act differently.

Is this like PENS?

Some of you may think this is the PENS system but it is different.

- The Provincial Emergency Notification System (PENS) is designed to alert
    - local governments,
    - emergency response officials and
    - the media of tsunami alerts.
- They in turn are tasked with alerting those communities that are most at risk.

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Page 060 of 258

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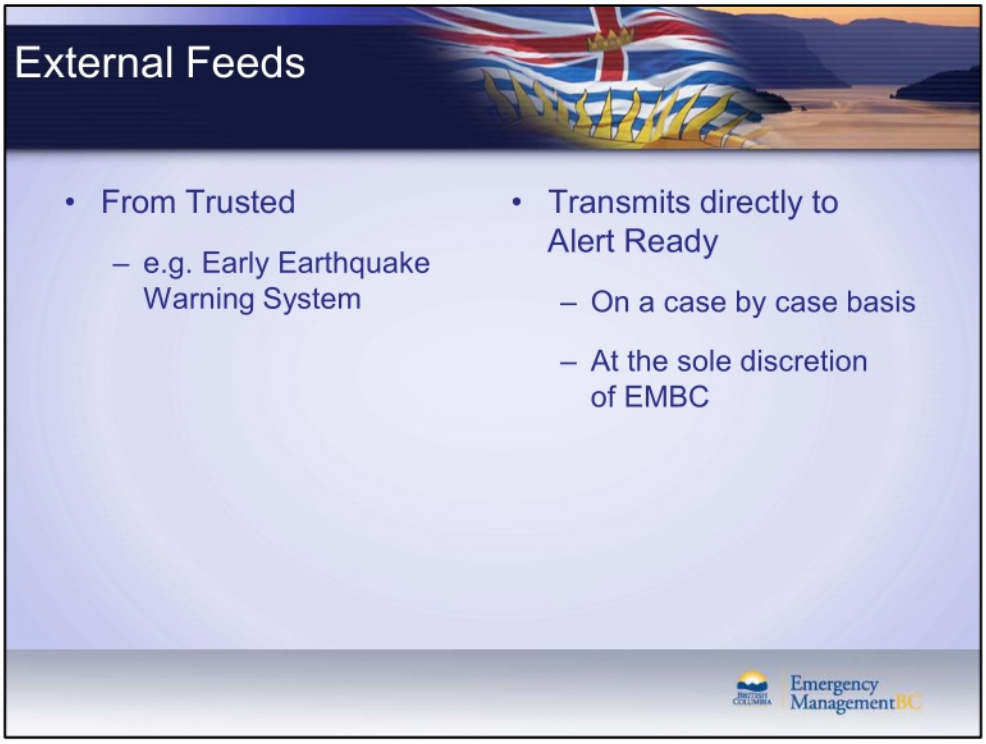

What are External Feeds?
EMBC as been working to create more automated means of alerting those at risk of potentially catastrophic events. An example of this is the soon to be implemented **Early Earthquake Warning System**. The information for these alerts is received through sensors and could provide time to prepare.

The benefits of earthquake early warning can be quite wide.
Rapid alerts that signal incoming earthquake ground shaking can

- reduce deaths,
- injuries and
- property losses.

Even a few seconds of warning are enough time to take protective and preventative measures, such as:

- triggering trains to slow down
- stopping bridge and tunnel traffic
- halting landings for incoming air traffic
- opening bay doors at fire and ambulance halls
- allowing surgeons to stop delicate procedures
- allowing people to Drop, Cover and Hold On before the shaking starts.

From another perspective, municipal level alerting systems could be utilized to generate alerts s.13

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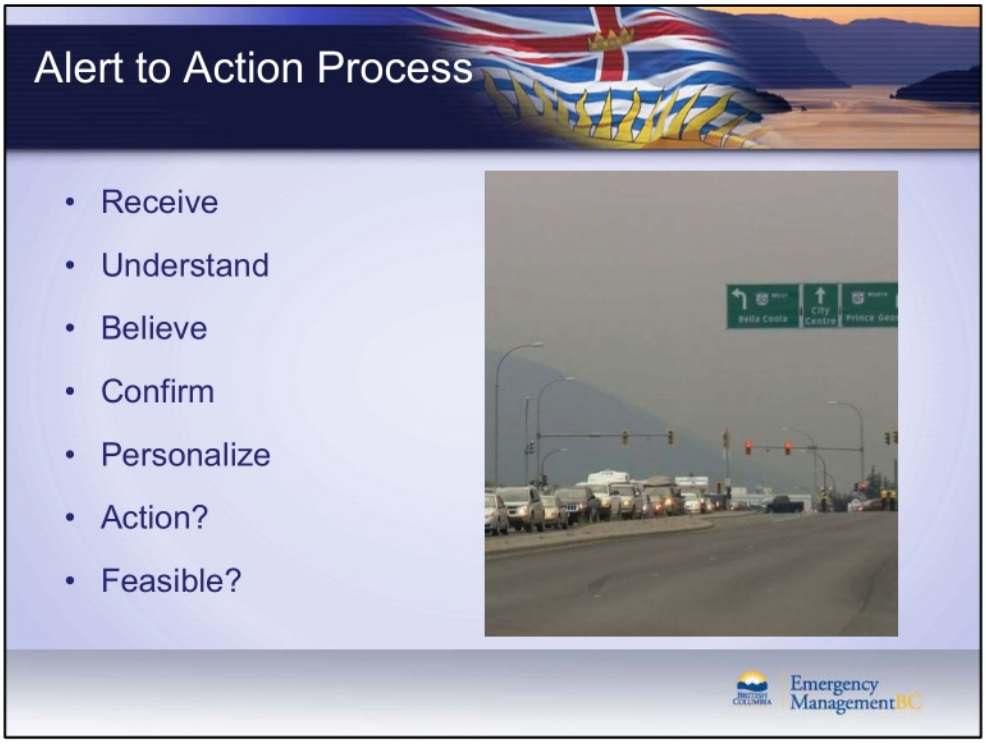
For reference and to assist with questions:

Text from http://www.oceannetworks.ca/innovation-centre/smart-ocean-systems/earthquake-early-warning



Successful emergency alerting happens when the greatest number of public-at-risk is sufficiently informed with the information needed to take action. Many studies show that most alert recipients don't automatically take action when alerted – recipients usually follow a series of steps **before** they decide to take action. In order to maximize the value of emergency alerting, every step of this Alert to Action process must be supported by the Alerting Framework. If the framework supports the entire process, studies show that a significantly greater number of people will act as recommended.

A member of the public's Alert to Action process is reflected in the slide:

1. They receive the message
2. Next it may take a few moments to understand the message, especially if they are already traumatized
3. Then they need to believe the message is credible. Good messaging with links to credible websites will help this process.
4. Many will confirm (or acknowledge) the message (from another source) if necessary
5. They often need to personalize the message; to determine the message applies to them
6. Once they have assessed the message they will then determine whether action is required
7. They also need to determine whether action is feasible

As you can see, the **more information** provided with the **least number of words** will assist people to make **good decisions** and save lives.

Image Credit: Global News

Public Awareness will be <u>important</u>. They will require education to understand <u>when</u> alerts are issued, <u>how</u>, <u>by whom</u>, <u>what to do</u> etc.

This all **improves**
- <u>speed</u> and
- <u>effectiveness</u> of the alert to action.

Training and Tests, are all very important.
- Reduces panic,
- Reduces confusion and
- Helps the public understand the limitations (and capabilities) of the alerting system. They typically think the systems are better than they are.

The May 9th Alert Ready test results showed that some people did not receive an alert from their carrier on their wireless device.

This could be due to **compatibility**, which may be dependent on many factors including

- the **handset** and
- the **software version** on the device, or
- whether they were **connected to an LTE network**.
- It's also possible that **outdated smartphone software** is a factor.

We have been working closely with Pelmorex, the company that manages Alert Ready, the federal government, other provinces and territories, and the wireless providers to identify and resolve the issue.

The intent of this test, and others that will follow, is to ensure that the expanded public alerting system works as intended and reaches as many people as possible. Testing provides an opportunity to address issues with the system before a real emergency.

The provinces and territories have agreed on the date for the issuance of a second, all-channel (wireless and broadcast) public awareness test message in 2018. In BC it will be on November 28, 2018. at 13:55 hrs (local time). The time may vary in other provinces. Please note that only EMBC creates test alerts. Local Authorities will not have that ability as they are strictly controlled.

Photo from Brishti Basa, Victoria Buzz - http://www.victoriabuzz.com/2018/05/about-half-the-phones-in-bc-did-not-get-todays-emergency-alert/
Emailed her at brishti@victoriabuzz.com *for permission – granted!*

Page 068 of 258

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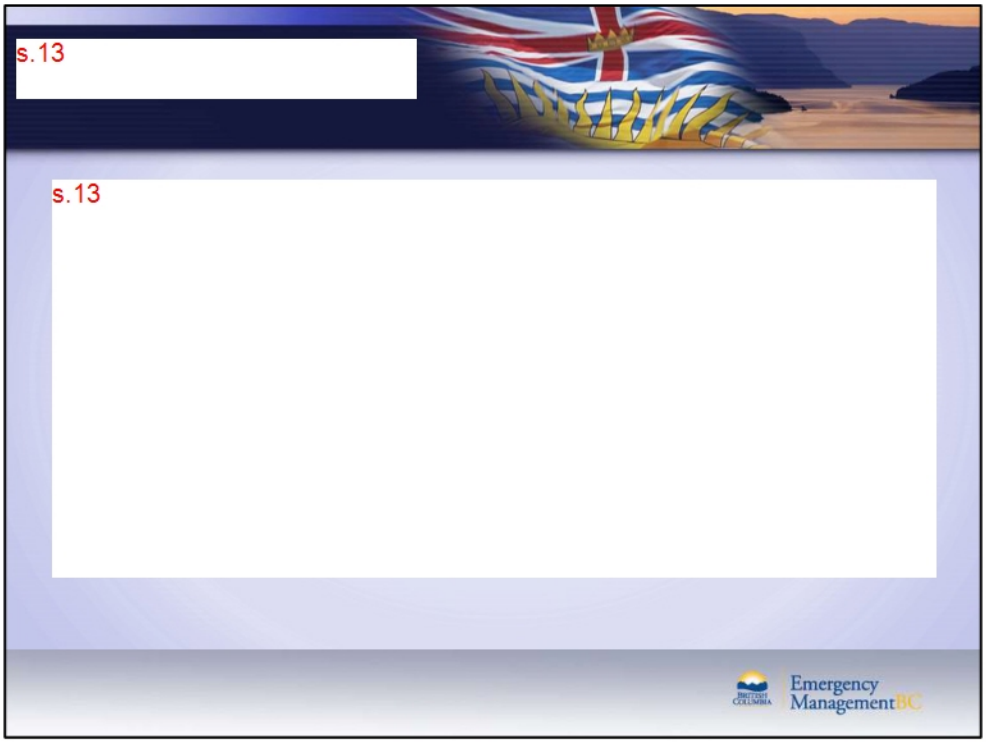

As I said earlier, Local Governments create alerts, other than the general tsunami alerts, weather alerts, and Amber alerts, for their own area and territory. We are hoping to add an early earthquake warning to the automated alerts in the next year.

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Page 070 of 258

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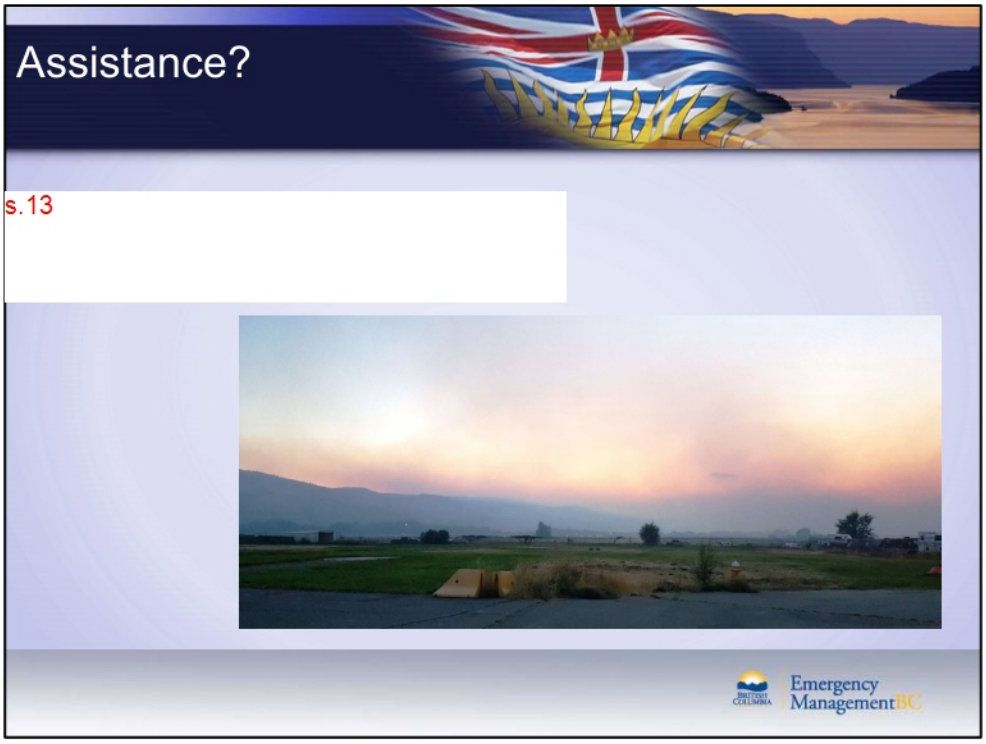
In order for emergency alerts to be received on a wireless device, **the device must be**:

- Wireless public alerting compatible;
- Connected to an LTE (or 4G) cellular network at the time the emergency alert is issued; and
- Within the emergency alert area.

People can visit the new alertready.ca site to learn if their devices are compatible.



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Example:
Fort McMurray (starting May 1, 2016) is a great example of ways the provincial entity can provide assistance. The Alberta Emergency Management Association took over after the first alert (http://emergencyalert.alberta.ca/alerts/2016/05/3698.html) and issued all subsequent alerts as the community EMO was overwhelmed and was evacuating as the event developed. They do this, if required, for communities who may not have alert issuers trained (or feeling competent) or unable due to other factors to issue an alert in the moment. They use the expression "On behalf of".

EMBC will issue Tsunami warnings: Local authorities may issue secondary Tsunami alerts with more detailed or specific local instructions. RCMP will issue AMBER alerts: Local authorities will not have access to AMBER alert capability.

Local authorities may only alert inside their boundaries unless an agreement with the another effected local authority is in place and registered with EMBC public alerting program.

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Page 074 of 258

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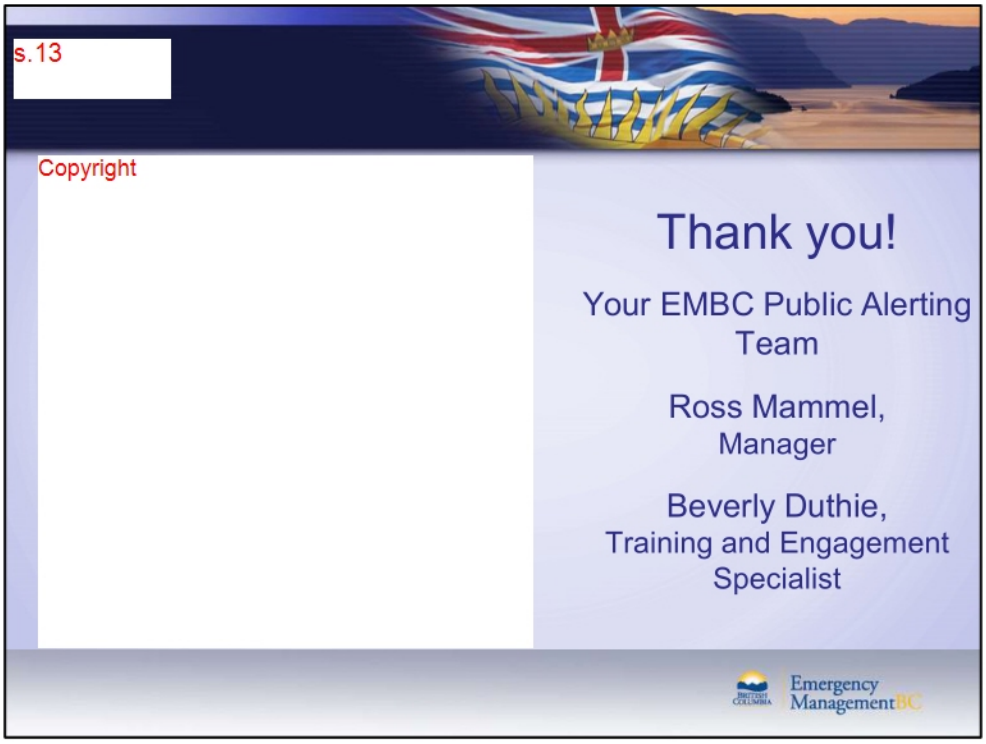
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Copyright
Thank you!
Your EMBC Public Alerting Team
Ross Mammel, Manager
Beverly Duthie, Training and Engagement Specialist
Emergency ManagementBC

.

Environmental Scan Report

for

BC Public Alerting Project

Prepared By:	BC Public Alerting Project Team, Business Analyst
Prepared For:	Ministry of Public Safety and Solicitor General
Document Version:	1.0.0
Creation Date:	July 5th 2016
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Table of Contents

Table of Figures **4**

Version Control **4**

1 Introduction **5**

1.1 Purpose 5

1.2 Audience 5

1.3 Related Documents 6

1.4 Document Location 6

2 Executive Summary **7**

2.1 Key Findings 7

3 Method **14**

3.1 Agencies Sampled 15

3.2 Questions 15

4 Results **16**

4.1 Results Summary 16

4.2 Summary of Interview Results 16

4.3 BC Local Authority Alerting Summary 22

4.4 Points of Interest with Pros and Cons 36

5 COTS Systems **42**

5.1 NetAlerts (www.netalerts.org) 42

5.2 Pelmorex / NAADS / AlertReady 43

5.3 E-Team 43

5.4 EVigilo 44

5.5 UMS 46

6 Approvals **47**

7 Appendix A – Survey Questions **48**

8 Appendix B: Jurisidiction Interview Notes **51**

8.1 Alberta 51

8.2 Saskatchewan 58

8.3 Washington State 62

8.4 New York 68

8.5 Australia 73
8.6 Sweden 79
8.7 Netherlands 85
8.8 Japan 91
9 Appendix C: Glossary of Terms 95
10 Appendix D: Alberta Emergncy Alert Architecture 102
11 Appendix E: Peter Andersen – SFU Research 105
12 Appendix F: Wireless Public Alerting System (WPAS) Trial 115
13 Appendix G: Early Earthquake Warning Alerting 117
13.1 EEW Alerting 117
14 Appendix H: Earthquake Early Warning Broadcast Telementry 122
15 Appendix I: Public Alerting Solution in Other Jurisdiction 128
15.1 SaskAlert 128
15.2 Weather Network 129
15.3 San Francisco 130
15.4 New York 132
15.5 Israel 134
16 Appendix J – Initial Research 138
17 Appendix K – COTS vs Custom Build 147
18 Appendix L - Mentioned Vendors 150
19 Appendix M - Alert origination software providers that have successfully demonstrated their IPAWS capabilities: 153
20 Appendix N – Research References 154
21 Appendix O – IPAWS Open Developer Organizations 155
22 Appendix P: Canadian Broadcast Partners 164

Table of Figures

Figure 1: Public Alerting Landscape 8
Figure 2: Cellular Coverage in BC (Peter Andersen-SFU) 10
Figure 3: Over-the-Air Radio Coverage in BC (Peter Andersen-SFU) 10
Figure 4: Chile Interface (Tsunami Example) 44
Figure 5: Architecture Diagram for EVigilo SMART Alert 45
Figure 6: Japan 2011 - Early Earthquake Warning 118
Figure 7: Screenshot from ShakeAlert.org 119
Figure 8: WeatherNews - Japan Earthquake Application 119
Figure 9: Mexico and Japan EEW Radio Receiver 120
Figure 10: EEW Alerts on SoftBank Cell Phone in Japan 120
Figure 11: Screenshot from google.ca 121
Figure 12 - An example of a Japanese loudspeaker array. Over 90% of Japanese cities, towns and villages have systems like this deployed. 122
Figure 13 - Screen shot of Shake Alert desktop application. 124
Figure 14 - Low cost Sarmex receiver used in Mexico 125
Figure 15 - An example of a specialized emergency broadcast receiver/transmitter. 126

Version Control

The purpose of this section is to document the history of this document to track changes and approvals.

Version	*Date*	*Change Description*	*Author*
0.1	July 5th 2016	Initial Draft	Julian Barabas
01.b	September 12th 2016	Added Environmental Scan Questions Appendix Added Jurisdictions to be interviewed.	Julian Barabas
0.8	March 31, 2017	First draft of complete document for Review	Andrew Lamoureux
0.9	May 15, 2017	Updates from IMB Review	Andrew Lamoureux
0.9.1	June 23, 2017	Updates from Software Engineer Review	Andrew Lamoureux
0.9.2	June 28, 2017	Updates from IMB Executive Review	Andrew

			Lamoureux
0.9.3	July 21, 2017	Updates from EMBC review	Andrew Lamoureux
1.0.0	January 11, 2018	Update for change to PSSG and final review	Ross Mammel

1 Introduction

Emergency Management BC, a Division of the Ministry of Public Safety and Solicitor General (PSSG, the Ministry), is looking to implement a public alerting system for BC. The primary purpose of the BC Public Alerting Project's Environmental Scan is to gather information about solutions currently being used by national and international emergency management jurisdictions as well as other local government sectors for alerting the public to emergency hazards. This team looked to gather data about potential solutions to attempt to clarify some unknowns, surrounding the project:

- Obtain jurisdiction experience that can be leveraged by future state business requirements, particularly regarding new technologies or standards that are being adopted in the industry;
- Identify the type(s) of solution(s) that might be available and meet the Ministry's needs including Commercial Off The Shelf (COTS) solutions, custom-designed, Software-As-A-Service (SAAS) or cloud-based services;
- Identify parties with previous experience in providing/developing and supporting comparable systems;
- Gather information that would advise any future procurement opportunity the Ministry may pursue;
- Obtain high-level cost and implementation schedule estimates for budget and planning purposes;
- Alert industry of a potential future procurement opportunity; and,
- At the Ministry's sole discretion, identify vendors who may have a product or solution that meets some or all of the Ministry's requirements, and with whom the Ministry would like to alert when an RFI is posted.

IMPORTANT: All vendor assumptions made in this report are based upon informal interviews with client jurisdictions and not the vendor themselves. Therefore, all assumptions should be confirmed directly with vendor, or at least re-affirmed with the jurisdiction, before they are used to make project decisions.

1.1 Purpose

The purpose of this document is to summarize the findings of the Environmental Scan. This analysis along with other research activities will then form the basis for a decision regarding project direction and procurement. A glossary of terms is provided in the document, please refer to Appendix C. Glossary of Terms.

1.2 Audience

Name	Role or Title	Role
Patricia Campbell	Team Lead, IM/IT Governance and Strategy, ISB	Signee
Chris Duffy	Business Sponsor, Emergency Management BC	Signee
Heather Macleod	Portfolio Lead, IMB	Reviewer
Melanie Cole-Kellows	Project Manager, BC Public Alerting	Reviewer
Ian Lightbody	Business Lead, Emergency Management BC	Reviewer
Jaklyn Vervynck	Software Engineer, IMB	Reviewer

1.3 Related Documents

Related documents are stored on the Public Alerting SharePoint site at s.15
s.15

1.4 Document Location

This document is stored on the Public Alerting SharePoint site at s.15
s.15

2 Executive Summary

The Environment Scan report team looked at public alerting systems implemented by varying levels of governments from municipal/local to federal level programs. The findings represent a broad spectrum of solutions and vary greater in alerting scope (from local to regional and national), cost of the solution (>10K to <$100M) and last-mile channels used. We interviewed:

- 2 Canadian provincial jurisdictions
- 2 American state level jurisdictions
- 3 International jurisdictions
- 11 local authority jurisdictions across British Columbia

In addition, due to the public nature of alerting system, the report identified the public facing components of alerting solution from 17 other jurisdictions that were not interviewed.

	Interviewed by Phone or In Person	Research systems through online documentation only
Canadian Jurisdictions	• Alberta • Saskatchewan	• Ontario • Environment Canada
United States Jurisdictions	• Washington State • New York	• San Francisco • FEMA
International Jurisdictions	• State of Victoria, Australia • Sweden • Netherlands	• Japan • Israel • Norway • Spain • Germany • Lithuania • Czech Republic • Chile • Taiwan • Korea
BC Jurisdictions	• Squamish • Capital Regional District • Village of Masset • Old Masset • Queen Charlotte City • Port Clements • Abbotsford • Squamish • Thompson Regional District • Merit • Kelowna	• Richmond • North Shore Emergency Management • Sidney

The key findings from the environment scan were:

1. Public Alerting Solutions are typically a system-of-systems
2. Alerting Channels varied greatly depending on Jurisdiction-Level
3. Wide-Area Notification Systems in Areas of Imminent Danger
4. Satellite is the only last-mile channel that has coverage across 100% of the province of BC
5. One-Way vs. Two-Way Alerting Solutions

6. Siloed Alerting Solutions and Low Integration between Systems
7. Purchasing alerting products off-the-shelf was the preferred method of implementation
8. Intrusive mobile public alerting was the preferred last-mile channel if all jurisdictions where it was possible

2.1 Key Findings

2.1.1 Public Alerting Solutions are System of Systems

Alerting Solutions are a system-of-systems where multiple systems often implemented by different organizations (public and private) and different levels of government (local, regional, national) were required to work together to get alerts to the public through as many channels as possible. This finding made comparing systems to each other in a fair manner not possible as systems classified as public alerting systems fulfill very different requirements based on the jurisdiction that they are implemented for.

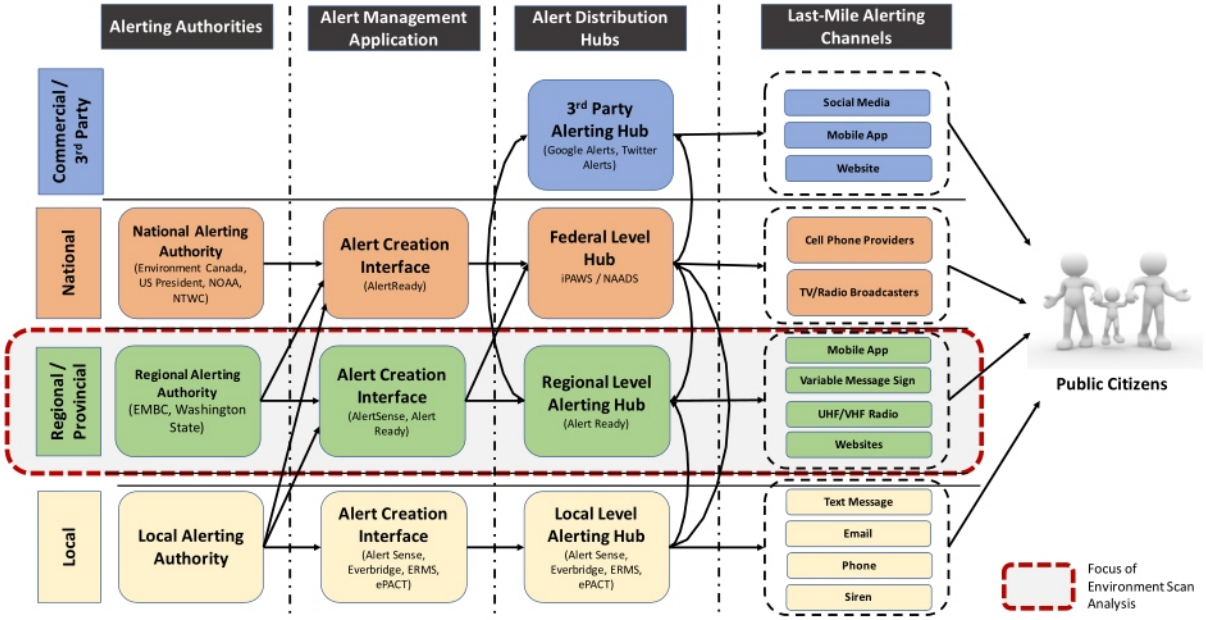

Figure 1: Public Alerting Landscape

The diagram above attempts to show the different systems found in the environment scan, that fall under different levels of jurisdiction that work together to produce alerts. Public alerting in BC should not be through of as a single system that meets all the alerting needs of the public by itself but rather a piece in the overall system that fills the gap between local alerting systems and national level initiatives and addresses the unique needs of the province.

It was found that local authorities used or interfaced with systems at higher levels of authority but the reverse was generally not true. Local authorities would use regional and national alerting interfaces but a national or regional authority would not have access to a local authority's system.

Note that some last-mile alerting channels seemed to most often interface with only one level of hub. This was not always the rule (Alert Emergency Alerts interface directly to TV and Radio) but the most commonly found configurations are shown to simplify the diagram.

2.1.2 Alerting Channels Varied greatly depending on Jurisdiction-Level

Local Solutions- Local alerting solutions included sirens and opt-in addressable notification systems that included email, SMS and telephone voice alerting. These solutions were purchased and implemented by local governments and can be used for very localized emergencies such as water advisories, local events and closures as well as larger emergency situations.

Regional – Regional Solutions tended to fill in the gaps between the local and national solutions. These solutions aggregated alerts at the local level into a regional level alerting hubs, disseminated the alerts across channels that required some custom integration and support such as the web and twitter and integrated with the national and private organization level initiates on behalf on local level governments who did not have the resources for this type of large project.

National – National alerting solutions focused on large scale implementations that involved implementing infrastructure and regulations that forced last-mile channels providers to comply and implement the public alerting interfaces as part of having a license to operate. This included initiatives to distribute alerts through television, AM/FM radio and the cellular phone network.

2.1.3 Wide-Area Notification Systems in Areas of Imminent Danger

Jurisdictions such as Japan, Israel and Eastern Europe where the threat of disaster (natural and man-made) are imminent daily, were much more likely to have implemented automated siren systems. In Sweden, the sirens are integrated and can be turned on individually or a group of sirens can be activated from a central location by a person using a siren control system. In Israel, sirens are connected directly to their alerting hub through a siren gateway access layer that can send messages automatically to activate sirens located in the alerting area. In these jurisdictions, the public is very aware of the risks that exist daily and expect government operated speaker systems.

BC has several local authorities that have install sirens including, the Capital Regional District (Port Renfrew and Jordon River), Tofino, Queen Charlotte City and Thompson Regional District (Spence's Bridge).

Some jurisdiction's surveyed were retiring their siren system (Netherlands), while other were modernizing their siren system (Sweden). In North America, San Francisco had a large city-wide siren network of 109 sirens/loud-speakers across the city.

2.1.4 Satellite is the last-mile channel that has the greatest geographical coverage (~99%) in the province of BC

BC's mountainous geography and spread-out populations in rural areas make it prohibitively expensive to service all of BC through land-based communications technologies such as radio, cellular or physical land lines. Limitations and costs associated with satellite make it expensive to use and many people, in rural areas and specifically transient populations will go into the remote, unconnected areas without satellite technology. Even for people who have satellite devices that could be used for alerting, these devices are not always connected, use significant battery power and generally aren't useful for receiving real-time alerts

Many people who live in remote communities do have television programming through satellite TV (Shaw Direct and Bell ExpressVu) and this would be a primary digital channel for those living in remote areas.

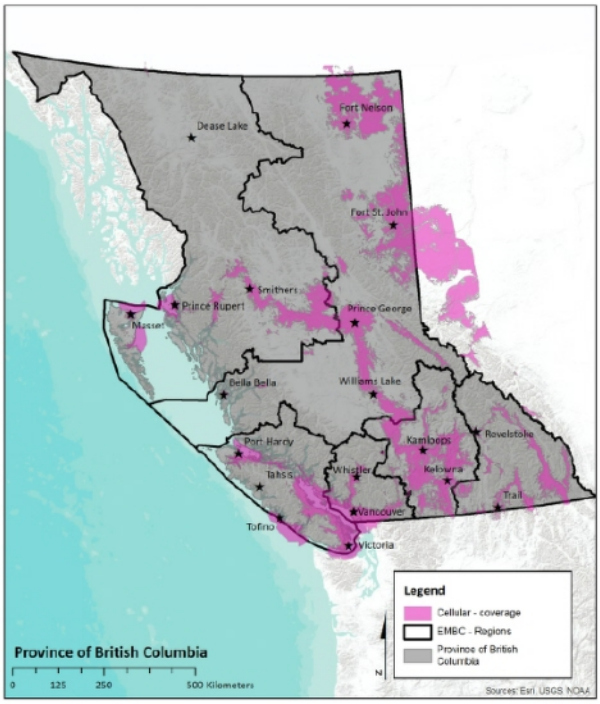

Figure 2: Cellular Coverage in BC (Peter Andersen-SFU)

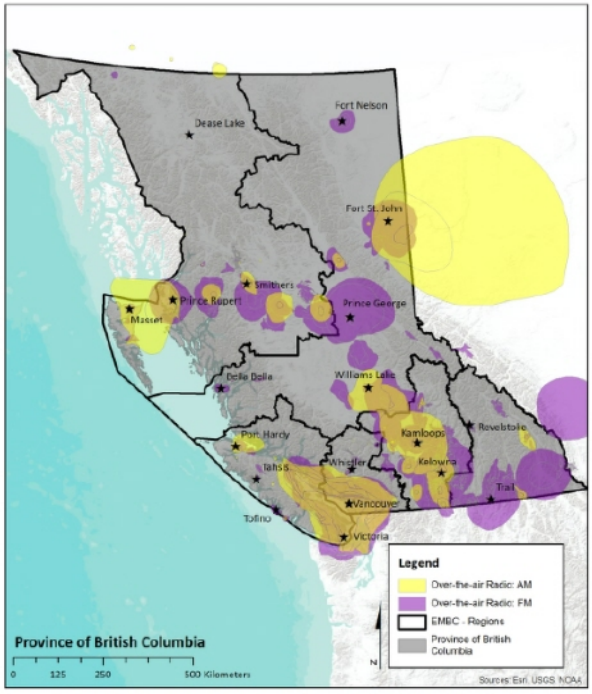

Figure 3: Over-the-Air Radio Coverage in BC (Peter Andersen-SFU)

2.1.5 One-Way vs. Two-Way Alerting Solutions

Most alerting solutions found provided one-way alerting from the alerting authority to the citizen. These solutions pushed information to the public but don't take advantage of the connection with the public to provide additional services. A couple jurisdictions, Israel and San Francisco provided an alerting solution that allowed for two-way communication with the public. The alerting authority can still push alerts out but additional features allowed the public to communicate back with the emergency managers. Some of these features included:

- Check-ins to let emergency managers know that they were either safe or needing assistance
- Aggregator websites that combine information sources from official government accounts with sources from social media (public and corporate), other emergency responder organizations (police, fire) and information from corporate sources (traffic, power) to give the public a more fulsome picture of the emergency and where to go for help (i.e., SF72.org).

2.1.6 Siloed Alerting Solutions and Low Integration between Systems

The general trend was for jurisdictions to implement a standalone or siloed alerting system. Systems were integrated with downstream last-mile distributors but there was no evidence of systems that were built for multiple notification requirements or other emergency management purposes where alerting was only a sub-function. Generally alerting solutions are not frequently used for intrusive alerts but when they are they need to be available, work the first time and not be cumbersome to use. We saw a trend of purpose built systems specifically designed for alerting and targeted at the authorities that would publish and manage alerts.

Table 1: Alberta Emergency Alerts Issued

	2017	2016	2015	2014	2013	2012
Intrusive Alert	16	17	11	8	28	24
Informational Alerts	60	48	38	68	73	44

We also noted that many jurisdictions have separate siloed systems for different last-mile alerting technology.

2.1.7 Purchasing alerting Commercial Off-The-Shelf (COTS) products was the preferred method of implementation

The environment scan found that there are pieces of a full end-to-end alerting solution that can be purchased. Jurisdictions interviewed that had recently implemented a public alerting system had purchased one or more alerting products and had done varying levels of integration to hook their other alerting/warning systems together. In many cases alerting systems were operated in parallel with each other.

Examples of COTS public alerting components:

- Public Alert Management Interface
- Creation of CAP formatted message
- Mass Distribution Alerting Systems for subscription channels
- Alerting website channel
- Branded public alerting mobile app

Examples of custom integration components

- Integration with Government owned last mile channels (overhead message signs, sirens, website banners, etc.)
- Integration with alerting sensors and systems (EEW))
- Integration with last mile channels owned by 3rd parties
- Integration with other alerting hubs and systems

Table 2: Summary of COTS Alerting products

	Alert Management UI	Alert Distribution Hub	Last-Mile Channels
Alberta	s.16	Net Alerts	Net Alerts (Website)
Saskatchewan		Net Alerts	Net Alerts (Website)
Washington		NA – using iPAWS (US Federal Government System)	NA
Australia		Developed by Cell Providers	Cell Providers - SMS-Only
Sweden		NA	HERMAN (siren control)
Netherlands		NA	NA
Israel		eVigilo	eVigilo

2.1.8 s.13; s.16

In general, all jurisdictions recognized the importance of alerting on mobile devices. For intrusive mobile alerting, there was a split between jurisdictions that implemented cell-broadcast alerting vs. location based SMS alerting. Many jurisdictions provided smart phones applications to complement other alerting channels and provide more detailed alerting information on mobile devices. Due to the importance of mobile devices as a future alerting channel a breakdown of ways to implement are summarized in the table below.

	Pros	Cons
Cell-Broadcast	• Not affected by other network traffic or congestion on the cell network • Alert can be associated with a distinct alerting tone and vibration • Redundancy provided through variant of cell providers in populated areas	• Less granularity in alerting area - Everyone connected to cell tower receives the alert regardless of whether the alert applies to them • Can't include pictures or URLs

Location Based SMS	• Able to target a specific city block or building	• Higher latency when sending alert to a large alerting area • Alert received as a text message and could easily be missed
Emergency Jurisdiction Mobile App	• Ability to provide rich-content on mobile devices including maps, detailed instruction, links to preparedness information, etc. • Can be used to provide two-way communication between emergency responders and the public	• Requires public to be proactive and download and install app • Not appropriate for urgent alerts. Alerts issued to apps can be delayed 2-10 minutes
3rd Party Notification Apps	• Provides choice to public for alerting app that is best suited for them • Often paired with weather apps (Weather Network)	• Requires public to be informed of choices and configure/install app
Social Media Apps (Twitter)	• Already installed on many people's devices • Twitter can be configured to allow tweets from select accounts to be shown as mobile notification	• Requires users to setup and configure applications for emergency accounts that are applicable to them • Requires alert creators to manage multiple accounts to allow for geo-targeted alerts (see Environment Canada twitter feeds)

For a full list analysis of pros and cons of other channel types, the BC Government has already contracted Peter Andersen, a SFU professor to do this work for Tsunami alerting. His analysis in the Document "BRITISH COLUMBIA TSUNAMI NOTIFICATION METHODS 'A Toolkit for Community Planning'" on channels is also applicable to alerting for other disaster types and can be found on the project SharePoint site

3 Method

The objective of the Environmental Scan was to assess the potential constraints and barriers to the implementation of several identified public alerting technologies on various Provincial public alerting and telecommunications networks, and to suggest potential pathways forward for the EMBC Public Alerting project.

The Environmental Scan consisted of work performed in two streams:

Work Stream	Activities
Environment Scan Research and Interviews	- Internet Research into alerting solutions at various levels of government around the world - Interviewed Peter Andersen (SFU professor) on Tsunami warning systems and alerting channels and reviewed research - Review of notes and documents from Ministry of Justice trip to Alberta - Phone and email interviews with selected jurisdictions - Analysis of research and interview results - Completion of Environment Scan document
Service Design – BC Environment Scan	- Travelled across BC and interviewed Service Providers on their current - Analyzed Interview Notes for current alerting processes and channels - Documented current state of local BC jurisdictions

3.1 Agencies Sampled

The following agencies were contacted and interviewed during the BC Public Alerting Environmental Scan.

	Interviewed by Phone or In Person	Research systems through online documentation only	Did Not Respond to Interview Request
BC Jurisdictions	• Squamish • Capital Regional District • Village of Masset • Old Masset • Queen Charlotte City • Port Clements • Abbotsford • Squamish • Thompson Regional District • Merit • Kelowna	• Richmond • North Shore Emergency Management • Sidney	•
Canadian Jurisdictions	• Alberta • Saskatchewan	• Ontario • Environment Canada	• Ontario
United States Jurisdictions	• Washington State • New York	• San Francisco • FEMA	• San Francisco
International Jurisdictions	• State of Victoria, Australia • Sweden • Netherlands	• Japan • Israel • Norway • Netherlands • Sweden • Spain • Germany • Lithuania • Czech Republic • Chile • Taiwan • Korea	• Japan (Email only)

3.2 Questions

The questions that were used as a prompt during telephone interview are included in Appendix A – Survey Questions. They can also be found on the SharePoint site at

s.15

4 Results

4.1 Results Summary

In the jurisdictions surveyed for this environment scan there was a wide variety of alerting solutions and channels. There was a mix of intrusive alerting technologies often paired with opt-in technologies. Different jurisdictions took differing approaches to alerting with some jurisdiction only publishing major emergencies while other jurisdictions used their alerting technology to publish local awareness information along with emergency alerts.

The results in the tables below attempt to summarize and compare the jurisdictions to each other. However due to the wide variability of jurisdictions interviewed, it was challenging to do a meaningful apples-to-apples comparison between jurisdictions.

4.2 Summary of Interview Results

The interviews were structured to capture business process and technical support and implementation of a jurisdictions public alerting solution. The interview questions were grouped into the following categories.

- Alert Creation
- Alert Distribution
- Alert Reaction
- System Development and Support
- Implementation Budget and Timelines

The summary of the interviews is grouped by question categories above.

Alert Creation

There was a mix of models for creating alerts. s.13; s.16

s.13; s.16

	Alberta	Saskatchewan	Washington	Australia	New York	Sweden	Netherlands
Alerting System Owned by	Provincial Government of Alberta	NAADS (Pelmorex) Front-End & Hub Website & Mobile App - Provincial Government of Saskatchewan	NAWAS – Federal Tsunami and Volcano Warning System – State EAS – Federal IPAWS – Federal AlertSense - State	Federal Government Level	Local – New York City	Federal Government	Federal Government Level
Alert Creation Process Model	s.16						
Alerting Support Model							
Quality Assurance Approach							
Manual Review of Alerts Before Distribution							
Separate System for Emergency Responder							

	Alberta	Saskatchewan	Washington	Australia	New York	Sweden	Netherlands
Notifications							

Alert Distribution and Reaction

s.13; s.16

	Alberta	Saskatchewan	Washington	Australia	New York	Sweden	Netherlands
Primary Alerting Channels	s.16						
Informational Alerting Channels							
Latency in Alert Distribution Channels							
Tracking Alerting Effectiveness							

System Development and Support

s.13; s.16

s.13; s.16

We surveyed government jurisdictions spanning very local authorities to national level authorities and thus founds.13; s.16

s.13; s.16

s.13; s.16

	Alberta	Saskatchewan	Washington	Australia	New York	Sweden	Netherlands
Development Method	s.16						
Support Models							
Vendors							
Testing Model							
COTS vs. Custom							
System Environments							
Procurement Method							

	Alberta	Saskatchewan	Washington	Australia	New York	Sweden	Netherlands
Implementation Date	s.16						
Implementation Timeline							
Development Costs							
Ongoing Costs							

[1]Working with Pelmorex to create a testing version of the interface

Alerting Channels Comparison

s.13; s.16

	Channels																	
Jurisdiction	Cell-Broadcast	Location Based SMS	Fixed Location SMS	Landline	Television	Radio	Amateur Radio	Website	Widgets	Facebook	Twitter	Social Media (Other)	Road Signs	Siren/Loud Speaker	Email	RSS	Mobile App
Alberta	s.16																
Saskatchewan																	
Washington																	
Ontario																	
Australia																	
New York																	
San Francisco																	
Japan																	
Israel																	
Norway																	
Netherlands																	
Sweden																	
Spain																	
Germany																	
Lithuania																	
Czech Republic																	
Chile																	
Taiwan																	
Korea																	

4.3 BC Local Authority Alerting Summary

During the Service Design ethnographic research interviews, the report team asked each local authority on how they currently alert the public in their jurisdictions. The table below summaries the alerting capability at each location visited based on interviews with local service providers:

	Current State Alerting Capability	Twitter	Facebook	Phone	SMS	Email	Fax	RSS	Website	Sirens	Mobile App	Opt-In Solution
Capital Regional District	• s.16 • • •											
Village of Masset	• •											
Old Masset	• •											
Queen Charlotte City	• • •											
Port Clements	•											

	Current State Alerting Capability	Twitter	Facebook	Phone	SMS	Email	Fax	RSS	Website	Sirens	Mobile App	Opt-In Solution
Abbotsford	• s.16 •											
Squamish	• •											
Thompson Regional District	•											
Merit	•											
Kelowna	• •											
Richmond	•											
North Shore Emergency Management	•											

	Current State Alerting Capability	Twitter	Facebook	Phone	SMS	Email	Fax	RSS	Website	Sirens	Mobile App	Opt-In Solution
	s.16											
Sidney	•											
Cariboo Regional District	•											

4.4 Points of Interest with Pros and Cons

The following tables list the points of interest, pros, and cons mentioned in each interview. A link to original meeting minutes is also provided. Note that pros and cons were only assessed for jurisdictions that were interviewed and not for jurisdictions that were researched only.

Canadian Agencies

Jurisdiction	Points of Interest	Pros	Cons
Alberta	s.16	s.13; s.16	
Saskatchewan			

	s.16		
Ontario		s.13; s.16	•

U.S. Agencies

Jurisdiction	Points of Interest	Pros	Cons
Washington	s.16	s.13; s.16	
New York			
San Francisco			

s.16

Other Agencies

Jurisdiction	Points of Interest	Pros	Cons
Australia	s.16	s.13; s.16	
Japan			
Israel			
Norway			
Netherlands			

Jurisdiction	Points of Interest	Pros	Cons
	broadcast		
Sweden	s.16	s.13; s.16	
Spain			
Germany			

Jurisdiction	Points of Interest	Pros	Cons
	s.16		
Lithuania		s.13; s.16	
Chile			
Taiwan			
Korea			

5 COTS Systems

In Canada, there are two public alerting solutions currently is production use. The federal government and Pelmorex (the Weather Network) has developed the National Alerting Aggregation and Dissemination System (NAADS) to support broadcast immediate distribution of alerts through TV and Radio. NetAlerts, a Canadian company based out of Sarnia Ontario, has developed a suite of applications including an alerting hub and an alerting user interface which has been deployed in Alberta's and Saskatchewan's alerting solutions.

In addition, to the Canadian solutions there are many alerting products that have been developed in the USA that support creation of alerts in the Common Alerting Protocol that could be used with minor modifications in Canada.

5.1 NetAlerts (www.netalerts.org)

NetAlerts is being used by both Alberta and Saskatchewan. s.16

s.16

NetAlerts has three commercial products available:

Product	Description
Alert Site	AlertSite is a web portal providing accurate, up-to-date emergency message information.
Alert Mail	AlertMail is an email alert notification system that enables emergency messages to be quickly and easily distributed through email to computers, handheld devices, pagers, and cell phones.
Alert Line	AlertLine is a telephone info line with recorded alert messages available to callers.

s.13; s.16

5.2 Pelmorex / NAADS / AlertReady

Pelmorex has developed the National Alert Aggregation and Dissemination System (NAADS) and the Alert Ready program to support reporting across Canada. The features of the NAADS system include:

- A user-interface for creating alert messages
- An alerting hub to distribute messages to last-mile providers
- The CRTC has regulated last-mile TV and Radio broadcast distributers to integrate with NAADS and display alerts issued through NAADS

Saskatchewan has opted to use the AlertReady interface directly instead of the one provided in the NetAlerts product.

s.13; s.16

5.3 E-Team

E-Team is a Public Safety and Incident Management Solution from NC4. E-Team is Emergency Operations Centre (EOC) software designed for large and/or cross-jurisdictional emergency management solutions.s.13; s.16
s.13; s.16

From the Current Solution Abstract

"E-Team is a public safety and incident / event management solution from NC4. s.13; s.16
s.13; s.16

s.13; s.16

5.4 EVigilo

EVigilo's is a product developed by an Israeli company and has been deployed in Israel, Turkey and Chile at the national level. Evigilo offers emergency alerting solutions to businesses, municipalities and national level governments.

EVigilo supports bi-directional, multi-channel communication technology. Channels that they claim to support includes Desktop, Social Media, Billboards, E-mail, Local Alerts Systems, Fax and Phone, Radio, Sirens, Television, SMS, Web and Smartphone Apps

s.16

eVigilo SMART Alert

Copyright

s.13; s.16

5.5 UMS

UMS is a commercial product developed in Norway originally for location-based SMS alerting. UMS has been deployed in the Netherlands and was adapted for cell-broadcast.

s.13; s.16

6 Approvals

This document has been approved as the official Environmental Scan document.

Approved by	*Signature*	*Date*
IMB – Software Engineer *Jaklyn Vervynck*	_____	_____
Approved by	***Signature***	***Date***
EMBC – Business Lead **Ian Lightbody**	_____	_____
Approved by	***Signature***	***Date***
IMB – Portfolio Lead Heather Macleod	_____	_____

^

7 Appendix A – Survey Questions

These are the questions that were used during the interviews with each Agency. Some agencies were better able to answer these questions than others.

1. **Alert Creation**
    a. What system(s) do you use for creating alerts? (Did you buy a solution, build your own or a combination)?
    b. What features do you support in an alert (ex. Preset or polygon alert areas, multi-language, audio or multi-media components). Do you have any features not supported by the Common Alerting Protocol (CAP-CP)?
    c. Do you use a centralized alerting model or do you allow local authorities access to your alerting solution to issue alerts?
        i. If de-centralized, describe the process for training and onboarding alerting users.
        ii. How are users, organizations and permissions managed?
    d. How do you authenticate users to ensure only authorized users alert?
        i. Do alerts have permissions assigned to them to restrict the types of alerts or areas a user/organization can alert for?
    e. How long does it take for an alert to be issued once the decision to alert has been made?
    f. How do you provide support alert creation (i.e. Help desk? Online FAQ? Approval processes for Originators?)
        i. Is your support 24x7?
        ii. What is the criteria to initiate additional processes and/or support?
    g. What steps do you take to ensure the quality of the alerts that are entered?
    h. Do you have any systems that automatically create alerts without a human intervention?
    i. To what extent would your users describe your system as being easy to use?

2. **Alert Distribution**
    a. Do you have a single alerting hub to coordinate alert distribution?
    b. What digital and non-digital channels do you support?
        i. What external systems does your alert distribution connect to?
    c. What other systems interoperate with your public alerting solution?

d. Do you use your public alerting solution to send emergency notifications to emergency responders? Or do you have a separate system for alerting emergency responders?

e. Is there any system introduced delays (ex. Verification, moderated) once the alert has been submitted?

f. What percentage of your entire population (e.g., residents, transients, institutions, vulnerable) does your alerting solution cover? What percentage is covered with each channel? For those not reachable by an alerting channel, are there other processes in place to reach them?

3. Alert Reaction

a. Where does the public go to get more detailed information that what is included in the alert and additional information as the emergency progresses? Are update alerts provided to previously sent alerts? What are the guidelines for these updates?

b. How do you monitor the public's reaction to an alert to determine if it was effective? What are other metrics used to track the effectiveness of public alerting in general?

c. Are you able to track and keep statistics on how many people receive alert messages?

d. Can the public opt-out or opt-in to the alerting solution?

e. How often are alerting solutions and processes tested? Unit testing? End to end testing? Disaster Recovery testing?

f. Do you distribute the history of your alerting messages to the public (Open Data)?

4. System Development and Support

a. What design/development approach did you take when developing your public alerting solution?

b. Were you able to find a COTS product? If yes, how much customization did you do?

c. How long did the implementation and development time take?

d. Did you do a public education campaign?

e. How many environments do you have for the system (e.g., development, integrated test, user acceptance testing, training, production, disaster recovery)?

f. What types of software and database technologies are you using?

    i. How is your infrastructure setup to scale for volume during emergency events?

g. Do you receive regular software updates from the vendor? If so, how often? Are these updates included in your ongoing costs?

h. What procurement method did you use?

5. <u>Financial Questions</u>

a. What were the ballpark financial costs for:

   i. requirements gathering, development and testing

   ii. implementation and servers/licenses

      1. Upfront (one time)

      2. Ongoing maintenance? (ongoing)

6. <u>Recommendations</u>

a. What lessons learned do you have to share?

   i. What are you happy with?

   ii. What would you like to see improved?

b. What other vendors do you recommend?

c. Are there any other jurisdictions that you recommend we interview?

d. Do you have any materials you could share with us? (e.g., RFI, RFQ, RFP, requirements, design, processes, user documentation, partner agreements/MOUs)

8 Appendix B: Jurisidiction Interview Notes

8.1 Alberta

Attendees – s.16 (by email)

Jurisdiction Documents Reviewed

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s.16

- s.16
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8.1.1 Alert Creation

	Question	Notes
a)	What system(s) do you use for creating alerts? (Did you buy a solution, build your own or a combination)?	s.16

		s.16
b)	What features do you support in an alert (ex. Preset or polygon alert areas, multi-language, audio or multi-media components). Do you have any features not supported by the Common Alerting Protocol (CAP-CP)?	s.16
c)	Do you use a centralized alerting model or do you allow local authorities access to your alerting solution to issue alerts? i. If de-centralized, describe the process for training and onboarding alerting users. ii. How are users, organizations and permissions managed?	
d)	How do you authenticate users to ensure only authorized users alert? i. Do alerts have permissions assigned to them to restrict the types of alerts or areas a user/organization can alert for?	
e)	How long does it take for an alert to be issued once the decision to alert has been made?	

f)	How do you provide support alert creation (i.e. Help desk? Online FAQ? Approval processes for Originators?) i. Is your support 24x7? ii. What is the criteria to initiate additional processes and/or support?	s.16
g)	What steps do you take to ensure the quality of the alerts that are entered?	s.16
h)	Do you have any systems that automatically create alerts without a human intervention?	
i)	To what extent would your users describe your system as being easy to use?	

8.1.2 Alert Distribution

	Question	Notes
a)	Do you have a single alerting hub to coordinate alert distribution?	s.16
b)	What digital and non-digital channels do you support? i. What external systems does your alert distribution connect to?	
c)	What other systems interoperate with your public alerting solution?	

		s.16
d)	Do you use your public alerting solution to send emergency notifications to emergency responders? Or do you have a separate system for alerting emergency responders?	
e)	Is there any system introduced delays (ex. Verification, moderated) once the alert has been submitted?	
f)	What percentage of your entire population (e.g., residents, transients, institutions, vulnerable) does your alerting solution cover? What percentage is covered with each channel? For those not reachable by an alerting channel, are there other processes in place to reach them?	

8.1.3 Alert Reaction

	Question	Notes
a)	Where does the public go to get more detailed information that what is included in the alert and additional information as the emergency progresses? Are update alerts provided to previously sent alerts? What are the guidelines for these updates?	s.16
b)	How do you monitor the public's reaction to an alert to determine if it was effective? What are other metrics used to track the effectiveness of public alerting in general?	
c)	Are you able to track and keep statistics on how many people receive alert messages?	
d)	Can the public opt-out or opt-in to the alerting solution?	s.16
e)	How often are alerting solutions and processes tested? Unit testing? End to end testing? Disaster Recovery testing?	
f)	Do you distribute the history of your alerting messages to the public (Open Data)	

8.1.4 System Development and Support

	Question	Notes
a)	What design/development approach did you take when developing your public alerting solution?	s.16

		s.16
b)	Were you able to find a COTS product? If yes, how much customization did you do?	
c)	How long did the implementation and development time take?	
d)	Did you do a public education campaign?	
e)	How many environments do you have for the system (e.g., development, integrated test, user acceptance testing, training, production, disaster recovery)?	
f)	What types of software and database technologies are you using? i. How is your infrastructure setup to scale for volume during emergency events	

g)	Do you receive regular software updates from the vendor? If so, how often? Are these updates included in your ongoing costs?	
h)	What procurement method did you use?	

8.1.5 Financial Questions

	Question	Notes
a)	What were the ballpark financial costs for: i. requirements gathering, development and testing ii. implementation and servers/licenses 1. Upfront (one time) 2. Ongoing maintenance? (ongoing)	s.16

8.1.6 Lessons Learned

	Question	Notes
a)	a. What lessons learned do you have to share? i. What are you happy with? ii. What would you like to see improved?	
b)	What other vendors do you recommend?	
c)	Are there any other jurisdictions that you recommend we interview?	
d)	Do you have any materials you could share with us? (e.g., RFI, RFQ, RFP, requirements, design, processes, user documentation, partner agreements/MOUs)	

8.2 Saskatchewan

Attendees

- s.16
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8.2.1 Alert Creation

	Question	Notes
a)	What system(s) do you use for creating alerts? (Did you buy a solution, build your own or a combination)?	s.16
b)	What features do you support in an alert (ex. Preset or polygon alert areas, multi-language, audio or multi-media components). Do you have any features not supported by the Common Alerting Protocol (CAP-CP)?	
c)	Do you use a centralized alerting model or do you allow local authorities access to your alerting solution to issue alerts? iii. If de-centralized, describe the process for training and onboarding alerting users. iv. How are users, organizations and permissions managed?	
d)	How do you authenticate users to ensure only authorized users alert? ii. Do alerts have permissions assigned to them to restrict the types of alerts or areas a user/organization can alert for?	
e)	How long does it take for an alert to be issued once the decision to alert has been made?	s.16
f)	How do you provide support alert creation (i.e. Help desk? Online FAQ? Approval processes for Originators?)	s.16

	iii. Is your support 24x7? iv. What is the criteria to initiate additional processes and/or support?	- s.16 -
g)	What steps do you take to ensure the quality of the alerts that are entered?	- s.16 -
h)	Do you have any systems that automatically create alerts without a human intervention?	s.16
i)	To what extent would your users describe your system as being easy to use?	

8.2.2 Alert Distribution

	Question	Notes
a)	Do you have a single alerting hub to coordinate alert distribution?	s.16
b)	What digital and non-digital channels do you support? ii. What external systems does your alert distribution connect to?	
c)	What other systems interoperate with your public alerting solution?	
d)	Do you use your public alerting solution to send emergency notifications to emergency responders? Or do you have a separate system for alerting emergency responders?	
e)	Is there any system introduced delays (ex. Verification, moderated) once the alert has been submitted?	
f)	What percentage of your entire population (e.g., residents, transients, institutions, vulnerable) does your alerting solution cover? What percentage is covered with each channel? For those not reachable by an	

	alerting channel, are there other processes in place to reach them?	

8.2.3 Alert Reaction

	Question	Notes
a)	Where does the public go to get more detailed information that what is included in the alert and additional information as the emergency progresses? Are update alerts provided to previously sent alerts? What are the guidelines for these updates?	- s.16 - -
b)	How do you monitor the public's reaction to an alert to determine if it was effective? What are other metrics used to track the effectiveness of public alerting in general?	- s.16 - - -
c)	Are you able to track and keep statistics on how many people receive alert messages?	- s.16
d)	Can the public opt-out or opt-in to the alerting solution?	- s.16 -
e)	How often are alerting solutions and processes tested? Unit testing? End to end testing? Disaster Recovery testing?	
f)	Do you distribute the history of your alerting messages to the public (Open Data)	s.16

8.2.4 System Development and Support

	Question	Notes
a)	What design/development approach did you take when developing your public alerting solution?	- s.16 -
b)	Were you able to find a COTS product? If yes, how much customization did you do?	s.16
c)	How long did the implementation and development time take?	

d)	Did you do a public education campaign?	s.16
e)	How many environments do you have for the system (e.g., development, integrated test, user acceptance testing, training, production, disaster recovery)?	
f)	What types of software and database technologies are you using? ii. How is your infrastructure setup to scale for volume during emergency events	
g)	Do you receive regular software updates from the vendor? If so, how often? Are these updates included in your ongoing costs?	
h)	What procurement method did you use?	

8.2.5 Financial Questions

	Question	Notes
a)	What were the ballpark financial costs for: iii. requirements gathering, development and testing iv. implementation and servers/licenses 3. Upfront (one time) 4. Ongoing maintenance? (ongoing)	- s.16 - -

8.2.6 Lessons Learned

	Question	Notes

a)	a. What lessons learned do you have to share? iii. What are you happy with? iv. What would you like to see improved?	- s.16 - - - - - • s.16
b)	What other vendors do you recommend?	
c)	Are there any other jurisdictions that you recommend we interview?	
d)	Do you have any materials you could share with us? (e.g., RFI, RFQ, RFP, requirements, design, processes, user documentation, partner agreements/MOUs)	s.16

8.3 Washington State

s.16

8.3.1 Alert Creation

	Question	Notes
a)	What system(s) do you use for creating alerts? (Did you buy a solution, build your own or a combination)?	s.16
b)	What features do you support in an alert (ex. Preset or polygon alert areas, multi-language, audio or multi-media components). Do you have any features not supported by the Common Alerting Protocol (CAP-CP)?	
c)	Do you use a centralized alerting model or do you allow local authorities access to your alerting solution to issue alerts? v. If de-centralized, describe the process for training and onboarding alerting users.	

	vi. How are users, organizations and permissions managed?	- s.16 - - -
d)	How do you authenticate users to ensure only authorized users alert? iii. Do alerts have permissions assigned to them to restrict the types of alerts or areas a user/organization can alert for?	- - - - - -
e)	How long does it take for an alert to be issued once the decision to alert has been made?	s.16
f)	How do you provide support alert creation (i.e. Help desk? Online FAQ? Approval processes for Originators?) v. Is your support 24x7? vi. What is the criteria to initiate additional processes and/or support?	
g)	What steps do you take to ensure the quality of the alerts that are entered?	
h)	Do you have any systems that automatically create alerts without a human intervention?	
i)	To what extent would your users describe your system as being easy to use?	

8.3.2 Alert Distribution

	Question	Notes
a)	Do you have a single alerting hub to coordinate alert distribution?	
b)	What digital and non-digital channels do you support? iii. What external systems does your alert distribution connect to?	• s.16 • • • • • • • • • • • •
c)	What other systems interoperate with your public alerting solution?	s.16
d)	Do you use your public alerting solution to send emergency notifications to emergency responders? Or do you have a separate system for alerting emergency responders?	
e)	Is there any system introduced delays (ex. Verification, moderated) once the alert has been submitted?	
f)	What percentage of your entire population (e.g., residents, transients, institutions,	- s.16 - -

	vulnerable) does your alerting solution cover? What percentage is covered with each channel? For those not reachable by an alerting channel, are there other processes in place to reach them?	- s.16 -

8.3.3 Alert Reaction

	Question	Notes
a)	Where does the public go to get more detailed information that what is included in the alert and additional information as the emergency progresses? Are update alerts provided to previously sent alerts? What are the guidelines for these updates?	s.16
b)	How do you monitor the public's reaction to an alert to determine if it was effective? What are other metrics used to track the effectiveness of public alerting in general?	
c)	Are you able to track and keep statistics on how many people receive alert messages?	
d)	Can the public opt-out or opt-in to the alerting solution?	
e)	How often are alerting solutions and processes tested? Unit testing? End to end testing? Disaster Recovery testing?	
f)	Do you distribute the history of your alerting messages to the public (Open Data)	

8.3.4 System Development and Support

	Question	Notes
a)	What design/development approach did you take when developing your public alerting solution?	s.16
b)	Were you able to find a COTS	

	product? If yes, how much customization did you do?	
c)	How long did the implementation and development time take?	
d)	Did you do a public education campaign?	
e)	How many environments do you have for the system (e.g., development, integrated test, user acceptance testing, training, production, disaster recovery)?	- s.16 -
f)	What types of software and database technologies are you using? iii. How is your infrastructure setup to scale for volume during emergency events	s.16
g)	Do you receive regular software updates from the vendor? If so, how often? Are these updates included in your ongoing costs?	
h)	What procurement method did you use?	s.16

8.3.5 Financial Questions

	Question	Notes
a)	What were the ballpark financial costs for: v. requirements gathering, development and testing vi. implementation and servers/licenses 5. Upfront (one time) 6. Ongoing maintenance? (ongoing)	s.16

8.3.6 Lessons Learned

	Question	Notes

a)	a. What lessons learned do you have to share? v. What are you happy with? vi. What would you like to see improved?	s.16
b)	What other vendors do you recommend?	
c)	Are there any other jurisdictions that you recommend we interview?	
d)	Do you have any materials you could share with us? (e.g., RFI, RFQ, RFP, requirements, design, processes, user documentation, partner agreements/MOUs)	s.16

8.4 New York

s.13; s.16

Contact: s.16

8.4.1 Alert Creation

	Question	Notes
j)	What system(s) do you use for creating alerts? (Did you buy a solution, build your own or a combination)?	s.16
k)	What features do you support in an alert (ex. Preset or polygon alert areas, multi-language, audio or multi-media components). Do you have any features not supported by the Common Alerting Protocol (CAP-CP)?	
l)	Do you use a centralized alerting model or do you allow local authorities access to your alerting solution to issue alerts? vii. If de-centralized, describe the process for training and onboarding alerting users. viii. How are users, organizations and permissions managed?	
m)	How do you authenticate users to ensure only authorized users alert? iv. Do alerts have permissions assigned to them to restrict the types of alerts or areas a user/organization can alert for?	s.16
n)	How long does it take for an alert to be issued once the decision to alert has been made?	s.16
o)	How do you provide support alert creation (i.e. Help desk? Online FAQ? Approval processes for Originators?) vii. Is your support 24x7? viii. What is the criteria to initiate additional processes and/or support?	
p)	What steps do you take to ensure	s.16

	the quality of the alerts that are entered?	s.16
q)	Do you have any systems that automatically create alerts without a human intervention?	
r)	To what extent would your users describe your system as being easy to use?	

8.4.2 Alert Distribution

	Question	Notes
g)	Do you have a single alerting hub to coordinate alert distribution?	
h)	What digital and non-digital channels do you support? iv. What external systems does your alert distribution connect to?	•
i)	What other systems interoperate with your public alerting solution?	
j)	Do you use your public alerting solution to send emergency notifications to emergency responders? Or do you have a separate system for alerting emergency responders?	
k)	Is there any system introduced delays (ex. Verification, moderated) once the alert has been submitted?	
l)	What percentage of your entire population (e.g., residents, transients, institutions, vulnerable) does your alerting solution cover? What percentage is covered with each channel? For those not reachable by an alerting channel, are there other processes in place to reach them?	

8.4.3 Alert Reaction

	Question	Notes
g)	Where does the public go to get more detailed information that what is included in the alert and additional information as the emergency progresses? Are update alerts provided to previously sent alerts? What are the guidelines for these updates?	s.16
h)	How do you monitor the public's reaction to an alert to determine if it was effective? What are other metrics used to track the effectiveness of public alerting in general?	
i)	Are you able to track and keep statistics on how many people receive alert messages?	
j)	Can the public opt-out or opt-in to the alerting solution.	
k)	How often are alerting solutions and processes tested? Unit testing? End to end testing? Disaster Recovery testing?	
l)	Do you distribute the history of your alerting messages to the public (Open Data)	

8.4.4 System Development and Support

	Question	Notes
i)	What design/development approach did you take when developing your public alerting solution?	
j)	Where you able to find a COTS product? Is you how much customization did you do?	
k)	How long did the implementation and development time take?	
l)	Did you do a public education	

	campaign?	
m)	How many environments do you have for the system (e.g., development, integrated test, user acceptance testing, training, production, disaster recovery)?	
n)	What types of software and database technologies are you using? iv. How is your infrastructure setup to scale for volume during emergency events	
o)	Do you receive regular software updates from the vendor? If so, how often? Are these updates included in your ongoing costs?	
p)	What procurement method did you use?	

8.4.5 Financial Questions

	Question	Notes
b)	What were the ballpark financial costs for: vii. requirements gathering, development and testing viii. implementation and servers/licenses 7. Upfront (one time) 8. Ongoing maintenance? (ongoing)	

8.4.6 Lessons Learned

		Question	Notes
e)		a. What lessons learned do you have to share? vii. What are you happy with? viii. What would you like to see improved?	•
f)		What other vendors do you recommend?	
g)		Are there any other	

		jurisdictions that you recommend we interview?	
h)		Do you have any materials you could share with us? (e.g., RFI, RFQ, RFP, requirements, design, processes, user documentation, partner agreements/MOUs)	

8.5 Australia

Contact: michael.hallowes@ewn.com.au

8.5.1 Alert Creation

	Question	Notes
a)	What system(s) do you use for creating alerts? (Did you buy a solution, build your own or a combination)?	s.16
b)	What features do you support in an alert (ex. Preset or polygon alert areas, multi-language, audio or multi-media components). Do you have any features not supported by the Common Alerting Protocol (CAP-CP)?	
c)	Do you use a centralized alerting model or do you allow local authorities access to your alerting solution to issue alerts? ix. If de-centralized, describe the process for training and onboarding alerting users.	

s.16

	x. How are users, organizations and permissions managed?	
d)	How do you authenticate users to ensure only authorized users alert? v. Do alerts have permissions assigned to them to restrict the types of alerts or areas a user/organization can alert for?	
e)	How long does it take for an alert to be issued once the decision to alert has been made?	
f)	How do you provide support alert creation (i.e. Help desk? Online FAQ? Approval processes for Originators?) ix. Is your support 24x7? x. What is the criteria to initiate additional processes and/or support?	
g)	What steps do you take to ensure the quality of the alerts that are entered?	
h)	Do you have any systems that automatically create alerts without a human intervention?	
i)	To what extent would your users describe your system as being easy to use?	

8.5.2 Alert Distribution

	Question	Notes
a)	Do you have a single alerting hub to coordinate alert distribution?	
b)	What digital and non-digital channels do you support? v. What external systems does your alert distribution connect to?	s.16
c)	What other systems interoperate with your public alerting solution?	
d)	Do you use your public alerting solution to send emergency notifications to emergency responders? Or do you have a separate system for alerting emergency responders?	
e)	Is there any system introduced delays (ex. Verification, moderated) once the alert has	

	been submitted?	
f)	What percentage of your entire population (e.g., residents, transients, institutions, vulnerable) does your alerting solution cover? What percentage is covered with each channel? For those not reachable by an alerting channel, are there other processes in place to reach them?	s.16

8.5.3 Alert Reaction

	Question	Notes
a)	Where does the public go to get more detailed information that what is included in the alert and additional information as the emergency progresses? Are update alerts provided to previously sent alerts? What are the guidelines for these updates?	s.16
b)	How do you monitor the public's reaction to an alert to determine if it was effective? What are other metrics used to track the effectiveness of public alerting in general?	
c)	Are you able to track and keep statistics on how many people receive alert messages?	
d)	Can the public opt-out or opt-in to the alerting solution?	
e)	How often are alerting solutions and processes tested? Unit testing? End to end testing? Disaster Recovery testing?	
f)	Do you distribute the history of your alerting messages to the public (Open Data)	

8.5.4 System Development and Support

	Question	Notes
a)	What design/development approach did you take when developing your public alerting solution?	s.16
b)	Were you able to find a COTS product? If yes, how much customization did you do?	
c)	How long did the implementation and development time take?	
d)	Did you do a public education campaign?	
e)	How many environments do you have for the system (e.g., development, integrated test, user acceptance testing, training, production, disaster recovery)?	
f)	What types of software and database technologies are you using? v. How is your infrastructure setup to scale for volume during emergency events	
g)	Do you receive regular software updates from the vendor? If so, how often? Are these updates included in your ongoing costs?	
h)	What procurement method did you use?	

8.5.5 Financial Questions

	Question	Notes
a)	What were the ballpark financial costs for:	

	ix. requirements gathering, development and testing x. implementation and servers/licenses 9. Upfront (one time) 10. Ongoing maintenance? (ongoing)	s.16

8.5.6 Lessons Learned

	Question	Notes
a)	a. What lessons learned do you have to share? ix. What are you happy with? x. What would you like to see improved?	s.16
b)	What other vendors do you recommend?	
c)	Are there any other jurisdictions that you recommend we interview?	
d)	Do you have any materials you could share with us? (e.g., RFI, RFQ, RFP, requirements, design, processes, user documentation, partner agreements/MOUs)	

8.6 Sweden

Contact - s.16

s.13; s.16

s.13; s.16

8.6.1 Alert Creation

	Question	Notes
a)	What system(s) do you use for creating alerts? (Did you buy a solution, build your own or a combination)?	s.16

		s.16
b)	What features do you support in an alert (ex. Preset or polygon alert areas, multi-language, audio or multi-media components). Do you have any features not supported by the Common Alerting Protocol (CAP-CP)?	
c)	Do you use a centralized alerting model or do you allow local authorities access to your alerting solution to issue alerts? xi. If de-centralized, describe the process for training and onboarding alerting users. xii. How are users, organizations and permissions managed?	

d)	How do you authenticate users to ensure only authorized users alert? vi. Do alerts have permissions assigned to them to restrict the types of alerts or areas a user/organization can alert for?	s.16
e)	How long does it take for an alert to be issued once the decision to alert has been made?	
f)	How do you provide support alert creation (i.e. Help desk? Online FAQ? Approval processes for Originators?) xi. Is your support 24x7? xii. What is the criteria to initiate additional processes and/or support?	
g)	What steps do you take to ensure the quality of the alerts that are entered?	s.16
h)	Do you have any systems that automatically create alerts without a human intervention?	
i)	To what extent would your users describe your system as being easy to use?	

8.6.2 Alert Distribution

	Question	Notes
a)	Do you have a single alerting hub to coordinate alert distribution?	s.16

b)	What digital and non-digital channels do you support? vi. What external systems does your alert distribution connect to?	s.16
c)	What other systems interoperate with your public alerting solution?	s.16
d)	Do you use your public alerting solution to send emergency notifications to emergency responders? Or do you have a separate system for alerting emergency responders?	s.16
e)	Is there any system introduced delays (ex. Verification, moderated) once the alert has been submitted?	
f)	What percentage of your entire population (e.g., residents, transients, institutions, vulnerable) does your alerting solution cover? What percentage is covered with each channel? For those not reachable by an alerting channel, are there other processes in place to reach them?	s.16

8.6.3 Alert Reaction

	Question	Notes
a)	Where does the public go to get more detailed information that what is included in the alert and additional information as the emergency progresses? Are update alerts provided to previously sent alerts? What are the guidelines for these updates?	s.16
b)	How do you monitor the public's reaction to an alert to determine if it was effective? What are other metrics used to track the effectiveness of public alerting in general?	s.16
c)	Are you able to track and keep statistics on how many people	s.16

	receive alert messages?	
d)	Can the public opt-out or opt-in to the alerting solution?	
e)	How often are alerting solutions and processes tested? Unit testing? End to end testing? Disaster Recovery testing?	s.16
f)	Do you distribute the history of your alerting messages to the public (Open Data)	

8.6.4 System Development and Support

	Question	Notes
a)	What design/development approach did you take when developing your public alerting solution?	s.16
b)	Were you able to find a COTS product? If yes, how much customization did you do?	
c)	How long did the implementation and development time take?	
d)	Did you do a public education campaign?	
e)	How many environments do you have for the system (e.g., development, integrated test, user acceptance testing, training, production, disaster recovery)?	
f)	What types of software and database technologies are you using? vi. How is your infrastructure setup to scale for volume during emergency events	
g)	Do you receive regular software	s.16

	updates from the vendor? If so, how often? Are these updates included in your ongoing costs?	
h)	What procurement method did you use?	s.16

8.6.5 Financial Questions

	Question	Notes
a)	What were the ballpark financial costs for: xi. requirements gathering, development and testing xii. implementation and servers/licenses 11. Upfront (one time) 12. Ongoing maintenance? (ongoing)	s.16

8.6.6 Lessons Learned

	Question	Notes
a)	a. What lessons learned do you have to share? xi. What are you happy with? xii. What would you like to see improved?	s.16
b)	What other vendors do you recommend?	
c)	Are there any other jurisdictions that you recommend we interview?	s.16
d)	Do you have any materials you could share with us? (e.g., RFI, RFQ, RFP, requirements, design, processes, user documentation, partner agreements/MOUs)	

8.7 Netherlands

Jurisdiction: Netherlands

Contact: s.16

Background

s.13; s.16

s.13; s.16

8.7.1 Alert Creation

	Question	Notes
a)	What system(s) do you use for creating alerts? (Did you buy a solution, build your own or a combination)?	s.16
b)	What features do you support in an alert (ex. Preset or polygon alert areas, multi-language, audio or multi-media components). Do you have any features not	

	supported by the Common Alerting Protocol (CAP-CP)?	
c)	Do you use a centralized alerting model or do you allow local authorities access to your alerting solution to issue alerts? xiii. If de-centralized, describe the process for training and onboarding alerting users. xiv. How are users, organizations and permissions managed?	s.16
d)	How do you authenticate users to ensure only authorized users alert? vii. Do alerts have permissions assigned to them to restrict the types of alerts or areas a user/organization can alert for?	s.16
e)	How long does it take for an alert to be issued once the decision to alert has been made?	s.16
f)	How do you provide support alert creation (i.e. Help desk? Online FAQ? Approval processes for Originators?) xiii. Is your support 24x7? xiv. What is the criteria to initiate additional processes and/or support?	
g)	What steps do you take to ensure the quality of the alerts that are entered?	
h)	Do you have any systems that automatically create alerts without a human intervention?	

i)	To what extent would your users describe your system as being easy to use?	s.16

8.7.2 Alert Distribution

	Question	Notes
a)	Do you have a single alerting hub to coordinate alert distribution?	s.16
b)	What digital and non-digital channels do you support? vii. What external systems does your alert distribution connect to?	
c)	What other systems interoperate with your public alerting solution?	
d)	Do you use your public alerting solution to send emergency notifications to emergency responders? Or do you have a separate system for alerting emergency responders?	s.16
e)	Is there any system introduced delays (ex. Verification, moderated) once the alert has been submitted?	s.16
f)	What percentage of your entire	s.16

	population (e.g., residents, transients, institutions, vulnerable) does your alerting solution cover? What percentage is covered with each channel? For those not reachable by an alerting channel, are there other processes in place to reach them?	s.16

8.7.3 Alert Reaction

	Question	Notes
a)	Where does the public go to get more detailed information that what is included in the alert and additional information as the emergency progresses? Are update alerts provided to previously sent alerts? What are the guidelines for these updates?	s.16
b)	How do you monitor the public's reaction to an alert to determine if it was effective? What are other metrics used to track the effectiveness of public alerting in general?	s.16
c)	Are you able to track and keep statistics on how many people receive alert messages?	s.16
d)	Can the public opt-out or opt-in to the alerting solution?	
e)	How often are alerting solutions and processes tested? Unit testing? End to end testing? Disaster Recovery testing?	s.16
f)	Do you distribute the history of your alerting messages to the public (Open Data)	

8.7.4 System Development and Support

	Question	Notes
a)	What design/development approach did you take when developing your public alerting solution?	s.16
b)	Were you able to find a COTS product? If yes, how much customization did you do?	
c)	How long did the implementation and development time take?	
d)	Did you do a public education campaign?	
e)	How many environments do you have for the system (e.g., development, integrated test, user acceptance testing, training, production, disaster recovery)?	
f)	What types of software and database technologies are you using? vii. How is your infrastructure setup to scale for volume during emergency events	
g)	Do you receive regular software updates from the vendor? If so, how often? Are these updates included in your ongoing costs?	
h)	What procurement method did you use?	

8.7.5 Financial Questions

	Question	Notes
a)	What were the ballpark financial costs for: xiii. requirements gathering, development and testing xiv. implementation and servers/licenses 13. Upfront (one time) 14. Ongoing	s.16

	maintenance? (ongoing)		s.16

8.7.6 Lessons Learned

	Question	Notes
a)	a. What lessons learned do you have to share? xiii. What are you happy with? xiv. What would you like to see improved?	s.16
b)	What other vendors do you recommend?	
c)	Are there any other jurisdictions that you recommend we interview?	s.16
d)	Do you have any materials you could share with us? (e.g., RFI, RFQ, RFP, requirements, design, processes, user documentation, partner agreements/MOUs)	

8.8 Japan

From: s.16

Sent: March 30, 2017 10:42 PM
To: Lamoureux, Andrew TRAN:EX <Andrew.Lamoureux@gov.bc.ca>
Cc: Sharlie Huffman <sharlieh@telus.net>
Subject: Re: s.16 in Japan

Dear Lamoureux-san,

Thank you for your e-mail.

s.13; s.16

Best regards,
s.16

-----Original Message-----
From: Lamoureux, Andrew TRAN:EX
Sent: Friday, March 31, 2017 2:06 AM
To: s.16
Cc: Sharlie Huffman
Subject: RE: s.16 in Japan

Hello s.16

It is very nice to meet you. Sharlie, thank you very much for the introduction.

I'm working with Sharlie and the government of British Columbia on the alerting side of the emergency warning system. s.13; s.16
s.13; s.16 and I am interviewing jurisdictions to get information on their systems and the processes they went through when implementing the systems.

I have a standard set of questions that we have been asking other jurisdictions that I have attached to this email to give you a sense of the information that we are looking to gather.

In addition to this set of questions, specifically for Japan I'm interested in finding more information about:

s.13; s.16

s.13; s.16

Thank you very much for your help

Andrew Lamoureux P.Eng. | Mobile: s.17 |
| Business Analyst | EMBC Public Alerting Project |

-----Original Message-----
From: Sharlie Huffman [mailto:sharlieh@telus.net]
Sent: March 29, 2017 6:53 AM
To: s.16
Cc: Lamoureux, Andrew TRAN:EX <Andrew.Lamoureux@gov.bc.ca>
Subject: RE:s.16 in Japan

Dear s.16

Thank you so much. Your support and advice for our efforts is very much appreciated.

Regards,

Sharlie Huffman, P.Eng. FEC
Huffman Engineering Ltd.

-----Original Message-----
From: s.16
Sent: March 28, 2017 10:40 PM
To: Sharlie Huffman <sharlieh@telus.net>
Subject: Re:s.16 in Japan

Dear Sharlie-san,

Thank you for your message. s.13; s.16
s.13; s.16

s.13; s.16

Best regards,

s.16

-----Original Message-----
From: Sharlie Huffman
Sent: Wednesday, March 29, 2017 6:43 AM
To: s.16
Subject: RE: s.16 in Japan

Dear s.16

s.13; s.16

Our provincial government is having an election in May s.13; s.16
s.13; s.13; s.16
s.13; s.16

s.13; s.16 I have shared your papers with our Emergency Management division and Andrew Lamoureux who is working on the public alerting aspect for Emergency Management BC would like very much to contact you. Would you be willing for that conversation?

Regards,

Sharlie Huffman, P.Eng. FEC

9 Appendix C: Glossary of Terms

This glossary of terms used definitions defined in "Functional and Technical Requirements Definition: Wireless Public Alerting Service (WPAS) Development Project" and has been augmented with terms that are applicable to the BC Public alerting project

Term	Description
Alberta Emergency Alerts	The province of Alberta's emergency alerting system that is used by the Alberta Government and local authorities to alert of emergency events affecting the public in Alberta
Alert Presentation	The method by which an alert is presented to recipients by the Distributors.
Alerting Attention Signal	An audible signal used to capture attention in advance of the presentation of an audience alert message
Alert Message	The complete CAP message, which may include multiple audience alert messages. See CAP documentation for further clarification. http://docs.oasisopen.
Audience Alert Message	A complete message within a CAP message, that may be distinct from another Audience Alert Message because of the language, alert area, severity, etc., and which is identifiable within the CAP message as a separate <info> block. It may or may not include audio and or other resources. When transcoded through the NAAD System WPAS Gateway, the Audience Alert Message provides the fundamental elements for the Wireless Public Alert Message (WPAM).
BC Emergency Response Management System (BCERMS)	BCERMS is recognized as a standard system for emergency response, and currently mandated for use within the Government of B.C. and recommended to local authorities.
BC SIMS	British Columbia Smart Infrastructure Monitoring System (BCSIMS)
Broadcast Delay	The time between the CAP alert message being available to a last mile distributor and the audience alert message(s) being presented to the public.
Broadcast Immediately List	A collection of event types and associated CAP urgency, severity and certainty conditions, that have been identified by the Senior Officials Responsible for Emergency Management as having an imminent or expected threat to life, that alerting officials wish to be distributed and presented to the public as soon as possible, even if it means disrupting the programming of last mile distributor
Broadcast Immediately Alert	An audience alert message that aligns with the broadcast immediately list
Broadcasting Distribution Undertakings (BDU)	Organizations such as cable companies or direct-to home satellite service providers that receive and retransmit broadcasting programs.
Canadian Profile of the Common Alerting Protocol (CAP-CP)	A set of rules and references specific to the use of CAP in Canada. www.CAP-CP.ca
Canadian Radio-television and Telecommunications Commission (CRTC)	Public organisation in Canada with mandate as a regulatory agency for broadcasting and telecommunications. It was created in 1976 when it took over responsibility for regulating telecommunication carriers.
Carrier	A carrier is a person who provides telecommunications services to the public over facilities that it owns or operates, and whose services are

Term	Description
	subject to conditions pursuant to section 24 of the Act. A non-carrier is a person who provides telecommunications services to the public but who is not a carrier, and whose services are subject to conditions pursuant to section 24.1 of the Act.
Common Alerting Protocol (CAP)	The international message protocol adopted for use in NPAS. It is an international standard managed by OASIS, the Organization for the Advancement of Structured Information Standards. http://docs.oasisopen.org/emergency/cap/
CAP Layer	A specification developed by one or more members of the alerting community that relates to the extension of CAP, in accordance with CAP, for including additional content within a CAP alert message. E.g. A "Broadcast Immediately" element value is defined in the SOREM Layer specification
CAP Profile	A specification developed by one or more members of the alerting community that includes additional constraints and rules for CAP users, all of which must be within the bounds of the CAP standard. e.g. Canadian Profile of the Common Alerting Protocol (CAP-CP). NPAS CLF Guidance v1.0 5
Cell Broadcast Centre (CBC)	The component within a WSP's Cell Broadcast System that receives the WPAC Alert Message from the NAAD System and converts the message to a geo-targeted audience alert message on the LTE communications network and the Radio Access Network (RAN).
Cell Broadcast System	The components within a WSP's network including the appropriately configured mobile phones (handsets) that are necessary to facilitate the geo-targeted delivery of Cell Broadcast Audience Alert Messages to Mobile Devices. Sub Components include (but are not limited to) the WPAS C-Interface, WSP Gateway, Cell Broadcast Centre (CBC), the LTE communications network, the Radio Access Network (RAN) and Cell Broadcast enabled Handsets
Commercial Mobile Alert System (CMAS)	Commercial Mobile Alert System; also, Commercial Mobile Alert Service, the former name of Wireless Emergency Alerts (WEA)
Common Look and Feel (CLF)	The objective of presenting clearly recognizable authoritative audience alert messages to the Canadian public through the diversity of communications media and distributors supporting the NPAS initiative
Commercial Off the Shelf (COTS)	Software or hardware products that are ready-made and available for sale to the general public
Emergency Alert System (EAS)	The Emergency Alert System (EAS) is a national warning system in the United States put into place on January 1, 1997 (approved by Federal Communications Commission (FCC) in November 1994),[1] when it replaced the Emergency Broadcast System (EBS), which in turn replaced the CONELRAD System. The official EAS is designed to enable the President of the United States to speak to the United States within 10 minutes.
Emergency Data Exchange Language (EDXL)	The Emergency Data Exchange Language (EDXL) is a suite of XML-based messaging standards that facilitate emergency information sharing between government entities and the full range of emergency-related organizations. EDXL standardizes messaging formats for communications between these parties. EDXL was developed as a royalty-free standard by the OASIS International Open Standards Consortium.[1]

Term	Description
Emergency Management BC (EMBC)	Emergency Management BC (EMBC) used to be known as the Provincial Emergency Program and is a division of the Ministry of Transportation and Infrastructure British Columbia, Canada. EMBC works with local governments and other provincial and federal agencies year-round, providing coordination and support before, during and after emergencies. EMBC is administered under the Emergency Program Act.
Emergency Notification System (ENS)	An emergency notification system is a method of facilitating the one-way dissemination or broadcast of messages to one or many groups of people, alerting them to a pending or existing emergency.
Emergency Operations Centre (EOC)	Central command and control facility responsible for carrying out the principles of emergency preparedness and emergency management, or disaster management functions at a strategic level during an emergency, and ensuring the continuity of operation of a company, political subdivision or other organization.
Event	An Event is a specific occurrence of a significant thing that has happened that has the potential to affect citizens or infrastructure in British Columbia. A Tsunami occurrence would be an example of an event. Events and Incidents are only recorded in E-Team when the event or incident is escalated to the regional or provincial level and EMBC becomes involved. The Event or Incident will be entered by the Provincial Emergency Coordination Centre (PECC) or the Provincial Regional Emergency Operation Centre (PREOC).
Federal Emergency Management Agency (FEMA)	The Federal Emergency Management Agency (FEMA) is an agency of the United States Department of Homeland Security, initially created by Presidential Reorganization Plan No. 3 of 1978 and implemented by two Executive Orders on April 1, 1979.
Incident	An Incident is geographical and hazard specific episode that has occurred and has the potential to affect citizens or infrastructure in British Columbia. An example of an incident would be flooding in Port Alberni caused by a Tsunami event or a bridge collapse in Vancouver caused by an earthquake.
Incident Management System (IMS)	The Incident Management System (IMS) is a standardized approach to emergency management encompassing personnel, facilities, equipment, procedures, and communications operating within a common organizational structure.
Integrated Public Alert and Warning System (IPAWS)	An architecture that unifies the United States' Emergency Alert System, National Warning System, Wireless Emergency Alerts, and NOAA Weather Radio, under a single platform.
Last Mile Distributor (LMD)	Operators of technology based service delivery systems that disseminate National Public Alerting System messages (Audience Alert Messages) to the public. LMDs include, but are not limited to, radio, television, Internet, landline or cellular telecommunication, billboard, and other forms of wireline or wireless technology service deliveries or systems. Any party that transmits standardized emergency alerts directly to the public, in a “made for end client” presentation, are LMDs. The LMD is responsible for delivery and presentation of the Alert Message while Alert Authorities are responsible for the message content.
LTE (Long Term Evolution) Network	Mobile phones (handsets) that connect directly to a Facility based Wireless Service Provider’s (WSP) Long Term Evolution (LTE) Network, can display a minimum of 280 Characters on an

Term	Description
	embedded screen and is approved by Canada's WSPs or Mobile Virtual Network Operator's (MVNO) for use on their networks.
MASAS	Canada's Multi-Agency Situational Awareness System (MASAS) is an information aggregation system that facilitates sharing situational awareness within the public safety community. Information shared relates to incidents and planned events. It includes public alerts, risks to responders, and community profiles. Hundreds of Canadian public safety organizations have access to MASAS, and several first response agencies use it to help reduce call times and improve the safety of responders. MASAS is also being used to prepare for and mitigate resource conflicts before and during planned events. E.g. Marathons, festivals. A virtual and visual MASAS exercise environment has been used throughout Canada, and during cross border exercises.
Mobile Devices	Mobile phones (handsets) that connect directly to a Facility based Wireless Service Provider's (WSP) Long Term Evolution (LTE) Network, can display a minimum of 280 Characters on an embedded screen and is approved by Canada's WSPs or Mobile Virtual Network Operator's (MVNO) for use on their networks
National Alert Aggregation & Dissemination (NAAD) System	The CAP alert message aggregation system recognized as the national aggregator for NPAS. Owned and operated by Pelmorex Communications Inc. See http://alerts.pelmorex.com/en/.
National Public Alerting System (NPAS)	The Canadian federal/provincial/territorial government led public alerting initiative.
National Oceanic and Atmospheric Administration (NOAA)	An American scientific agency within the United States Department of Commerce focused on the conditions of the oceans and the atmosphere
National Tsunami Warning Center (NTWC)	The National Tsunami Warning Center (NTWC) is one of two tsunami warning centers that are operated by the National Oceanic and Atmospheric Administration (NOAA) in the United States. It was called the West Coast and Alaska Tsunami Warning Center (WC/ATWC) until October 1, 2013. The name was changed to reflect its geographical zone of responsibility. Headquartered in Palmer, Alaska, the NTWC is part of an international tsunami warning system (TWS) program and serves as the operational center for TWS of all coastal regions of Canada and the United States, except Hawaii, the Caribbean, and the Gulf of Mexico.
National Weather Service (NWS)	The National Weather Service (NWS) is an agency of the United States federal government that is tasked with providing weather forecasts, warnings of hazardous weather, and other weather-related products to organizations and the public for the purposes of protection, safety, and general information.
Organization for the Advancement of Structured Information Standards (OASIS)	The Organization for the Advancement of Structured Information Standards (OASIS) is a global non-profit consortium that works on the development, convergence, and adoption of standards for security, Internet of Things, energy, content technologies, emergency management, and other areas.
Pacific Tsunami Warning Center (PTWC)	The Pacific Tsunami Warning Center (PTWC) is one of two tsunami warning centers that are operated by NOAA in the United States. Headquartered on Ford Island, HI, the PTWC is part of an international tsunami warning system (TWS) program and serves as the operational center for TWS of the

Term	Description
	Pacific issuing bulletins and warnings to participating members and other nations in the Pacific Ocean area of responsibility.
Pelmorex Public Alerting Governance Council	The Governance Body from which the National Alert Aggregation & Dissemination (NAAD) System receives assistance.
Provincial Emergency Coordination Centre (PECC)	The emergency operation centre established and activated at the provincial coordination support level to facilitate and coordinate the provincial government's overall priorities and objectives in a significant emergency management event. The PECC is located at the EMBC
Provincial Emergency Notification System (PENS)	The Provincial Emergency Notification System (PENS) is used by EMBC to alert local government officials and the media of tsunami watch, advisory and warnings in British Columbia.
Provincial Regional Emergency Operation Centre (PREOC).	A PREOC has overall responsibility to: • Coordinate the province's response to emergencies and disasters within a PEP region • Coordinate regional provincial and agency support for a local authority, First Nations or another provincial ministry or agency • Prioritize the deployment of provincial resources on a regional basis and/or to those designated critical by the PREOC • Report directly to and take policy direction from the Provincial Emergency Coordination Centre (PECC) • Provide the PECC with situational information on events within the region including PREOC activities in support of local authorities • Request resources from the PECC whenever appropriate and/or sufficient resources are not available within the region. Additional resources may include, but are not limited to, those provided by provincial, federal or international agencies as well as the private
Radio Access Network (RAN)	A Radio Access Network (RAN) is part of a mobile telecommunication system. Conceptually, it resides between a device such as a mobile phone, and the core network which is the LTE Network for the WPAS. It is often referred to as the Air Interface and it is a component within the Cell Broadcast System
SaskAlert	The province of Saskatchewan's emergency alerting system that is used by the Saskatchewan Government and local authorities to alert of emergency events affecting the public in Saskatchewan
Senior Officials Responsible for Emergency Management (SOREM)	SOREM is a forum of Federal/Provincial/Territorial (F/P/T) officials responsible for coordinating a strategy for emergency management in Canada, and for providing guidance and advice on how to enhance emergency management in Canada. SOREM includes representatives from provincial and territorial emergency management organizations and Public Safety Canada
Short Message Service (SMS)	Short Message Service (**SMS**) is a text messaging service component of most telephone, World Wide Web, and mobile telephony systems. It uses standardized communication protocols to enable mobile phone devices to exchange short text messages.
Short Message Service – Cell Broadcast (SMS-CB)	Cell Broadcast/Cell Information (CB) messaging is a mobile technology feature defined by the ETSI's GSM committee and is part of the GSM standard. It is also known as Short Message Service-Cell Broadcast. (SMS-CB). Cell Broadcast is designed for simultaneous delivery to multiple users in a specified area.

Term	Description
Short Message Service–Point to Point (SMS-PP)	Short Message Service-Point to Point (SMS-PP) is a one-to-one and one-to-a-few service (requires multiple SMS messages, as each message can only carry one phone number)
SOREM Layer	A public alerting specification developed and owned by SOREM that is currently limited to identifying an audience alert message as “Broadcast Immediately
Strategic Investment Fund (SIF)	Strategic Investment Fund was implemented by the BC Government to share technical strategy and funding between technology organizations and government organizations.
Wireless Emergency Alerts (WEA)	Originally called CMAS (Commercial Mobile Alert System), WEA is used in the United States of America. The technical specifications for this service are still referred to as CMAS Specifications
Wireless Public Alert Service Architecture for C-Interface (WPAC)	The communication protocol required for the C-Interface and the reliable transmission of Wireless Public Alert Messages from the NAAD System to multiple WSPs.
Wireless Service Provider (WSP)	A WSP is any one of Canada's National or Regional Cellular Voice and Data Service Providers that operate their own network infrastructure within Canada
WPAS C-Interface	The operational interface between and inclusive of the National Alert Aggregation and Dissemination (NAAD) System Wireless Public Alerting Service (WPAS) Gateway and Wireless Service Provider (WSP) Gateway for the purpose of issuing WPAS alert
Wireless Public Alert Message (WPAM)	A derivative of the original CAP–CP Audience Alert Message that has been specifically assembled by the NAAD System WPAS Gateway for transport across the WPAC for processing by the WSP Gateway. The WPAM is comprised of the XML Script that encapsulates (but is not limited to) the CAP-CP Event Code, CAP Message ID, CAP-CP Location Code(s), associated Geographic Coordinates, additional Geographic Coordinates for polygons, and a bilingual message text field. While architected to accommodate both English + French languages, the bilingual message text field may contain an English Message, a French Message, a Bilingual English + French Message or a Bilingual French + English Message. The content of the message text field (Audience Alert Message) shall be determined by the Alerting Authority when creating the CAP Alert Message whereas the composition of the WPAM text field shall be assembled by the WPAS Gateway based on a simple concatenation algorithm.
WPAS Gateway	The NAAD System Interface specifically designed to securely interconnect with the WSP Gateway within the Cell Broadcast Systems of WSPs using the WPAC Protocol.
WSP Gateway	A WSP administered system, identified by a unique IP address or Fully Qualified Domain Name, which interfaces with the NAAD System WPAS Gateway via the WPAC protocol to process and condition WPAMs for delivery of Audience Alerts via the Cell Broadcast Centre.

10 Appendix D: Alberta Emergncy Alert Architecture

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Page 167 of 258 to/à Page 168 of 258

Withheld pursuant to/removed as

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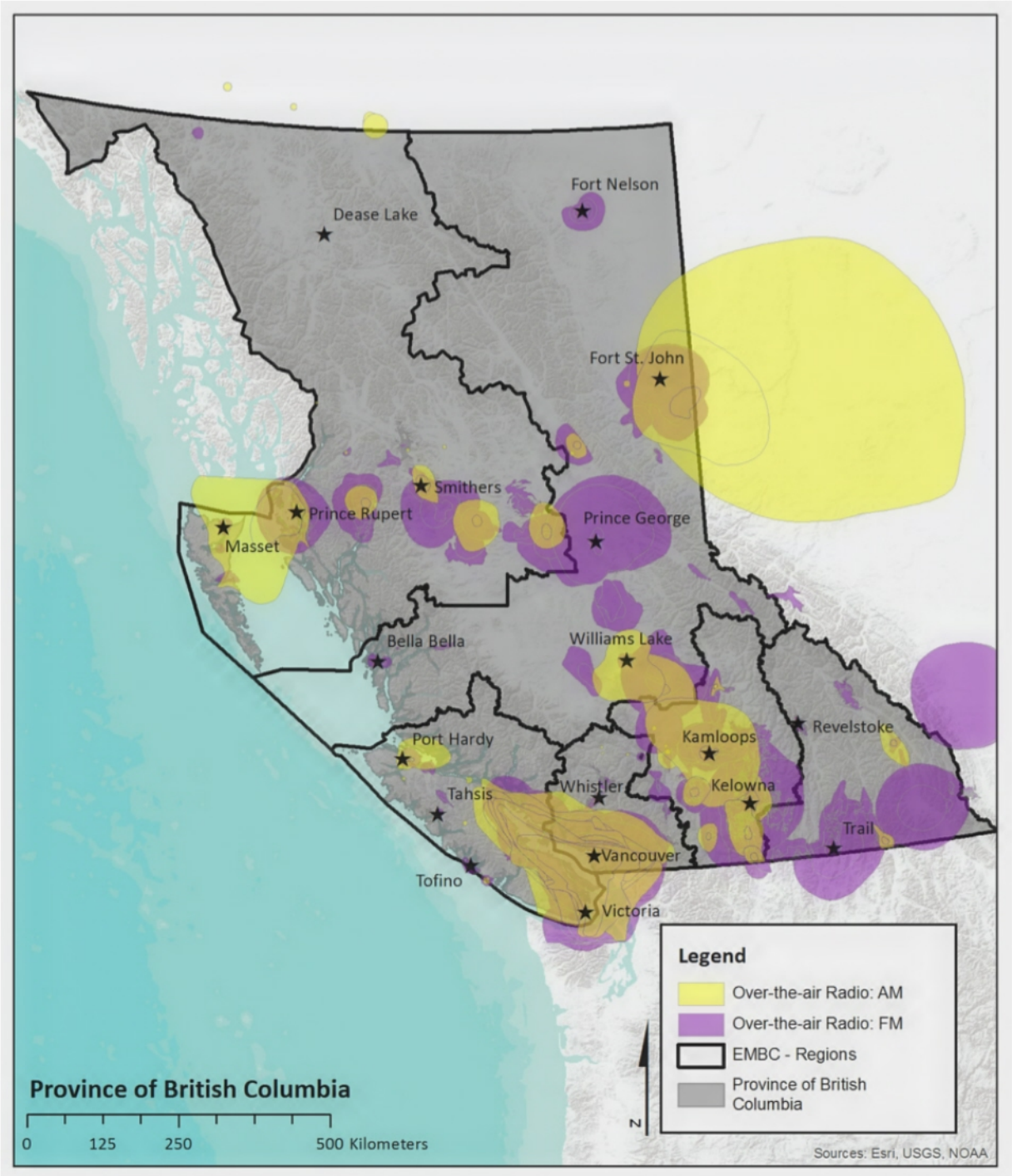
11 Appendix E: Peter Andersen – SFU Research

Peter Andersen is a SFU professor who has worked with Emergency Management BC since the 1980's. Dr. Andersen has done significant research into Tsunami warning and notification in the west coast of British Columbia. In 2016 he wrote a Tsunami Toolkit for EMBC to help BC coastal communities better prepare for a Tsunami. Dr. Andersen shared a large amount of his research with the Public Alerting project team and provided additional insight into Public Alerting challenges in BC through phone and in-person interviews.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Kelowna
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Vancouver
Tofino
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Legend
Over-the-air Radio: AM
Over-the-air Radio: FM
EMBC - Regions
Province of British Columbia
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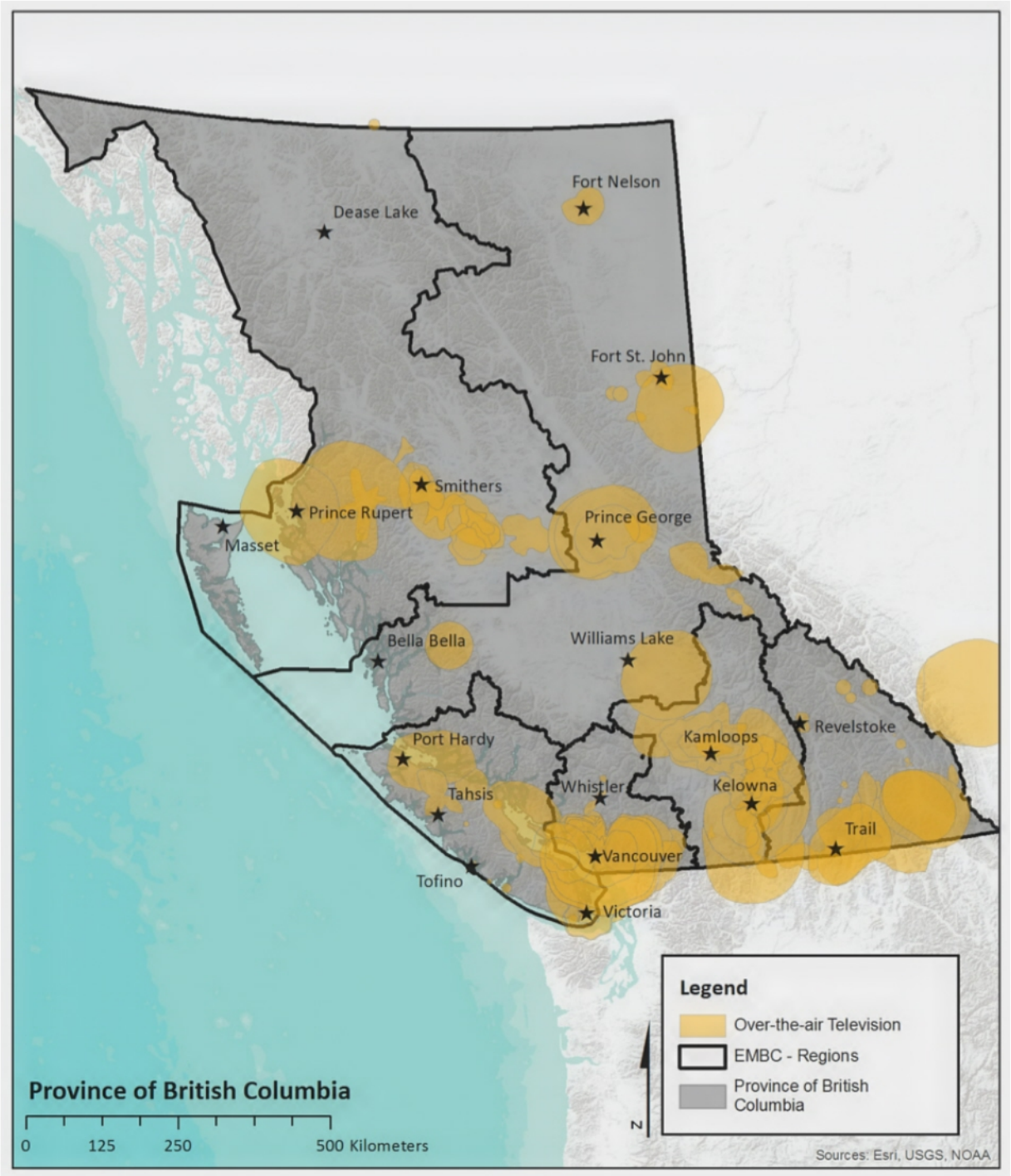
Sources: Esri, USGS, NOAA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Trail
Vancouver
Tofino
Victoria
Legend
Over-the-air Television
EMBC - Regions
Province of British Columbia
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500 Kilometers
Sources: Esri, USGS, NOAA


Fort Nelson
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Williams Lake
Revelstoke
Kamloops
Port Hardy
Whistler
Kelowna
Tahsis
Trail
Vancouver
Tofino
Victoria
Legend
Canadian Coast Guard VHF - marginal coverage
Canadian Coast Guard VHF - coverage
EMBC - Regions
Province of British Columbia
N
Province of British Columbia
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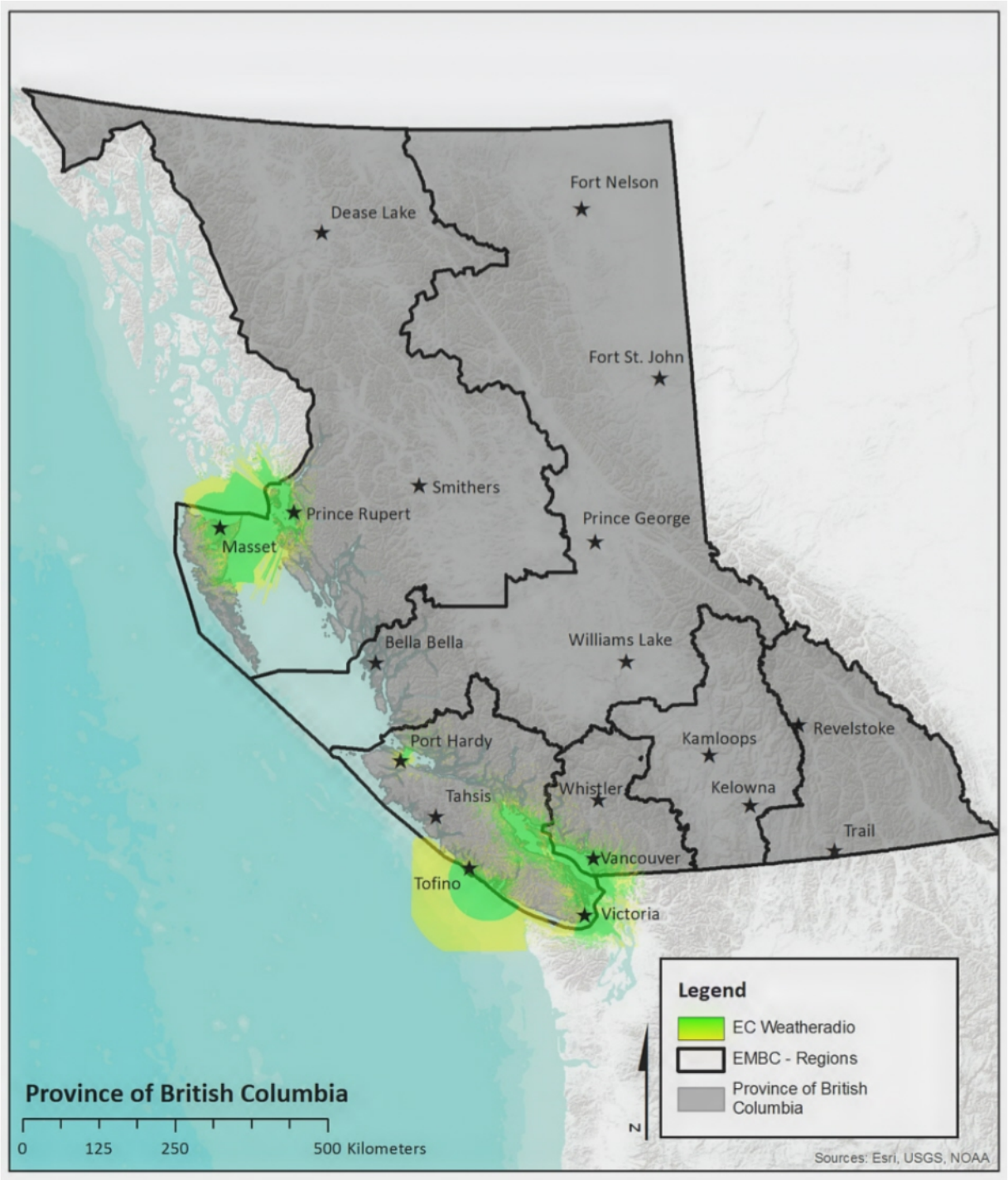
125
250
500 Kilometers
Sources: Esri, USGS, NOAA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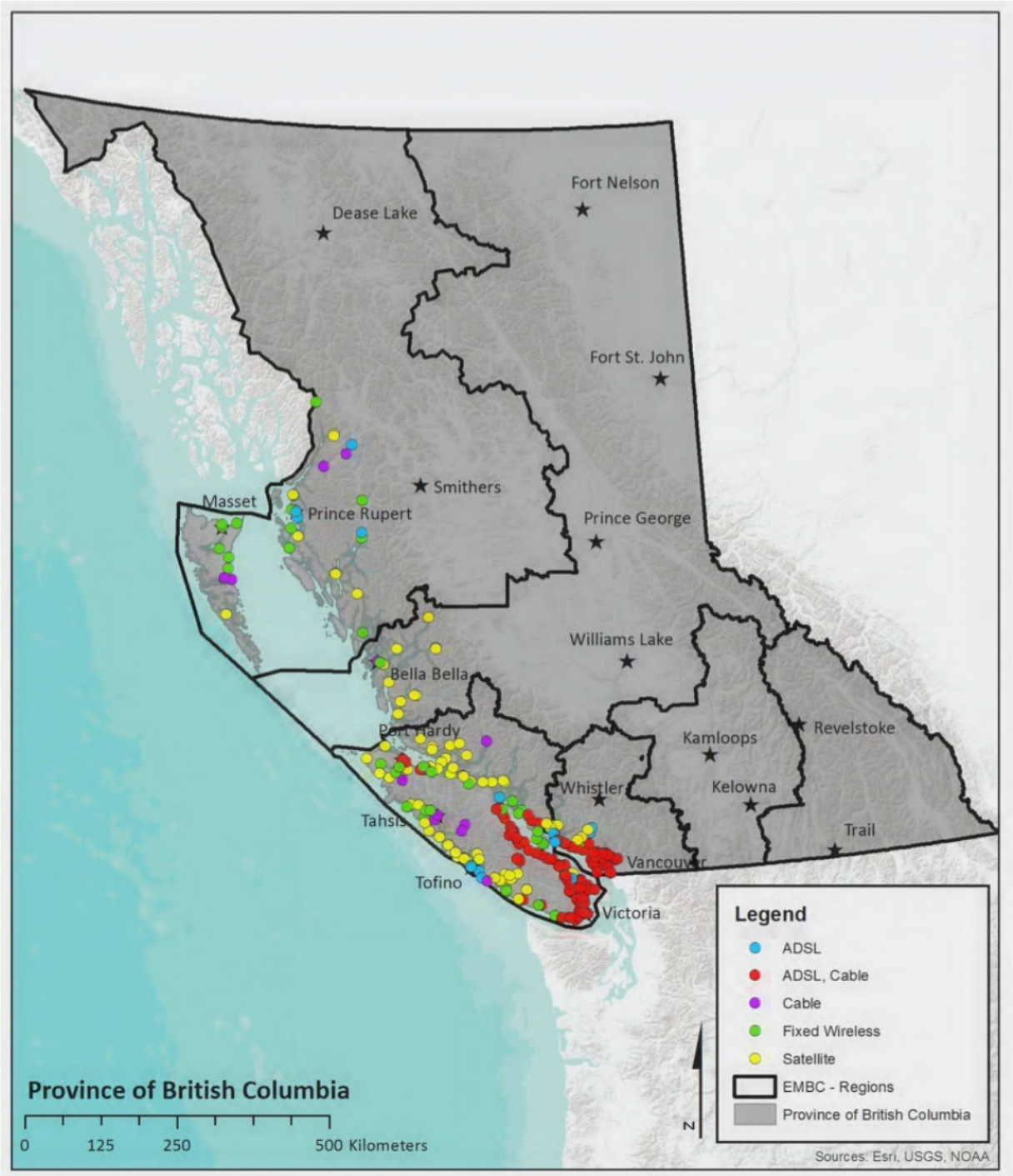
Sources: Esri, USGS, NOAA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ADSL
ADSL, Cable
Cable
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EMBC - Regions
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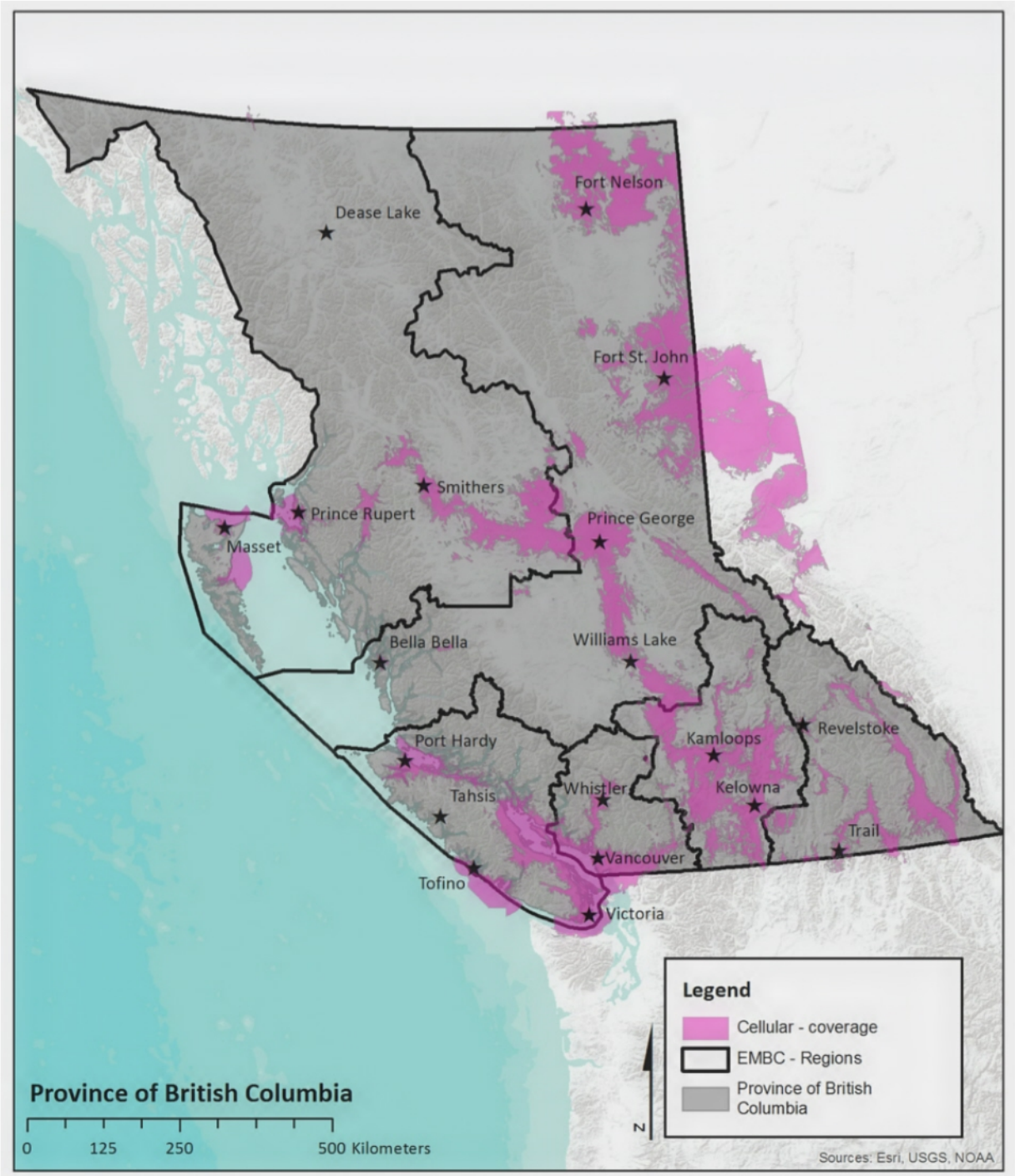
Sources: Esri, USGS, NOAA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Kelowna
Tahsis
Trail
Vancouver
Tofino
Victoria
Legend
Cellular - coverage
EMBC - Regions
Province of British Columbia
N
Province of British Columbia
0
125
250
500 Kilometers
Sources: Esri, USGS, NOAA

12 Appendix F: Wireless Public Alerting System (WPAS) Trial

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13 Appendix G: Early Earthquake Warning Alerting

The following appendix was taken form the Environmental Assessment Report for the Early Earthquake Warning and Seismic Monitoring projects

13.1 EEW Alerting

Earthquake Early Warning notify the public that an earthquake is coming and gives them a chance to prepare by finding cover, turning off machinery, shutting down equipment, etc. Before broadcasting alerts to the public most jurisdictions wait for the earthquake to be detected by a at least three seismic stations to reduce the chances of sending out a false alert. In addition to the initial alert, the EEW alert is updated continuously as the earthquake is detected at additional stations and the epicenter location and expected intensity of the shaking can be estimated with more precision.

Informational Earthquake Bulletins are sent out after the quake to give emergency responders and the public additional information on the areas most affected by strong shaking and details about the size and location of the earthquake

Early Warning Alerts

Early Earthquake Warnings are generated after the P-Wave is detected by multiple stations and the epicenter and intensity have been estimated. These warning can give anywhere from a few seconds to a minute and half of warning depending on how far people are from the epicenter and how quickly the earthquake was detected.

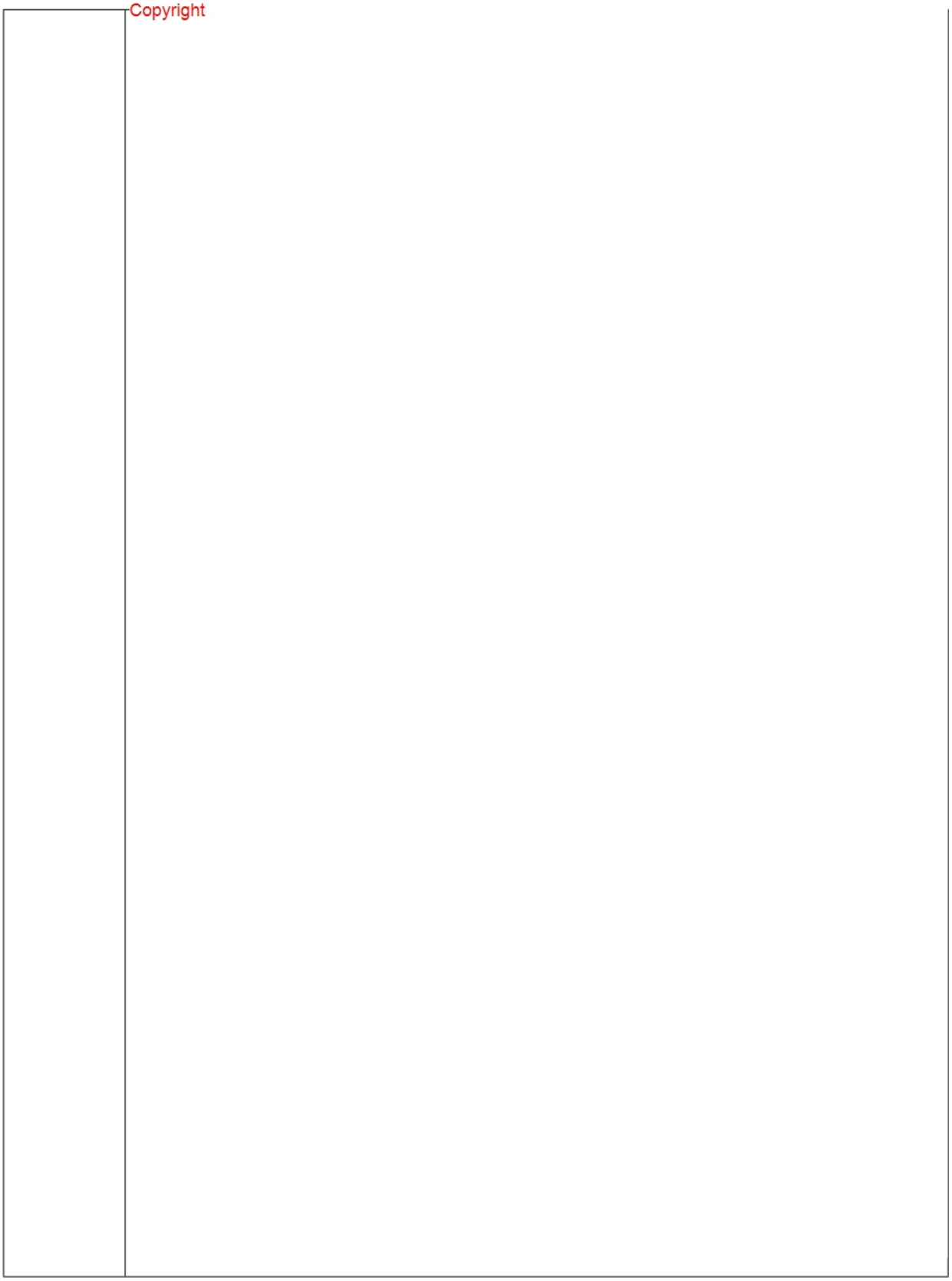
EEW Alerts differ from alerts for other disaster types in several ways:

- The latency of distribution is in the order of seconds to be effective not minutes like most other disasters
- The alert needs to be updated every few seconds as more stations pick up the alert and the earthquake parameters become better defined
-

The following channels were found to be used of earthquake early warning message dissemination:

Alerting Channel	Description
Loud Speaker Broadcast Systems	- Useful in densely populated urban areas such as schools, office building, etc. - S-Wave count-down and maximum estimated intensity - Used by Taiwan, Mexico - In Japan - Chime Sound and Sign Sound
Electronic Marquees and Billboards	- Scrolling marquees can be installed in public places - Electronic billboards can be overridden to display EEW message and S-Wave countdown - Used By: Taiwan
Broadcast Television	- Message displayed on screen to inform about approximate epicenter and location that may experience high intensity shaking - Can't be localized due to large broadcast area so more generic message with affected areas is displayed - Japan – Two sets of chimes + "This is an Earthquake Early Warning. Please prepare for

	powerful tremors." Copyright -
Broadcast Radio	- Similar to TV except Earthquake message is dictated - Due to the automated requirement for EEW alerts radio messages mush use Text to Speech translation or generic pre-recorded messages - Japan – Two sets of chimes + "This is an Earthquake Early Warning. Please prepare for powerful tremors."
Dedicated Computer Displays	- The USA and Japan have developed On Screen Display that can display the P-Wave and S-Wave arrival times along with the expected shaking intensity at the user's locations - Used by: Taiwan and USGS ShakeAlert - Japan – computer application from WeatherNews



Machine to Machine Alerts	- Automated systems can automatically shut down or put their systems in a "safe" state - In Japan, nuclear reactors automatically insert control rods, bullet trains are slowed and stopped.
Emergency Responder Radios	- Used by: Mexico, Japan - National Weather Radio - Train conductors are stop trains based on radio alerts  Figure 9: Mexico and Japan EEW Radio Receiver
Cell Phone and Mobile Device Alerting	- ShakeAlert is planning on implementing EEW alerts over cell-phones using the WEA program in 2018 - Japan sends early warning messages through cell broadcast - Japan – number of emergency apps made by 3rd parties

Post-Earthquake Informational Alerts

The earthquake information bulletins are typically published through the following channels:

Alerting Channel	Description
Notification Emails	- USGS provides an email notification service for earthquake anywhere in the

	world - Allows you to select geographical areas and magnitudes to be notified of
Twitter	- NR Canada and the USGS have Twitter feeds that automatically tweet earthquake parameters shortly after a quake is detected. - @USGSEarthquakes - @CANADAquakes – NR Canada
Web Pages	- Authoritative sources such as NR Canada and the USGS publish earthquake information on their web site. - USGS posts information for the entire world - NR Canada focuses on earthquakes affecting Canada
Google Alerts	- USGS is publishing its earthquake notification to Google Alerts. If you search for earthquake at a specific place it will come up above the first organic search result and will be linked to the official USGS web page for the event

14 Appendix H: Earthquake Early Warning Broadcast Telementry

The following appendix was taken form the Environmental Assessment Report for the Early Earthquake Warning and Seismic Monitoring projects

14.1.1 EEW Broadcast Telemetry Methods

Loudspeaker

At a Glance:

Network Type	**Broadcast EEW**
Used By	Mexico, Japan, Taiwan
Latency	**Varies based on telemetry link used to connect to loudspeaker system**
Pros	• **ability to notify public that may not have access to other notification methods (visitors, elderly etc.)** • **existing loudspeaker infrastructure can be utilized in schools, hospitals, industrial work sites etc.** • **commonly understood method of emergency notifications (sirens, fire alarms etc.)**
Cons	• **reach limited by the installed environment** • **can require the partnerships of private and public entities (buildings)** • **can be expensive to implement** • **location and real-estate** • **will require ongoing maintenance**
Implementation Challenges	• time and resource intensive • large geography to cover

Overview:

Central processing typically transmits EEW messages to loudspeakers directly, these can be sent over various telemetry links including UHF/VHF/SS radio, dedicated lines, satellite etc. Typically, these systems will operate regular testing procedures to ensure correct operation. In Japan, these tests are performed on a daily basis, in English this is commonly referred to as “the 5 pm bell” where music is played for 20-30 seconds.

Figure 12 - An example of a Japanese loudspeaker array. Over 90% of Japanese cities, towns and villages have systems like this deployed.

Cell Broadcast (CB) Short Message Service-Cell Broadcast. (SMS-CB)

At a Glance:

Network Type	Broadcast EEW
Used By	Taiwan, Japan, US (Testing EEW), China (Testing EEW), Israel
Latency	**Varies**
Pros	• cell Broadcast message can reach a huge number of terminals at once • **messages can be geo-targeted** • unaffected by traffic volume • **possible for network provider to identify and ignore broadcasts of already received messages** • **does not require a cell number**
Cons	• delays can occur in poor network coverage areas • disruption due to cell system damage or disconnection • implementation needs to be standardized, manual device configuration a major barrier • carrier system modifications like upgrades can affect performance negatively • not possible to confirm receipt of messages • current specifications limit message page to one every 1.883 seconds
Implementation Challenges	• national legislation key success factor • public awareness • technical device issues (turning the feature on, feature use etc.) • end user device compatibility, may require purchase of new device, cost born by end users

Overview:

Cell broadcast looks like is an SMS message to the recipient however unlike SMS which is a one to one or one to few messaging service, cell broadcast is one-to-many geographically focused messaging service, designed for simultaneous delivery of messages to multiple users in a specified area. Cell broadcast can transmit messages to millions of devices at once, additional unique characteristics of the technology are:

- it allows a text or binary message to be defined and distributed to all mobile terminals connected to a set of cells
- device subscription is not required
- it is an un confirmed push service (no confirmation of message receipt or identification or receiver is possible)

Technical details of the service:

- message page is composed of 82octets
- can encode 93 characters
- 15 of these pages may be concatenated to form a cell broadcast message
- Each page of such a message will have the same message identifier (indicating the source of the message), and the same serial number. Using this information, the mobile telephone can identify and ignore broadcasts of already received messages.
- This technology is currently being tested in Canada for the purposes of transmitting public warning broadcasts.

Internet (Desktop/App)

At a Glance:

Network Type	**Broadcast EEW**

Used By	Japan, Taiwan, US
Latency	**Varies**
Pros	• **relatively inexpensive to implement for receivers and transmitter** • **wide reach over urban areas** • **no additional specialized is required if using broadband telemetry links**
Cons	• **reach limited by the installed environment** • **poor reach over rural areas** • **requires recipient to install applications** • **device compatibility issues** • **latencies vary wildly** • **devices much be on applications running and connected to the internet** • **insecure transmission without security protocols in place**
Implementation Challenges	• transmission latency • security

Overview:

Central processing typically transmits EEW messages to subscribers directly, typically these are transmitted over a broadband connection. Subscribers receive transmissions to computing devices which can include desktops, laptops, tables etc. Typically, an application will remain running awaiting receipt of an EEW message, when received the application may provide an audio alert, and display pertinent information.

Radio Receiver (UHF/VHF Weather Radio, Dedicated Receiver)

At a Glance:

Network Type	**Broadcast EEW**
Used By	Mexico, Japan
Latency	**Varies**

Pros	• **relatively inexpensive to implement for receivers** • **private manufacturers can make devices readily available** • **device customization has been done by other jurisdictions it may be possible to leverage this** • **dedicated appliance ensures always available notification**
Cons	• **expensive to implement for transmitter** • **reach limited by the installed environment and application** • **some devices can be expensive** • **may require device customization** • **private individual devices will have limited coverage** • **require significant new infrastructure** • **significant ongoing maintenance and testing**
Implementation Challenges	• new infrastructure development • resource intensive • ongoing maintenance

Overview:

Radio receivers used in EEW systems can include several devices most commonly they are:

- Lower cost consumer devices like weather radios (customized to receive EEW messages) or purpose-built receivers designed specifically to receive EEW messages. EEW broadcasters will usually perform regular testing of the network by transmitting test messages to devices to indicate that the device is functioning as it should.
- Custom radio receivers, these devices are used in a variety of ways including the activation of loudspeakers, structural monitoring systems, operate automated control functions (shut off gas lines, lower elevators, open doors etc.)

Figure 14 - Low cost Sarmex receiver used in Mexico

AM/FM Radio

At a Glance:

Network Type	**Broadcast EEW**
Used By	Mexico, Japan, Taiwan,
Latency	**Varies**
Pros	• **relatively inexpensive to implement for transmitter** • **no additional specialized is required if using broadband telemetry links**

Cons	• **reach limited by the installed environment and listenership** • **broadcasters may require new infrastructure** • **dedicated telemetry links can be costly**
Implementation Challenges	• without legislation broadcasters, may not wish to participate in EEW broadcasts • minimizing transmission time

Overview:

Central processing typically transmits EEW messages to radio broadcasters directly, these can be sent over various telemetry links including broadband internet providers, dedicated lines, satellite etc. Radio broadcasters receive transmissions to specialized receivers that may or may not decode or translate the incoming message these receivers will typically take over live broadcasts, providing the relevant emergency information in audio form.

Public alerting equipment is well established in north America for notifications via radio broadcasters. However, the methodology employed is not well suited to the nature of transmitting EEW messages and likely new telemetry links and network nodes will be needed to make this a viable broadcast method.

Figure 15 - An example of a specialized emergency broadcast receiver/transmitter.

Television (T.V.)

At a Glance:

Network Type	**Broadcast EEW**
Used By	Mexico, Japan, Taiwan
Latency	**N/A**
Pros	• **relatively inexpensive to implement for transmitter** • **no additional specialized is required if using broadband telemetry links**
Cons	• **reach limited by the installed environment and viewership** • **broadcasters may require new infrastructure** • **dedicated telemetry links can be costly**
Implementation Challenges	• without legislation broadcasters, may not wish to participate in EEW broadcasts • minimizing transmission time

Overview:

Like transmitting to radio broadcasters central processing typically transmits EEW messages to TV broadcasters directly, these can be sent over various telemetry links including broadband, dedicated lines, satellite etc. TV broadcasters receive transmissions to specialized receivers that may or may not decode or translate the incoming message these receivers will typically take over live broadcasts, providing the relevant emergency information. Unlike radio TV broadcasters in addition to ad audio warning TV broadcasters will also typically display an on-screen warning.

Figure: An example of a Japanese EEW TV Broadcast (pop-up) appears over regular broadcast.

Public alerting equipment is well established in north America for notifications via TV broadcasters. However, the methodology employed is not well suited to the nature of transmitting EEW messages and likely new telemetry links and network nodes will be needed to make this a viable broadcast method.

15 Appendix I: Public Alerting Solution in Other Jurisdiction

This appendix is a collection of screenshots for alerting solutions from other jurisdictions.

15.1 SaskAlert

15.2 Weather Network

Pelmorex, the company who developed and hosts the National Alert Aggregation and Dissemination System also owns the Weather Network. The weather network website and app will display emergency alerts in addition to weather alerts.

15.3 San Francisco

San Francisco has a unique website that is a real-time information hub for emergency information. In the case of an emergency their real-time information hub will consolidate emergency information from several sources.

San Francisco also has large public warning system across the city. These loud speaker systems are installed around the city and can provide emergency alerts to the public.

15.4 New York

Notify NYC takes a different approach to public alerting than most other jurisdictions and publishes many alerts for situations most jurisdictions would not consider emergency situations. The emails below are examples of notifications from NYC.

15.5 Israel

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Page 199 of 258 to/à Page 201 of 258

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16 Appendix J – Initial Research

The following table was constructed early in the environment scan process while reviewing potential jurisdictions to interview further. This table was reviewed by IMB and EMBC when deciding which jurisdictions to follow-up on for interviews.

#	Jurisdiction Name	Organization Name	Organization Jurisdiction Scope	Hazard	Contacts
	United States	Integrated Public Alert and Warning System (IPAWS)	National	All	IPAWS Contacts: https://www.fema.gov/integrated-public-alert-and-warning-system-contact-us Organizations with Alerting Authority: http://www.fema.gov/media-library-data/1470418455623-3858964cd28632503e3333ef09ef9421/PAA_Complete_08052016.pdf
	Los Angeles	Country of Los Angeles – Office of Emergency Management	County	All	County of Los Angeles Chief Executive Office, Office of Emergency Management (323) 980-2260 – Office (323) 881-6897 – Fax LA Contacts: LA: http://lacoa.org/contactus.htm
	Washington	Washington State	State	All	
	Oregon Public Alerts	Oregon State	State	Tsunami, Flood, and Avalanche	*PublicAlerts* is administered by the Portland Bureau of Emergency Management on behalf of the region. The lead partners are the City of Portland and Clackamas, Clark, Columbia, Multnomah and Washington counties. http://www.publicalerts.org/

#	Jurisdiction Name	Organization Name	Organization Jurisdiction Scope	Hazard	Contacts
	Wisconsin Emergency Management	Wisconsin State	State		The state of Wisconsin has implemented a cell broadcasting based alerting system since 2005. Source: http://www.civildefence.govt.nz/assets/Uploads/publications/CAENZ-public-alerting-technology-study-report.pdf (page 17) Wisconsin Emergency Management Tod Pritchard Assistant Public Information Officer 2400 Wright St. Madison, WI 53704 tod.pritchard@wisconsin.gov Phone: 608.242.3324 Cell: 608.219.4008 Fax: 608.242.3247 Source: http://ready.wi.gov/frm/contact.asp
	Alberta	Alberta Emergency Alert	Province		Website: http://www.emergencyalert.alberta.ca/ Contact: http://www.alberta.ca/emergency-numbers.aspx
	Colorado		State	Wild Fire and Avalanche	Alerts: http://avalanche.state.co.us/forecasts/watches-and-warnings/ Colorado Avalanche Information Center 325 Broadway WS1 Boulder, CO 80305 303-499-9650 Friends of CAIC PO Box 267 Grand Junction, CO 81502" All: http://www.coemergency.com/ (Flood / Fire / Other)

#	Jurisdiction Name	Organization Name	Organization Jurisdiction Scope	Hazard	Contacts
					Counties: http://www.coemergency.com/p/local-info-sources.html
	Illinois	State of Illinois Department of Central Management Services	State	All	SIREN is a secure web-based persistent messaging and alerting system that leverages email, phone, text, pagers and other messaging formats to provide 24/7/365 notification, alerting, and flow of critical information. This system provides rapid communication, alerting and confirmation between state and local agencies, public and private partners, target disciplines and authorized individuals in support of state and local emergency preparedness and response. https://siren.illinois.gov/
	Saskatchewan		Provincial		SaskAlert is Saskatchewan's Emergency Public Alerting program used to alert the public in real-time of an emergency situation. http://emergencyalert.saskatchewan.ca/ Contacts: http://www.saskatchewan.ca/residents/environment-public-health-and-safety/emergency%20management
	Michigan	None?	State		News: http://www.michigan.gov/snyder/0,4668,7-277--387382--,00.html http://www.detroitnews.com/story/opinion/2016/04/27/michigan-public-threat-alert-system/83630394/ Michigan EAS Contacts The MAB's Alisha Clack is the EAS administrator and works on EAS and AMBER Alert. You may reach her via clack@michmab.com or via phone at 1-800-968-7622. For after-hours emergencies, Alisha may be reached at 517-449-4651. Gary Blievernicht is Acting Chairman of EAS. Gary is also Vice Chairman of the Michigan Emergency Alert System (EAS) and the State Emergency Communications Committee (SECC). as well as Director of Engineering at WKAR-AM-FM-TV at Michigan State University. Gary can be reached at 517-884-4720 or via email at garyb@wkar.org. By adding ""EAS"" in the subject line, email will go directly to his cell phone.

#	Jurisdiction Name	Organization Name	Organization Jurisdiction Scope	Hazard	Contacts
	Minnesota	Homeland Security and Emergency Management A Division of the Minnesota Department of Public Safety	State		The Minnesota Emergency Alert System Statewide Plan (July 2014) explains who can create and originate emergency alerts in Minnesota and how and under what circumstances these alerts are distributed via the EAS and the Integrated Public Alert and Warning System (IPAWS). https://dps.mn.gov/divisions/hsem/emergency-response/Documents/mn-emergency-alert-system-statewide-plan-2014.pdf County map of originators: https://dps.mn.gov/divisions/hsem/emergency-response/Documents/IPAWS-alert-authority-counties-072016.pdf MN-IPAWS Policy Sub-Subcommittee Member December 2013. Julie Anderson External Affairs Coordinator Department of Public Safety Homeland Security and Emergency Management Telephone: 651 201-7576 Email; julie.anderson@state.mn.us
	Washington State				http://mil.wa.gov/other-links/emergency-alert-system-eas-state-plan Jim Hutchinson, State Agency Liaison Coordinator WA State Military Dept., Emergency Management Division Phone: 253.512.7120 Email: james.hutchinson@mil.wa.gov
	California				http://www.caloes.ca.gov/
	Japan				Major threats: Earthquake is a common occurrence in Japan. Decision and implementation period: Area Mail is operational since 2007. Technical solution: Japan has an advanced infrastructure of seismic sensors in the ocean around Japan that detects earthquakes and which generates messages that are broadcasted to the citizens via the 'Area Mail' service. Area Mail is

#	Jurisdiction Name	Organization Name	Organization Jurisdiction Scope	Hazard	Contacts
					based on the Cell Broadcast bearer service. The 3GPP specified "Earthquake and Tsunami Warning System" (ETWS) uses both 'Area Mail' and additional Paging Channel bearers. The ETWS detects the initial slight tremor of an earthquake, the Primary Wave and sends a warning message that an earthquake (Secondary Wave) is about to happen to the mobile devices in the affected area. ETWS can deliver the first notification to mobile devices within four seconds using the 'Paging Channel' bearer. This Primary Notification only contains minimum information, such as "Earthquake" or "Tsunami". The mobile device will display a pre-set message. The Secondary Notification uses the 'Area Mail' service (which is similar to the Cell Broadcast bearer service). This bearer contains more detailed information in text. Source: http://www.eena.org/uploads/gallery/files/operations_documents/2012_06_25_publicwarning.pdf --- Japan is planning to use normal 'Cell Broadcast' for warning and informing the public for emergencies, but is also investigating a special, additional signal in the 'Paging Channel' for earthquake and tsunami warnings. Japan's tsunami risk necessitates messages to be sent very rapidly. The paging channel can sound a special alert tone to all customers within 20 seconds to indicate an imminent tsunami. In contrast, cell broadcasting will take between 20 seconds and 2 minutes. Japan does not run a 3G network compatible to the New Zealand 3G networks but this is a technology that could be of value in the future. Source: http://www.civildefence.govt.nz/assets/Uploads/publications/CAENZ-public-alerting-technology-study-report.pdf J-Alert (全国瞬時警報システム Zenkoku Shunji Keihō System?) is a nationwide warning system in Japan launched in February 2007. It is designed to quickly inform the public of various threats. The system was developed in the hope that early warnings would speed up evacuation times and help coordinate emergency response. J-Alert is a satellite based system that allows authorities to quickly broadcast alerts to local media and to citizens directly via a system of loudspeakers. According to Japanese officials it takes about 1 second to inform local officials, and between 4 and 20 seconds to relay the message to citizens. All warnings, except for severe weather warnings, are broadcast in five languages: Japanese, English, Mandarin, Korean and Portuguese (Japan has a small Chinese, Korean and Brazilian population). The warnings were broadcast in these languages during the 11 March 2011

#	Jurisdiction Name	Organization Name	Organization Jurisdiction Scope	Hazard	Contacts
					earthquake and tsunami.[1] The severe weather warnings are only broadcast in Japanese. J-Alert broadcasts via the Superbird-B2 communication satellite. Source: https://en.wikipedia.org/wiki/J-Alert
	Israel				Major threats: Israel is in the focus of multi-fold challenges that are threatening the population's safety and security on a constant base. Besides being in the focal point of missile and rocket threats of the neighbouring countries, additional challenges are being imposed based on the fact that Israel is located on the Syrian-African Break of the respective tectonic plates. As such Israel has to prepare itself for a devastating earthquake that might occur any minute. In addition to that, given the country's geographic circumstances and the fact that both the majority of the industry as well as the population are concentrated on 35% of the country's area, make the population also vulnerable to any kind of man-made and natural disasters, something that has been proved once again during the devastating forest fires that took place beginning of December 2010 and caused the death of 41 people enforcing the evacuation of ten thousand people. Source: http://www.eena.org/uploads/gallery/files/operations_documents/2012_06_25_publicwarning.pdf
	Thailand				
	Indonesia				
	Peter Anderson				
	Red Cross				
	New Zealand 1				

#	Jurisdiction Name	Organization Name	Organization Jurisdiction Scope	Hazard	Contacts
	New Zealand 2				
	Norway				Public warning for fixed phones Major threats: Due to a major accident in the small town of Lillestrøm in 2000 solutions were demanded for easier and faster ways of communicating with affected citizens. Norway faces threats like flooding, tsunamis, extreme weather and (after the 22nd of July 2011) also terror. Decision and implementation period: In 2003 the Directorate for Civil Protection and Emergency Planning launched the first large scale test towards fixed phones – with good results. Since then solutions covering fixed phones have not been used in large scale but on several occasions each year in local areas. Source: http://www.eena.org/uploads/gallery/files/operations_documents/2012_06_25_publicwarning.pdf Tools: Unified Messaging System: http://www.umsalert.no/
	Ontario				Ontario's Emergency Public Warning System is a tool that provides timely and accurate information to Ontario residents, businesses and visitors during an emergency. The system allows Ontarians to receive three types of warnings – Red Alerts, Emergency Information Advisories and Tornado Warnings.
	Netherlands				The Netherlands was the first country to implement a government sponsored cell broadcasting system which demonstrated strong partnerships between the private sector carriers and government8. This partnership is also providing significant support to an EU project on cell broadcasting. In addition to cell broadcasting, the Netherlands uses a feature of radio broadcasting to provide messages (such as traffic updates) via the space on radio displays that carries the station ID to deliver alert messages. Source: http://www.civildefence.govt.nz/assets/Uploads/publications/CAENZ-public-alerting-technology-study-report.pdf

#	Jurisdiction Name	Organization Name	Organization Jurisdiction Scope	Hazard	Contacts
					--- Netherlands, with public safety at the top of any government's agenda, the Dutch Ministry of the Interior and Kingdom Relations, realised that a modern public warning system was essential for the safety of its citizens. With UMS' Multi Channel Alert and Notification System, it found a solution that met all of its requirements. Tool: http://www.umsalert.com/use-cases/public-warning-system-netherlands/
	Sweden				Sweden has taken it one step further and together with UMS, the Swedish Government has launched a comprehensive national emergency warning system, which can alert all or specified groups of citizens at home or abroad, based on various selection criteria. The system will also ensure that emergency operations can be coordinated in the most effective and optimal manner. Tool: http://www.umsalert.com/use-cases/sos-alarm-sweden/
	Italy			Earthquake	Italy has requirements beyond public alerting. Carriers are required to identify Italian citizens in a foreign country affected by a natural disaster, contact them via a text message with a set of questions, receive and collate the responses, and provide a report to their government. In Italy, the emergency system is based on a network of public authorities, which cooperate each another on subsidiarity basis. This means that the more a public authority is close to a just recognized hazard the more it should be the first entity in charge for the emergency management, but it has the responsibility of keeping informed the other authorities on the evolving situation. In Italy, until the 2013 communications among public authorities were mainly based on facsimile transmission (Fax). A recent law (L. 98 09/08/2013) forbids explicitly the use of Fax for official communications between public institutions, and it gives legal force only to communications based on certified electronic mail (PEC), attachments digitally signed, and secure services of inter-application cooperation. Source: http://www.opti-alert.eu/assets/files/Deliverable%206-1.pdf

#	Jurisdiction Name	Organization Name	Organization Jurisdiction Scope	Hazard	Contacts
	Australia				'Public alerting' has received a high profile in Australia in 2008, with the Australian Prime Minister and State Premiers supporting a mass public alerting project intended to be operational next year. This system is expected to provide a similar level of functionality to the CIWS system tested by the Victoria Government10. Source: http://www.civildefence.govt.nz/assets/Uploads/publications/CAENZ-public-alerting-technology-study-report.pdf

17 Appendix K – COTS vs Custom Build

Custom solutions need be compared against COTS plus necessary enhancements.

A COTS implementation requires a discussion of:

- **Expertise Requirements.**
  Determine if the MoTI has the in-house expertise required to support, a COTS solution of this complexity.
- **Product GAP fit.**
  Determine whether the functionality promised is the functionality delivered, and whether functional requirements can be met by the functionality delivered.
- **Total Cost of Ownership (TCO).**
  COTS evaluations should also include an analysis of Total Cost of Ownership (TCO). TCO should attempt to quantify the financial impact of deploying the COTS product over its life cycle. Costs and expenses should include (but not be limited to):
    - Computer hardware and programs.
    - Network hardware and software.
    - Server hardware and software.
    - Installation and integration of hardware and software.
    - Warranties and licenses.
    - Migration expenses.
    - Operation expenses.
    - Testing.
    - Backup and recovery process.
    - Technology training.
    - Audit (internal and external).
    - Replacement.
    - Future upgrade or scalability expenses.
    - Decommissioning costs.
- **Non-functional requirements (especially if hosted by vendor).**
  Determine whether required non-functional requirements (e.g. portability, reliability, security, performance, and other considerations) can be met.
- **Solution suitability for B.C.'s transportation environment.**
  Determine whether the proposed solution, with its suite of components, can operate successfully in the environment where the system is intended to operate.
- **Interoperability.**
  Determine whether the proposed set of solution components can operate successfully in an integrated fashion.

- **Supplier Compatibility.**
  Determine the stability and viability of the suggested vendor, and the willingness of the vendor to cooperate and help make the project successful.
- **Implementation Timelines.**
  Determine if the product be implemented in a suitable timeline.
- **Service Level Agreements.**
  Determine if the solution vendor's SLA agreements match the MoTI's service level goals, backup and recovery capabilities
- **COTS product road map.**
  Determine if the vendor can provide a suitable product road map for the future.
- **Control over enhancements when using COTS.**
  Determine if using a COTS product might reduce MoTI's control over enhancement timelines, enhancement priorities, and costs.

- <u>A Custom implementation requires a discussion of:</u>
  - **Expertise Requirements.**
    - Determine if the MoTI has the in-house expertise required to develop, implement and operate a custom solution of this complexity.
    - Determine if the MoTI can train or recruit personnel with the necessary skills and experience to implement the proposed custom solution?
    - Determine if the MoTI can retain technology resources with the skill sets used in developing the custom solution?
    - Determine if the MoTI can affordably create a custom product of the same quality as a mature COTS product? Is the risk to quality greater with a custom product?
  - **Budget Requirements and Return on Investment.**
    - Determine if the MoTI has the budget to create a custom software product?
    - Determine if the MoTI can accurately estimate the return on investment (ROI), or added value created, by developing its own custom solution?
    - Determine how ROI will be measured for the proposed custom solution?
  - **Operational Expertise.**
    - Determine if the MoTI has the operational maturity to create, implement and operate a custom product that compares in quality and complexity to a shared service?
    - Determine if the MoTI can avoid future project and/or product scope creep in the creation, implementation and operational support of a custom product?
    - Determine if the MoTI can identify and mitigate the risks associated with developing a custom product? For example, budget, quality and schedule risk.

- Determine if the MoTI has enough familiarity with the required technologies? And decided if this should be a factor considered when making the technology decisions that affect this project?

18 Appendix L - Mentioned Vendors

1. CellCast Technologies

"CellCast Technologies provides message processing systems for emergency messaging, public service messaging, community messaging and point to multi-point mobile marketing messaging.

Our messaging systems are used to deliver life-saving emergency alerts, post-disaster informational messages, public service messages concerning the location and availability of health care services (flu shots, etc.), prior to or during an outbreak, criminal activity alerts, and other important community interest messages.

CellCast has a strong interest in improving the delivery of life-saving emergency messages to affected populations around the world. Our unique solutions and strong partnerships enable us to deploy our solutions anywhere in the world and CellCast is focused on ensuring that both citizens and tourists receive these vital messages.

CellCast is actively participating in the roll-out of the Commercial Mobile Alerting System (CMAS) in the USA, including the completion of the first end-to-end CMAS pilot conducted in the State of Florida using cell broadcast. Of course, CellCast is active in similar projects around the world."

Source: New Zealand Study
Website: http://www.cellcastcorp.com/

2. UMS Alert

"UMS deliver solutions for citizen communication and public warning for people's security, convenience and welfare. With our expertise in reaching people during a crisis, UMS ensure safety with effective and timely message delivery. Our solutions enable utilities, public services and businesses to reach citizens with critical information. UMS use advanced location based services and analytical software to innovate communication and develop new solutions to improve quality of life."

Source: New Zealand Study
Website: http://www.umsalert.com/

3. Whispir

"Incident Communications Management - Helping client's respond to service disruptions and emergency situations, including Cloud-based messaging over multiple channels."

Source: New Zealand Study
Website: http://www.whispir.com/resources/casestudies/ibm-incident-communications-management

4. Rave Wireless

"Rave Wireless is an application designed for Rave Wireless campuses that incorporates a wide range of applications including: course management, course messaging, course polling, course alerts, flashcards, streaming video, in-class polling, group messaging, group polling, school email, bus tracker, broadcast alerts and a campus safety application."

Source: New Zealand Study

5. SquareLoop

"SquareLoop is an alerting application that SquareLoop receives all alerts sent using the SquareLoop Table 1: Public Alerting System Implementation Mechanisms [source: GSMA. 20059] Instrument Country Technology Carrier Participation Compensation Legislation Finland Any technology may be used Compulsory Some financial compensation Legislation and contractual agreement USA Probably SMS-based (but still to be determined) Proposed to be voluntary Possibility of government financing Contractual agreement Netherlands Cell broadcast Voluntary No financial compensation Contractual agreement Italy SMS Voluntary No financial compensation Contractual agreement Korea Cell broadcast Voluntary No financial compensation Oral agreement India SMS and cell broadcast simultaneously Voluntary No financial compensation Oral agreement Malaysia Cell broadcast Voluntary No financial compensation 9 GSM Association, 2005. Report on Emergency Alerting and Emergency Handling Initiatives, GSMA Report p19. 10 Betts, R, 2006. Community Information and Warning System – The Report of the Trial and Evaluation, Report of the Office of the Emergency Services Commissioner, Department of Justice, Victorian Government, Australia 116p. Page 18 NZ Telecommunications Based Public Alerting Systems Technology Study technology, determines the location of the phone to determine if the alert is relevant, and if so display the alert to the user along with an audible alert."

Source: New Zealand Study

6. Zingerang

"Zingerang for desktops and mobile devices that allow alerts to 'travel' from device to device for a user. If no reply is received within a certain timeframe, then the system moves the alert to the next device of the user. Zingerang is currently under a trial of emergency notifications from California's Emergency Information Service (EDIS). These alerts are provided for fire, earthquake, health, weather and other events."

Source: New Zealand Study

7. Hyper-Reach

"Hyper-Reach/Communities is a product of The Asher Group, a respected telecommunications and data systems integrator offering a complete range of business and IT services. Our services combine large scale database expertise with state-of-the-art communications systems, integrating the Internet, traditional telecommunications infrastructure and evolving communications technologies. We specialize in highly scalable Interactive Voice Response (IVR) systems for customer service applications, digital product delivery and community-oriented outbound communications. These systems are offered as

fully-hosted, customizable turnkey systems, or we can develop enterprise IVR systems that integrate with your internal networks."

Source: https://www.publicalerts.org/signup

Website: http://www.hyper-reach.com/

8. Everbridge

Website: http://www.everbridge.com/

Source: https://www.publicalerts.org/signup

9. Evigilo

Website: http://www.evigilo.net/

Source: http://www.breakingisraelnews.com/15912/startup-spotlight-israeli-warning-system-provides-real-time-lifesaving-information/#GXK4gHwID26aFQHF.97

10. Public Emergency Consultants
http://galainsolutions.com/
http://www.emergencymgmt.com/emergency-blogs/alerts

19 Appendix M - Alert origination software providers that have successfully demonstrated their IPAWS capabilities:

There are several vendors who have implemented alerting solution that integrate with IPAWS in the USA:

- AmberAlertGPS—LEAP (Law Enforcement Alerting Portal)
- Asher Group—Hyper Reach
- AtHoc—IWS Alerts
- CivicPlus - CivicReady
- Comlabs—EM Net
- ECN (Emergency Communications Network)—
- Code Red
- Everbridge
- Federal Signal Corporation—CenterPoint
- Dashboard
- Geo-Comm, Inc.—GeoLynx
- GSS Alert Studio
- Inspiron Logistics—WENS
- Interop-Solutions—Paraclete
- Monroe Electronics—DAS-EOC
- MyStateUSA—Alert Sense
- NC4—E-Team
- Nixle
- KDDE Technology LLC—On-the-Go Alerting
- Ping 4—Ping 4 Alerts!
- Regroup Mass Notifications

Source: http://www.fema.gov/media-library-data/1466171680713-128bf57a771d7ba525443dc78a7c72ab/Alert_Origination_Software_Providers_06172016.pdf

20 Appendix N – Research References

- *New Zealand Public Alerting Options Assessment*
  http://www.civildefence.govt.nz/assets/Uploads/publications/is-10-09-public-alerting-options-assessment.pdf
- *Public Alerting Assessment Study:*
  http://www.eena.org/uploads/gallery/files/operations_documents/2012_06_25_publicwarning.pdf
- *Capability Assessment Tool*
  http://www.civildefence.govt.nz/assets/Uploads/CDEM-Capability-Assessment-Tool-2014-v7.0-August-2014.xls

- *New Zealand Telecom Based Public Alerting Study*
  http://ir.canterbury.ac.nz/bitstream/handle/10092/11581/Alerting_Report.pdf?sequence=1&isAllowed=y
- *FEMA WEA*
  https://www.fema.gov/emergency-alert-system-participants
- *FEMA Private/Public Partners*
  http://www.fema.gov/media-library-data/20130726-1917-25045-5167/IPAWS_partner_organizations_may2013.txt

- *European Emergency Number Association Study on Public Alerting.*
  http://www.eena.org/uploads/gallery/files/operations_documents/2012_06_25_publicwarning.pdf
- *Federal Communications Commission*
  https://www.fcc.gov/general/emergency-alert-system-eas
- *Certified EAS Equipment Vendors*
  https://www.fcc.gov/public-safety-and-homeland-security/policy-and-licensing-division/alerting/general/certified-eas
- *Additional Researched Vendors:*
  s.15

21 Appendix O – IPAWS Open Developer Organizations

These companies have agreements with FEMA for purposes of development and testing. See list of "Alert Origination Software Providers That Have Successfully Demonstrated Their IPAWS Capabilities" for companies who have completed their development and testing.

Private Sector Systems

Company	System Name	Public Alerting	Other
911 Thinksign/Thinksign Optolectonics	EMC Control System	YES	YES
Akamai Technologies, Inc.	Web Emergency Alert Reporting Service	---	---
Alcatel-Lucent NSIT Lab	Alcatel-Lucent NSIT Testbed Systems	NO	YES
Alerting Solutions, Inc.	Next Generation CAP Alert	YES	YES
Alertus Technologies	Alertus Emergency Notification System	YES	YES
Amatra Technologies Inc.	Amatra SmartSource™	YES	YES
Amika Mobile Corporation	Amika Mobility Server - Commercial Mass Notification Product	NO	YES
Andrew Potter	Stormee	NO	YES
Apex Innovations, Inc.	i-INFO	YES	YES
Asher Group	Hyper-Reach	YES	YES
AT&T Services, Inc.	Emergency Alert System for AT&T U-verse TV	NO	YES
AtHoc, Inc.	AtHoc IWS Alerts	YES	YES
ATI Systems, Inc.	Mass Alert	YES	YES

Company	System Name	Public Alerting	Other
Aventura Technologies	GovComm Unified Communication System; Aventura Vantage	YES	YES
Aventura Technologies	GovComm Unified Communication System; Aventura Vantage	YES	YES
Avtex Solutions LLC	CityWatch	YES	YES
Belsito Communications, Inc.	1st Responder Wireless News	YES	YES
Blackboard Connect, Inc.	Blackboard Connect		
Blaser Software	BEAMS - Blaser Emergency Alert Messaging System	YES	YES
Broadcast Television Group, LLC	TV Scout	---	---
Buffalo Computer Graphics, Inc	DisasterLAN; NY Alert; iAlertz	YES	YES
BullBerry Systems, Inc.	BullBerry Maps (Notify Extension)	NO	YES
Callaway GraphicSoftware, LLC, DBA CGS Infographics Automation	NewsChief Display System	NO	YES
Carnegie Mellon University Silicon Valley	CAP Tool	YES	YES
Cassidian Communications (formerly PlantCML)	The Communicator! NXT, GEOCAST Web, REVERSE 911(The Communicator! NXT and GeoCast Web)	YES	YES
Catalyst, LLC	RevelDigital Altering Application	NO	YES
CellCast Technologies, LLC	CellCast Aggregator Gateway and EAGLE Alerts	YES	YES
Cisco Systems Inc.	AlertManager - A Conductor Service in Cisco Videoscape	NO	YES
Code Blue Corporation	Blue Alert	YES	YES
Communications & Power Engineering (dba CommPower), Inc.	iNOTiFY	YES	YES
Communications Laboratories, Inc.	The Emergency Management Network (EMnet)	YES	YES

Company	System Name	Public Alerting	Other
Communications Laboratories, Inc.	ENVOY by viaRadio	---	---
Cooper Notification	Roam Secure Alert Network	YES	YES
CS Consulting Corp	ICCACCESS.COM	YES	YES
DA/Page, LLC	DA/Page Messaging System	---	---
DaleParsons.com	DPA-WEB	---	---
Daniel Iland	Family Locator Emergency Assistant	NO	YES
Deaf Link Inc.	Accessible Hazard Alert System (AHAS)	NO	YES
Defense Group	CoBRA	NO	YES
Depiction, Inc.	Depiction	---	---
Desktop Alert, Inc.	Desktop Alert Mass Notification System(Desktop Alert)	YES	YES
Digital Alert Systems	DASDEC/DASDEC-II CAP EAS encoder/decoder; Monroe R189/R189SE One-Net CAP EAS encoder/decoder; HALO CAP EAS alert server	YES	YES
Disaster Management Solutions, Inc.	FirstTrak	NO	YES
Dotomi, a ValueClick Company	Dotomi Messaging System	NO	YES
Earth Technology Integration, LLC	South Carolina Pametto Vision(South Carolina "Palmetto Vision" (aka EM-COP) Project)	---	---
ELERTS Corporation	ELERTS	NO	YES
Emergency Communications Network	CodeRED	YES	YES
EmerGeo Solutions	EmerGeo Fusionpoint	NO	YES
Enera, Incorporated	RapidReach ENS WEB	---	---
ESi Acquisition, Inc.(ESi)	WebEOC	NO	YES
Everbridge, Inc.	Everbridge Aware, Everbridge Matrix; Everbridge SmartGIS; Everbridge Mass Notification; Everbridge Interactive Visibility	YES	YES
Eye Street Solutions	On-The-Go Alerting (eyeAlert)	YES	YES
EZ Automation	EZ CAP	NO	YES

Company	System Name	Public Alerting	Other
Federal Signal Corporation	Federal Commander Digital Systems (Federal Signal Alerting and Notification System); SmartMsg (Federal Signal Alerting and Notification System); EMTools (Federal Signal Alerting and Notification System)	YES	YES
Ferrentino Systems	Alert Tray	---	---
FirstCall Network, Inc.	FirstCall Emergency Notification System(FirstCall)	YES	YES
Flaggpole Inc. DBA TwitZip	TwitZip.com	NO	YES
Future Concepts IS, Inc.	Antares(ANTARES)	---	---
Gary A. Ham dba grandpaham.com	IPAWS Connection Component	YES	YES
Geo-Comm, Inc.	GeoLynx Server	YES	YES
Global Connect	Global Connect	YES	YES
Global Security Systems LLC	Alert FM; GSS Alert Studio	YES	YES
Global Weather Technologies, Inc of Florida	Personal Threat Notification	YES	YES
Google.org	Google CAP Ingestion	---	---
Gorman-Redlich Manufacturing Company	CAP-DEC 1	---	---
GovComm, Inc.	GovComm	YES	YES
GovDelivery	GovDelivery Digital Communication Management	YES	YES
GrasshopperLLC	LI/SN CAP2EAS	YES	NO
Harris Corporation, RF Communications Division	PSPC IPAWS Evaluation	NO	YES
Ibiquity Digital Corporation	Active Alerts test system	YES	YES
ImageTrend, Inc.	ImageTrend Resource Bridge	NO	YES
Inspiron Logistics LLC	WENS - Wireless Emergency Notification System	YES	YES
Intelligent Transportation Video, LLC	EMA Fusion	---	---
Intermedix Corporation (Collaborative Fusion, Inc.)	Intermedix EMSystems CORES Platform, Alert Notification System, and Health Alert Network (Collaborative Fusion, Inc.'s CORES™ Platform)	YES	YES
Interop-Solutions, LLC	Paraclete	YES	YES

Company	System Name	Public Alerting	Other
Jacosoft, LLC	DeltAlert(R)	NO	YES
Josephson Engineering, Inc	Altaphon	NO	YES
Keywest Technology Inc.	InfoZone and Media Xtreme	YES	YES
Law Enforcement Alerting Inc.	Law Enforcement Alerting Portal (LEAP)	YES	YES
Mach7 Software	Defense Banner (DefBan)	YES	NO
Misel Consulting LLC	AUXALERT	NO	YES
Mobilaps, LLC	Broadband Alerting System	---	---
MobileTREC Corporation	Community And Personal Safety System	YES	YES
Myriad Devices	Myriad Apps	YES	YES
MyStateUSA, Inc.	MyStateUSA Alert Sense(myStateUSA)	YES	YES
NC4	Mission Center; E-Sponder; E-Team	NO	YES
Neighborhood Watch Alerts, Inc.	neighborhoodwatchalerts.com	NO	YES
ODS Security, LLC	IPAWS Profile CAP Authoring Tool	YES	YES
Nixle, LLC	Nixle	YES	NO
nsight2, LLC	Campusecure	YES	YES
Omnilert, LLC	Omnilert; e2Campus; Amerilert	YES	YES
On Time Telecom Inc.	We Notify	YES	YES
OptiMetrics, Inc.	Nuclear, Biological, Chemical Remote Message Center (NBC-RMC)	NO	YES
Parlant Technology, Inc.	ASP Auto-Dialing System	YES	NO
PIER Systems LLC	PIER System	YES	YES
Previstar Inc.	Previstar CPS	NO	YES
Public Alerter, LLC	Public Alerter	NO	YES
Rapid Notify, Inc.	Rapid Notify, Mass Notification System	YES	YES
Rave Alert	Rave Alert; Rave Campus Messenger from AT&T	YES	YES
Regroup	Regroup	YES	YES
Safe Environment Engineering	Lifeline Interoperable Wireless Monitoring System	NO	YES
Safer Institute	tRex (Tool for Resource Exchange)	YES	YES
SafeT, Inc.	SafeT	NO	YES

Company	System Name	Public Alerting	Other
SAGE Alerting Systems, Inc.	Sage Digital ENDEC Model 3644	NO	YES
Singlewire Software LLC [www.singlewire.com]	InformaCast	NO	YES
Smiths Detection	Common Gateway	NO	YES
Sorenson Communications	VRS Alerts	NO	YES
Spectacular Media	Sm Infinity	NO	YES
SpectraRep, LLC	SpectraRep AlertManager(SpectraRep)	YES	YES
Spectrum Solutions and Services	Ready4Emergency	NO	YES
Swan Island Networks, Inc.	TIES - Trusted Information Exchange Service	NO	YES
SwiftReach Networks, Inc.	Swift911 Emergency Notification System	YES	YES
TechRadium, Inc.	Immediate Response Information System - IRIS	YES	YES
TeleCommunications Systems, Inc.	TCS Alerts Portal	---	---
Teletouch Paging, LP A subsidieary of Critical Alert Systems	Teletouch Paging	---	---
Telvent DTN	MxVision WeatherSentry Online	NO	YES
TFT, Inc.	EAS911+	NO	YES
The Associated Press	ENPS - Electronic News Production System	---	---
The Weather Channel Companies	WINDstream	NO	YES
Thunder Eagle, Inc	FIPS Server	NO	YES
Total Integrated Mobile LLC	App Emergency Alert Notification System	NO	YES
Trilithic,Inc.	Trilithic EASy Series CAP/EAS Firmware/Software	NO	YES
TriStateAlerts, LLC	Weather4Me Alerts Platform	---	---
Twenty First Century Communications, Inc.	TFCC Alert	YES	YES
Upp Technology, Inc.	IRMS PM	NO	YES
Valcom, Inc.	eLaunch	---	---
VeriSign, Inc.	Verisign Audio Watermarks	NO	YES
Versitell Communications, LLC	ReadyWarn Online EAS	NO	YES
VirtualAgility	VirtualAgility OPS Center (VOC)	---	---

Company	System Name	Public Alerting	Other
VSAT Systems	ReadyConnect	---	---
W.A.R.N., LLC	Wide Area Rapid Notification - W.A.R.N.	YES	YES
Weather Decision Technologies	WDT Alerting Engine	---	---
Weather Message Software LLC	Weather Message	NO	YES
Blackboard Inc.	Blackboard Connect	YES	YES

Public Sector Systems

Company	System Name	Public Alerting	Other
Air Force Research Laboratory	Integrated Information Management System	---	---
City of Lakewood, CO	Lakewood.org	NO	YES
Department of Homeland Security Geospatial Management Office (GMO)	DHS Geospatial Information Infrastructure (GII); DHS OneView; DHS Common Operation Picture (COP)	YES	YES
DHS Science &Technology Directorate: First Responders Group	Virtual USA (vUSA) Virtual Library	YES	YES
IEM, Inc.	NY-NJ-CT-PA Regional Catastrophic Planning Team Message Broker Prototype	NO	YES
Instrumental Software Technologies, Inc (ISTI)	QuakeWatchCAPClient(Testing of USGS Earthquake CAP Alert generation for IPAWS)	---	---
IUP Research Institute Business and Technology Group, Inc.	National Guard Civil Support Teams Information Management System (CIMS)	YES	YES
Johns Hopkins University Applied Physics Laboratory	JHU/APL CMAS RDT&E Lab	NO	YES
Joint Program Manager Guardian	Decision Support System (DSS) 5.0	YES	YES
Maine Office of Information Technology (OIT), Office of GIS (MEGIS)	Virtual Maine	---	---
MITRE Corporation	MITRE IC.NET	YES	YES

Company	System Name	Public Alerting	Other
Monmouth University	RISES/RRI	---	---
National Oceanic and Atmospheric Administration (NOAA) Office of Atmospheric Research (OAR) Earth System Research Laboratory (ESRL) Global Systems Division (GSD) Geo-Targeted Alerting System (GTAS Project (NOAA/OAR/ESRL/GSD))	NOAA GSD Geo-Targeted Alerting System (GTAS)(GTAS)	YES	YES
National Public Radio (NPR)	Public Radio Satellite System	---	---
National Weather Service	National Weather Service - iNWS	---	---
New York City Office of Emergency Management	E-Team (New York City Instance)	YES	YES
NIH	NLM's Lost Person Finder	NO	YES
Preparedness-Technology, Analysis, and Coordination (P-TAC) Center Supporting Technology Evaluation Project (STEP) Test Tool (Federal Emergency Management Agency (NIMS) Supporting Technology Evaluation Program (STEP) Test Tool)	P-TAC STEP Test Tool and Evaluation Project	NO	YES
Science Applications International Corporation (SAIC)	Unified Incident Command and Decision Support System (UICDS)	NO	YES
SPAWAR System Center Atlantic	IC2ATS (ASOCC)	YES	YES
SPAWAR Systems Center Pacific	ICBRNE Toolset	---	---
St. Clair County Homeland Security(St Clair County Michigan)	Blue Water REsILIeNT ((Situation Awareness/Incident Management Custom System(Situation Awareness/Incident Management Custom System (IDV Solutions)))	---	---

Company	System Name	Public Alerting	Other
The National Center for Missing and Exploited Children	NCMEC's AMBER Alert Secondary Distribution System	---	---
U.S. Geological Survey National Earthquake Information Center	QuakeWatchCAPClient	NO	YES

Source: http://www.fema.gov/media-library-data/1438269192616-64f850f94ddc59227fe0c8612fb5900b/OpenDevelopers_07162015.pdf

22 Appendix P: Canadian Broadcast Partners

Thank you to the members of the broadcast industry for supporting the Alert Ready campaign.

- Acadia Broadcasting
- Bell Media
- Bayshore Broadcasting
- Blackburn Radio
- Blue Ant Media
- Cab-K Broadcasting
- CBC/Radio- Canada
- CHCH Television
- Cogeco Cable
- Corus
- Dougall Media
- Eastlink
- Evanov Media
- Golden West Radio
- Leclec Communication
- Lynx Media
- MBS
- Mitchell-Seaforth Cable Group
- MTN MTS CableF
- MyAccess Cable
- Newcap Radio
- Novus Radio
- NTV
- Pattison Media
- QMI
- Rawlco Radio
- Rogers Media
- SaskTel
- Shaw Media
- Telus
- Tbaytel
- TVA
- Vista Radio
- YES TV

Source: https://www.theweathernetwork.com/alert-ready#alert-ready-info

Page 229 of 258 to/à Page 258 of 258

Withheld pursuant to/removed as

s.12 ; s.13 ; s.16