



**City of
Portland**

Annex C – Alert and Warning



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Annex C

Alert and Warning

I. Introduction

- A. Purpose – This Annex is intended to facilitate the coordination of timely emergency information across bureaus and to the general public. It describes the methods by which emergency alerts and warnings are communicated to the public and incidents that trigger the lead response bureau to notify the Portland Bureau of Emergency Management (PBEM).
- B. Scope – This Annex supports the City of Portland's Basic Emergency Operations Plan (BEOP) and applies to all City bureaus, offices, staff and elected officials. This annex includes the following messaging types:
1. Emergency Alert System (EAS)
 2. Community Emergency Notification System (CENS)
 3. Wireless Emergency Alerts (WEA)
 4. PublicAlerts.org
 5. Social media
 6. Media releases
 7. Door-to-door notifications
- C. Objectives – The provisions of this Annex seek to establish and maintain a consistent understanding and use of information, technology and relationships to communicate emergency information among City bureaus, emergency management partners and the general public. Additionally, this Annex provides a common standard for City bureaus to follow for notifying the Mayor and appropriate City officials.

II. Situation and Assumptions

- A. Situation –
1. Some incidents occur with enough warning that notification can be issued to ensure the appropriate level of preparation (e.g., winter weather, flood). Other incidents occur with little or no advanced warning and do not provide enough time to adequately notify the public (e.g., earthquake, tornado).

2. To alert the greatest possible audience at risk in an emergency requires the use of multiple systems and methods to:
 - a) Capture the public's immediate attention, regardless of their location or the time of day.
 - b) Ensure important safety actions are communicated to all in the affected community regardless of language, disability or other factors inhibiting a clear understanding of the message.
3. As a hazard becomes known, and based on the circumstances and conditions that evolve, choices will be made to select:
 - a) The best communications tools to use given the situation.
 - b) The appropriate message content.
 - c) The optimum format for each message.
 - d) The most effective times for releasing each message.
4. Effective emergency messaging requires communication of the nature, extent and expected impact of a hazardous incident as well as clear, concise and decisive information concerning appropriate protective measures. The timely and coordinated use of public warnings can reduce the impact of hazardous incidents.
5. Each communication mode has different limitations. For example, messages sent via social media (Twitter) are limited to 140 characters. Additionally, most wireless carriers do not guarantee the timely delivery of text messages, nor do they guarantee text messages will be received at all. The public's ability to receive voicemails and emails may be disrupted if the networks are compromised by outages or high traffic volumes.
6. In general, PBEM relies on the lead response bureau(s), Portland Bureau of Emergency Communications (BOEC), or other partner agency (e.g., National Weather Service) to initiate notification to PBEM of an emergency incident or event.
7. Bureau PIOs or other representatives will post information regarding a significant incident on their respective bureau website or social media accounts.

B. Assumptions –

1. This Annex is only intended to address initial emergency messaging to the public and across City bureaus, not ongoing communication during a prolonged incident. In most cases, ongoing information to the public will be provided via many, but not all, of the same mechanisms described in this Annex.
2. If an incident occurs suddenly and the situation evolves rapidly, information may be incomplete or unconfirmed.
3. While every effort has been made to ensure the reliability of the notification systems the City uses, the successful delivery of messages is heavily dependent on external networks and providers outside the City's control.
4. The City's community emergency notification system is in addition to other notification system used by neighboring jurisdictions, schools and universities or other public or private organizations.
5. Various factors can influence the public's response to an emergency message:
 - a. Interpretation of message – when different people listen to the same message, there may be a variation in what they hear or how they understand the message, leading to different interpretation and response.
 - b. Previous experiences – often people will rely on their previous experiences with the hazard to determine what actions they initially take (or don't take).
 - c. Observations – individual responses to warnings vary, but most people will seek some form of confirmation. For example, some people will look for more information through environmental cues, while others will seek to contact other trusted sources.
 - d. Perception of risk/proximity – people tend to make a rapid assessment of the relative safety of their location. If their perception of personal risk is high, people will act quickly. If their perception is low, they may delay acting.
 - e. Length of residency – tourists and newcomers to the area lack knowledge of local hazards and the history of local disasters, so they may react differently.

III. Concept of Operations

A. General – Timely and accurate emergency notifications to the public can prevent or reduce harm. The following principles of effective risk communication govern all alerts and warnings issued by the City:

1. Message clarity – describe the hazard or threat in accessible and direct terms.
2. Indicate intended audience – specify the geographic area or population affected by the alert.
3. Specify actions – tell people what they should do to protect themselves and others. Some examples include evacuating, staying indoors, avoiding a certain area or monitoring news or other information.
4. Acknowledge impacts – specify what damage has occurred or is expected to occur as a result of the incident.
5. Describe the response – let people know what the City and its partners are doing to manage the incident and its impacts.
6. Manage expectations – provide timely updates and “all clear” messages when appropriate to inform the public when it is safe to resume normal activities.

B. Message Format – When a hazard threatens public safety or creates a significant service disruption and an alert needs to be issued to the public, the Incident Commander (IC) of the lead response bureau or PBEM Director will determine the message content, geographic area to be covered, timing of message delivery and event duration, and appropriate public warning tools. To the greatest extent practicable, alert notifications should be uniformly categorized using the following format:

1. Category: Geophysical, Meteorological, Security, Rescue, Fire, Health, Environmental, Transportation, Infrastructure, CBRNE, Safety or Other.
2. Location.
3. Brief description of hazard, intended audience and recommended protective actions.
4. Message expiration / hazard duration.

The following table summarizes hazard categories and the lead bureaus responsible for originating notification to the public and for notifying PBEM. Notifications to PBEM may come from the lead response bureau, incident commander, public information officer (PIO), emergency management official or other designated staff.

Category	Description	Notifying Agency
Geophysical	Land instability, landslides, earthquakes, volcanic eruptions, ash plumes, lahars, tsunami and similar incidents that require a response from one or more City bureaus.	Incident or Unified Command with one or more of the following: PBOT, BDS, BES, Fire, Police, Parks, NOAA/NWS or USGS.
Meteorological	Extreme temperatures and severe weather conditions such as snow/ice, tornado, wind, lightning, flooding or other conditions observed by or reported to the National Weather Service (NWS).	NWS, Incident or Unified Command with one or all of the following: PBOT, Housing, Fire, Police or Multnomah County Drainage District.
Security	Law enforcement, military or homeland security incidents including civil disturbances or serious criminal or terrorist activity.	Police.
Rescue	Medical incidents, occasionally involving trauma or entrapment, requiring the urgent attention of specialist personnel to avoid death or serious injury.	Fire or Multnomah County EMS.
Fire	Urban and wildland fires, including those resulting either from human activity or natural hazards.	Fire.
Health	Human and animal disease outbreaks, epidemics and associated countermeasures including food-borne illnesses, suspected or confirmed contamination of drinking water supplies, and the suspected airborne spread of microbial pathogens capable of causing illness or distress.	Multnomah County Public Health or Water.
Environmental	Threats to groundwater, air or land quality that do not arise from the release of hazardous materials or substances.	Incident or Unified Command with one or more of the following: BES, Water, Multnomah County Public Health, Oregon DEQ or the US Coast Guard.
Transportation/ Infrastructure	Incidents involving the supply of gas or liquid fuels, power production or energy transmission, telecommunications, cable television, Internet or other communication capabilities and disruptions to the supply of drinking water or the removal or treatment of water or wastewater.	Water, BES, energy utility or telecommunications provider.
CBRNE	Uncontrolled release of a chemical, biological, radiological, nuclear or explosive material capable of causing harm to people, property or the environment, whether in transportation or at a fixed facility. This category includes intentional releases of hazardous substances, suspicious packages or devices, and spills or releases of unknown or unidentified materials.	Unified Command with one or more of the following: Fire, Police, PBOT, Water or BES.
Safety	Any incident not described above that threatens the safety or health of the community or the quality of the environment.	Varies.

C. Notifying PBEM –

1. Warning is a two-part function: first, learning of the hazard or threat of hazard and second, alerting officials and the public. PBEM relies on the lead response bureau(s), BOEC, or other partner agency to initiate notification to PBEM of an emergency. The previous table and organization responsibilities section outlines specific hazards that require notification to the PBEM Duty Officer by designated lead bureau staff.
2. Bureau representatives should also notify the PBEM Duty Officer when a *significant incident* or event occurs that meets any one or more of the following criteria:
 - a) Continuity of Operations (COOP) – Any situation that significantly affects the bureau's continuity of operations, i.e., the ability of a bureau to meet routine expectations or deliver essential services.
 - b) Duration – Any non-routine, unplanned incident expected to continue beyond a single operational period (work shift).
 - c) Resources – Any situation that requires resources not provided by routine operational procedures or mutual aid.
 - d) Media Interest – Any incident that attracts significant media attention due to social, cultural, economic, political, technical or legal impacts (on staff or the public).
3. When the PBEM Duty Officer receives a notification of a significant incident or event they will log the incident in WebEOC. If the incident requires a coordinated multi-bureau response, the PBEM Duty Officer – in discussion with the PBEM Operations Manager – will determine whether to activate one or more Emergency Coordination Center (ECC) positions.
 - a) PBEM Duty Officer log – When an incident or event requires a coordinated response or threatens to disrupt the essential functions of more than one bureau, the PBEM Duty Officer will flag the log entry for reposting to the Citywide Significant Events board. This will trigger additional notifications to emergency managers and emergency management partners (e.g. 211info).
 - b) New WebEOC incident – If the incident or event will continue for more than one operational period or is likely to generate significant message traffic from more than one bureau, the PBEM Duty Officer will create a new incident after making an initial PBEM Duty Officer log entry and posting to the Citywide Significant Events board. The log entry must include the name of the new incident. The PBEM Duty Officer will then notify by email

all PBEM Duty Officers, the Emergency Management Steering Committee (EMSC), affected bureaus and other partners as necessary that the new WebEOC incident has been created.

- c) Additional notifications – If the incident requires the partial or full activation of the ECC, the PBEM Duty Officer will immediately notify the PBEM Operations Manager. Additional notification of the change in operational status of the ECC will be made to PBEM staff, Mayor's Chief of Staff and Communications Director, members of the Disaster Policy Council (DPC), members of the EMSC, and the BOEC Supervisor via email.
- d) In a partial or full activation of the ECC, the PBEM Duty Officer will notify ECC responders. If unable to do so directly, the PBEM Duty Officer should contact the Bureau of Emergency Communications (BOEC) Supervisor to initiate a page to rostered ECC responders notifying them to respond.

D. Communication Tools –

1. Emergency Alert System (EAS) –

- a) BOEC provides access to EAS for relaying important messages to the public through participating broadcasters. Because of the large geographical area served by EAS, use should be restricted to situations in which *all four* of the following conditions apply:
 - i. The situation is imminent (time is critical).
 - ii. The situation is life threatening to the public.
 - iii. The public must be provided with instructions.
 - iv. Other warning methods would be ineffective.
- b) Persons authorized to request an activation of the EAS include: elected officials, local public safety or emergency management officials, or an Incident Commander in charge of an emergency incident.
- c) All requests for an EAS activation must be made to the BOEC Supervisor. The message content will be provided and/or verified by the Incident Commander.

2. Community Emergency Notification System (CENS) –

- a) CENS can initiate SMS text, email and phone calls to residents and businesses within Multnomah County impacted by, or in danger of being impacted by, an emergency or significant incident. The system is preprogrammed with *published* and *unpublished* landline numbers from CenturyLink, Voice over Internet Protocol (VoIP) phones provided by Comcast and City employee information from SAP. However, it cannot contact mobile phones, VoIP phones from other providers, or send emails unless the individual registers the additional contact information at www.publicalerts.org/signup.
- b) CENS activation is accessed through the website <http://www.FirstCall.net> operated by the vendor First Call. Its use is limited to urgent incidents that require the public to take action (e.g. evacuate or stay indoors). Messaging that does not require immediate public action should be disseminated via press releases, social media and other non-CENS channels.
- c) CENS provides a GIS interface that allows the sender to draw a circle or polygon to define the impacted area and limit notification to that specific area.
- d) The use of CENS requires prior authorization by the Incident Commander of the lead response bureau, PBEM Director or elected official. Upon authorization, activation may be initiated by the PBEM Director, PBEM Duty Officer, BOEC Supervisor, other First Call system administrator (Water Bureau, Multnomah County Emergency Management Director) or by directly contacting First Call.
- e) Immediate requests to use CENS by an Incident Commander (or their designee) from a fire or law enforcement agency that BOEC dispatches for will be initiated by the BOEC Supervisor. Other requests for an activation of CENS within Portland city limits must be coordinated through the PBEM Duty Officer. If another bureau or agency has requested the activation of CENS, the PBEM Duty Officer will immediately notify the PBEM Operations Manager. BOEC will notify the PBEM Duty Officer of all CENS activations they initiate within the City of Portland.
- f) The PBEM Duty Officer will notify all PBEM staff, the BOEC Supervisor, the Office of Neighborhood Involvement's Information and Referral Line, Mayor's Chief of Staff and Communications Director, members of the Disaster Policy Council, members of the Emergency Management Steering Committee, members of the City PIO Group and the emergency manager from each impacted jurisdiction of all significant CENS activations by issuing a separate alert or via email. A significant CENS activation is one

going out to more than 1,000 devices or receiving considerable media attention. Notification to this group will include the text of the original message and location of targeted geographic area.

3. **Wireless Emergency Alerts (WEA) –**

- a) WEA allows geographically targeted text-like alerts to be delivered directly to WEA-enabled mobile devices. The public does not need to sign up for this service; however, successful notification requires a WEA-enabled mobile device and participation by the wireless provider in WEA.
- b) WEA uses a unique ring tone and vibration to signal that an alert has arrived – this is particularly helpful to people with hearing or vision-related disabilities.
- c) WEA alerts are limited to 90 characters per message typically alerting the recipient of the type of event and recommended protective action (e.g. stay indoors, evacuate). To get more specific information the public will be directed to a website, local news or other source of information via WEA.
- d) WEA alerts are also issued by NOAA's National Weather Service (NWS) for imminent and severe weather conditions (e.g. tornado, blizzard warnings) in or near the city.
- e) WEA is intended to complement the EAS, which sends warnings to broadcast and satellite television and radio in the affected area.

4. **PublicAlerts.org –**

- a) When an incident creates a significant service disruption, City bureaus and participating partner agencies throughout the region post relevant information to their websites and social media accounts. This information is aggregated on the PublicAlerts.org website homepage and, in some instances, re-posted to the @PublicAlerts Twitter account. Typically the lead City bureau or partner agency responding to the incident is responsible for posting information to PublicAlerts.org
- b) When an incident presents an unusual threat or requires additional attention, the PBEM Director or PBEM Public Information Officer may post detailed information as a static banner at the top of the PublicAlerts.org homepage.
- c) During a prolonged incident with regional impact, PublicAlerts.org will be the focal point for providing coordinated information to the public on behalf of the region's joint information system. PIOs from PBEM, City bureaus and Portland's regional partners will work to ensure messaging is accurate and consistent.

5. Social Media (Twitter) –

- a) Bureau PIOs use Twitter accounts to make information quickly accessible to a wide, highly mobile and interconnected public. None of these accounts are monitored 24 hours a day nor are considered a primary means of informing the public. However, Twitter has proven an effective adjunct to other alerting systems. Additionally, social media is a form of two-way communication, not just an outbound channel.
- b) In general, the Twitter account from the lead response bureau (e.g. Fire for a hazardous materials incident) is the primary account for disseminating information about the incident via Twitter to the public.
- c) Information from the lead response bureau will be re-tweeted, when appropriate, by PBEM and on other City bureau Twitter accounts.

6. Media Releases –

- a) The lead response bureau will issue media releases (in coordination with other City bureaus) to advise the public of planned events, service disruptions, the appropriate response to ongoing situations, and update the status of response and coordination activities following a significant incident.
- b) Information contained in a media release is typically posted to the lead response bureau's Portlandoregon.gov website and disseminated via social media, FlashAlerts and/or other means.
- c) Media releases are not used as the primary means of communicating urgent warnings about life threatening situations.

7. Door-to-door Notifications –

- a) In the event of a significant or catastrophic telecommunications disruption, or the inability to communicate emergency information via means described in this Annex – police and fire bureau personnel and Neighborhood Emergency Team (NET) volunteers may disseminate emergency information via roaming loudspeakers in emergency response vehicles or via door-to-door notifications.

IV. Organization and Responsibilities

- A. The Mayor and City Council are responsible for providing general oversight of the City's emergency management program, including the authorization and appropriation of resources necessary to establish and maintain emergency notification and warning systems. Their leadership ensures the coordinated response of all City bureaus and the engagement of Portland's civic and commercial institutions. Partnerships between the City and these institutions helps ensure an effective response to emergencies.
- B. Individual commissioners have executive authority for the emergency management programs of bureaus and offices within their portfolios. This responsibility includes maintenance of continuity of operations plans, hazard mitigation programs, and emergency preparedness and response arrangements for specific hazards. These plans prescribe specific notification thresholds consistent with this Annex for communicating the occurrence of hazardous incidents to PBEM, other bureaus and the public at large.
- C. The Disaster Policy Council (DPC) advises the Mayor concerning emergency management arrangements before, during and after an emergency. In a declared emergency or disaster, the Mayor may rely on the DPC to formulate strategies and policies for managing the City's response and recovery. This role may include determining the areas targeted for specific warning messages and the notification thresholds for issuing public warnings.
- D. PBEM reports to the Mayor and coordinates emergency management activities within the City of Portland and among its regional partners in the public, private and non-profit sectors. PBEM administers the PublicAlerts.org website, Twitter feeds, and is one of the agencies responsible for initiating alerts to the public through CENS, WEA and other systems described in this Annex. The bureau also maintains the Emergency Coordination Center, which helps facilitate coordination among City bureaus and outside agencies in an emergency.
- E. The Bureau of Emergency Communications serves as the local National Warning System (NAWAS) Primary Warning Point (PWP) – these locations must be staffed 24 hours a day and are responsible for disseminating the warning to local government officials. BOEC additionally maintains the City's access point to the Emergency Alert System (EAS). BOEC will notify the PBEM Duty Officer by SMS text via pager and/or mobile device if any of the following occur:
 - 1. Significant incidents (described below) attended by Portland Police Bureau or Portland Fire & Rescue.
 - 2. Severe weather warnings issued by the National Weather Service, or state and national warnings received over the NAWAS for the City and/or Multnomah County.
 - 3. Requests from an Incident Commander of the lead response bureau or elected official to activate EAS, CENS or WEA. The BOEC Supervisor

will initiate an EAS or CENS message after a request to do so by any authorized official.

F. Bureau of Environmental Services (BES) will notify the PBEM Duty Officer of the occurrence of any of the following incidents:

1. The release of a hazardous material at a wastewater treatment plant.
2. Any release of sewage to ground or water that threatens public health.
3. Extended disruption of wastewater treatment services when the duration of the disruption is unknown or undetermined.

G. Portland Fire & Rescue has identified the following as significant incidents. The BOEC Computer Aided Dispatch (CAD) system is programmed to automatically notify the PBEM Duty Officer of these incidents including:

1. Fires requiring a third alarm or greater response.
2. Hazmat incidents that requires the use of the EAS or CENS to notify the public whether to evacuate or shelter-in-place.
3. Mass casualty / mass fatality incidents.
4. Other incidents that may affect large parts of the city.

H. The Portland Housing Bureau will notify the PBEM Duty Officer any time a severe weather notice has been issued. PBEM will monitor weather conditions and alert PHB anytime weather conditions meet the criteria for determining a severe weather alert and the corresponding opening of emergency warming centers.

I. Portland Parks and Recreation will notify the PBEM Duty Officer of any incident that involves the suspected contamination of its facilities or the uncontrolled spread of disease among its patrons or staff and the closure of natural areas or recreation areas during periods of extreme fire danger, flooding or other causes.

J. Portland Police Bureau has identified the following as significant incidents. The BOEC CAD system is programmed to automatically notify the PBEM Duty Officer of these incidents:

1. Special Emergency Reaction Team (SERT) activations involving hostages or an active shooter.
2. Civil disturbances or terrorist activity.

K. Portland Bureau of Transportation (PBOT) has identified the following notification thresholds for significant incidents:

1. The PBOT Maintenance Operations senior manager on call will initiate notification of landslides blocking roadways or rights-of-way, unexpected closures of arterial routes or primary streets, and all incidents likely to affect mass transit operations.
 2. The PBOT Public Information Officer will notify PBEM of all planned closures and maintenance activities expected to disrupt arterial routes, primary streets or transit operations.
 3. The PBOT senior manager on call will notify PBEM when the bureau operations center is activated to serve as an incident command post for snow/ice, flood or other emergency operations.
- L. The Water Bureau has identified the following as significant incidents that require the notification of the PBEM Duty Officer:
1. Possible or imminent failure of a dam or reservoir.
 2. Actual, threatened or suspected contamination of the drinking water supply.
 3. Water main, tank or tower breaks that obstruct primary streets or arterial routes.
 4. Water main, tank or tower breaks that disrupt the supply of drinking water to critical facilities inside or outside Portland.
 5. Water main, tank or tower breaks that disrupt the supply of drinking water to customers inside or outside Portland for periods longer than a few hours.
- M. Incident Commanders may notify the PBEM Duty Officer when an incident poses an unusual or extreme risk to public health or safety requiring coordination among response agencies or the assistance of agencies beyond the scope of routine mutual aid.

The following table summarizes hazardous incidents and the corresponding public warning system that will likely be used for disseminating information to the public.

	CENS / Authorized by ¹		EAS / WEA Authorized by*	
Boil Water Notice	✓	Water Bureau IC	✓	Water Bureau IC
Civil Unrest	✓	Police Bureau IC	✓	Police Bureau IC
Debris Flow (major)	✓	Lead Bureau IC	✓	Lead Bureau IC
Earthquake (post incident information)	✓	Unified Command	✓	Unified Command
Evacuation (large scale)	✓	Lead Bureau IC	✓	Lead Bureau IC
Flood Advisory Flood Watch	X	X	X	X
Flood Warning Levee Failure Dam Failure	✓	PBOT, Water Bureau IC or MCDD	✓	PBOT, Water Bureau IC or MCDD
Hazardous Material Spill (any requiring evacuation or shelter in place)	✓	Fire Bureau IC	✓	Fire Bureau IC
Power Outages (brown/blackouts)	✓	Lead Bureau IC	✓	Lead Bureau IC
Public Health Emergency	✓	Multnomah County Public Health	✓	Multnomah County Public Health
Severe Weather (flash flood, wind, heat)	X	X	✓	NOAA/NWS
Sewage Releases	X	X	X	X
Space Weather (major solar activity)	X	X	✓	NOAA/NWS

¹ Assumes scale or timing of incident merits use of CENS.

* Instead of an activation of the EAS, broadcasters may be asked to display crawling tickers at the bottom of their broadcast feeds.

	CENS / Authorized by ¹		EAS / WEA Authorized by*	
Structural Collapse	✓	Lead Bureau IC	X	X
Terrorism / Cyber attack (confirmed incident)	✓	Unified Command	✓	Unified Command
Tornado Warning	X	X	✓	NOAA/NWS
Tsunami	X	X	✓	NOAA/NWS
Volcanic Eruption (ash fall)	X	X	✓	NOAA/NWS
Water Main, Tank or Tower Break	✓	Water Bureau IC	X	X
Wild land Fire	✓	Fire Bureau IC	✓	Fire Bureau IC
Winter Weather (snow/ice)	✓	PBOT IC	✓	NOAA/NWS

V. Plan Development, Maintenance, and Review

- A. Ownership – The update of this Annex is the responsibility of the PBEM Planning and Preparedness Manager. The Planning and Preparedness Manager will facilitate the vetting and coordination of this Annex with stakeholders and the community. All plans will be reviewed and approved by the Emergency Management Steering Committee and Disaster Policy Council prior to adoption by Portland City Council.
- B. Periodic Review – This Annex will be reviewed and revised (as necessary) following EAS or CENS activations, but no less than every two years.
- C. Consultation – Changes to this Annex will be reviewed by the EMSC, DPC and City PIO Group prior to adoption and implementation.

VI. Authorities and References

A. Statutes –

- 1. Oregon Revised Statutes (ORS) Chapter 401 – Emergency Management and Services

B. Ordinances –

- 1. Portland City Code – Title 15 Emergency Code

C. Plans and Procedures

- 1. Portland Basic Emergency Operations Plan (BEOP)
- 2. PBEM Duty Officer Standard Operating Procedure
- 3. BOEC Standard Operating Procedures – 10.20.010 – Emergency Alert System
 - a) 10.20.010.a1 – EAS Launch Instructions

D. Other Documents

- 1. Wireless Emergency Alerts, Federal Communications Commission
- 2. Emergency Alert System, Public Safety and Homeland Security Bureau, Federal Communications Commission
- 3. Integrated Public Alert and Warning System, Federal Emergency Management Agency
- 4. National Warning System Operations Manual, Federal Emergency Management Agency
- 5. Next Generation DM-Framework and Enhanced DM-OPEN 2.0, Federal Emergency Management Agency