



Cambridge
Public Health
Department

Cambridge Public Health Department
Water, Sanitation, and Hygiene (WASH) Emergency Plan
Annex to the Emergency Operations Plan

Table of Contents

Record of Revisions	ii
Record of Distribution	iii
I. Overview.....	1
II. Plan Assumptions	2
III. WASH-Emergency Roles and Responsibilities	4
IV. Concept of Operations	10
Appendix A: Authorities and References	15
Appendix B: Water-Driven Event Activation Levels	17
Appendix C: WASH-Related Supplies	179
Appendix D: At-Risk and Disproportionately Impacted Populations	20

Record of Revisions

Version Update	Date	Description of Change	Pages Affected	Reviewed or Changed by

Record of Distribution

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I. Overview

Plan Purpose

The purpose of the Water, Sanitation, and Hygiene (WASH) Annex is to guide planning for and responding to the public health impacts associated with WASH-emergencies, including the disproportionate impacts experienced by individuals with access and functional needs.

A WASH-emergency is an event or situation that results in the lack of access to clean water, the inability to maintain sanitary conditions, and the inability to maintain personal hygiene to prevent disease.

A WASH-emergency can occur due to:

- Infrastructure failure or power loss
- Supply chain disruption or personnel shortage
- Intentional or unintentional contamination
- Natural disasters and climate change impacts
- Naturally occurring disease outbreaks
- Circumstantial or living situations

Associated Public Health Emergency Preparedness and Response Capabilities¹

- Community Preparedness
- Community Recovery
- Emergency Operations Coordination
- Emergency Public Information and Warning
- Information Sharing
- Mass Care
- Medical Countermeasure Dispensing and Administration
- Medical Surge
- Public Health Surveillance and Epidemiological Investigation

Associated Plan(s)

- Public Health Emergency Response Plan
- Public Health Continuity of Operations Plan
- Cambridge Water Department Emergency Response Plan
- Cambridge Water Department [Dam Emergency Action Plan](#)
- Cambridge Water Department [Hazardous Materials Emergency Response Plan](#)

Plan Maintenance

This WASH Annex is owned and maintained by Cambridge Public Health Department. The plan will be reviewed on an annual basis and is recommended to be evaluated during preparedness exercises.

¹ https://www.cdc.gov/cpr/readiness/00_docs/CDC_PreparednesResponseCapabilities_October2018_Final_508.pdf

II. Plan Assumptions

The following considerations, roles, and resources should be assumed related to a WASH emergency event.

1. WASH-emergencies can result from a variety of hazards, incidents, and situations.
 - a. **Infrastructure failure or damage and power loss.** Aging WASH-sector infrastructure could lead to system failure and cause a localized or wide-spread WASH-emergency.
 - b. **Supply chain disruption and personnel shortage.** A disruption to the supply chain for WASH-sector resources could lead to short or long-term shutoffs of water and sanitation services. WASH-sector personnel shortage or outage could also impact WASH-services. Additionally, supply chain disruption could impact access to WASH-resources that would be distributed to the public during a WASH-emergency.
 - c. **Intentional and unintentional contamination.** The intentional release of an agent into the water system or intentional damage to WASH-sector infrastructure could lead to short or long-term shutoffs of water and sanitation services. These services could also be disrupted by unintentional incidents, such as a chemical spill (hazardous materials) or infectious contamination.
 - d. **Natural disasters.** A natural disaster, such as a hurricane, flood, or drought could impact WASH-sector infrastructure. Aging infrastructure may be more susceptible to failure from natural disasters. Floodwaters may contain chemical or toxic contaminants, infectious pathogens, or dangerous debris. Climate change may lead to increased frequency and severity of natural disasters and increased incidence of WASH-emergencies.
 - e. **Naturally occurring outbreak or contamination.** WASH emergencies that originate naturally include biological contaminants, such as algal toxins, or pathogens such as legionella, shigella, or vibrio.
 - f. **Circumstantial or living situations.** Some populations may be at higher risk of WASH-emergency health impacts due to their personal circumstances or living situation, such as people who are experiencing homelessness and individuals who are living in encampments.
2. Surveillance systems are in place to identify a WASH-related emergency.
 - a. **Water Sector:** Effective surveillance is in place, including routine water quality monitoring at treatment plants and intake/distribution points, for infrastructure damage/failure and contamination. Local systems/staff are integrated into state reporting mechanisms and are drilled/trained regularly on emergency protocols and warning signs of abnormal activity.
 - b. **Sanitation Sector:** Surveillance of wastewater systems is in place, inclusive of backwash and disease monitoring, to identify infrastructure damage/failure and outbreaks. Local systems/staff are integrated into state reporting mechanisms

and are drilled/trained regularly on emergency protocols and warning signs of abnormal activity.

- c. **Infectious Disease Surveillance:** Infectious disease surveillance, through the Massachusetts Virtual Epidemiologic Network (MAVEN), effectively communicates incidences of infectious diseases from providers, hospitals, and laboratories to local and state health departments.

WASH-related reportable diseases tracked in MAVEN include: Amebiasis, Anthrax, Calicivirus/Norovirus, Campylobacter, Crypto, E.coli, Giardia, Hepatitis A and E, Legionella, Leptospirosis, Shigella, Salmonella, and Polio.
3. Cambridge Water Department (CWD) maintains response plans and trained staff to respond to primary water emergency events. Responsibility for action is limited to its service area. This service area includes raw water supply, treatment, and distribution facilities. In the event of an emergency, CWD employees will be the first to take action. CWD has developed mutual aid agreements with the Massachusetts Water Resources Authority (MWRA), with whom they are closely aligned.
 4. Public Health will play a supporting role to the water emergency event, but lead public health response actions including but not limited to:
 - a. Surveillance and Epidemiological Investigation, including contact tracing and case investigation.
 - b. Emergency Public Information and Warning, including public health education, outreach, and guidance related to the incident.
 - c. Non Pharmaceutical Intervention guidance, including hand hygiene, mitigation measures, and personal protective equipment.
 5. Government officials, including those with the State of Massachusetts, City of Cambridge, and the CWD, will continue to recognize their responsibilities with regard to public safety. They will exercise their authority to implement emergency operations and recovery plans in a timely manner when confronted with a real or threatened crisis.
 6. Emergency response to criminal activities and to events that present immediate and imminent threats to human health and safety will be handled by local law enforcement.

III. WASH-Emergency Roles and Responsibilities

Department/Organization	Responsibilities
Cambridge Public Health Department (CPHD)	<p><i>Pre-Incident:</i></p> <ul style="list-style-type: none"> • Develop and update plans and procedures for responding to the public health impacts associated with a WASH-emergency, including disproportionately impacted populations. • Develop and maintain relationships with City departments, external response partners, and health and medical facilities. • Develop and maintain relationships with community-based organizations that work with higher risk or disproportionately impacted populations. • Conduct infectious disease surveillance. • Maintain training and user information for MAVEN. <p><i>During Incident:</i></p> <ul style="list-style-type: none"> • Document all actions taken by CPHD during the response to the WASH-emergency. • Activate and/or participate in response organization as assigned (e.g., Emergency Operations Center or Department Operations Center). • Notify health, medical, and community based organizations related to the scenario and to populations that are likely to be disproportionately impacted by the event. • Monitor MAVEN for positive lab results. • Conduct case investigations and contact tracing. • Perform any mandatory reporting to MDPH (see list of reportable diseases in Section IV.C) • Deploy public health nurses as needed/appropriate for on-site testing, treatment, and/or education. • If a drinking water public health order has been issued, assist with notification to populations that are likely to be disproportionately impacted by the event. • Develop incident-specific public health messages and guidance. • Coordinate incident-specific public health education and outreach activities. • Coordinate resources when available and resource requests as needed through established procedures. • Communicate and coordinate with Region 4AB HMCC and MDPH where appropriate. • Utilize the Cambridge Community Corps as needed to support incident-specific public health education and outreach activities.

Department/Organization	Responsibilities
CPHD, Environmental Health	<p><i>Pre-Incident:</i></p> <ul style="list-style-type: none"> ● Plan, train, and exercise with CPHD where appropriate. <p><i>During Incident:</i></p> <ul style="list-style-type: none"> ● Participate in response organization as assigned. ● Send out incident-specific advisories as needed. ● Support environmental health site inspections and assessments. ● Conduct environmental testing and monitoring as needed.
CPHD, Communication and Marketing	<p><i>Pre-Incident:</i></p> <ul style="list-style-type: none"> ● Plan, train, and exercise with CPHD where appropriate. <p><i>During Incident:</i></p> <ul style="list-style-type: none"> ● Participate in response organization as assigned. ● Provide public information, messaging, and marketing support. ● Interface with the media. ● Support public messaging and guidance development and dissemination. ● Interface with City Communications and Community Relations. ● Support Call Center(s) if activated or needed.
Cambridge Water Department	<p><i>Pre-Incident:</i></p> <ul style="list-style-type: none"> ● Develop and update annually the drinking water Emergency Response Plan (ERP) and submit it to Massachusetts Department of Environmental Health (DEP). ● Develop and update a Hazardous Materials Emergency Response Plan. ● Monitor the Public Water System (PWS) for emergency conditions and identify its severity level as outlined in the ERP. Adjust severity level if conditions change. ● Plan, train, and exercise with CPHD where appropriate. <p><i>During Incident:</i></p> <ul style="list-style-type: none"> ● Based on the emergency severity level, notify appropriate stakeholders and issue public and media notifications. ● The Cambridge Water Department, as operator of the public water system, may petition the Massachusetts DEP for a declaration of a state of water emergency. When a state of water emergency has been declared, the DEP may issue orders within or outside the area where the water emergency exists. See also MGL. C.21G, S.15; MGL. C.21G. S17; MassDEP Policy 87-05 Declaration of State of Water Supply Emergency. ● When DEP issues a drinking water order to the public water system, Cambridge Water Department will notify the

Department/Organization	Responsibilities
	<p>Cambridge Public Health Department of the order per DEP requirements.</p> <ul style="list-style-type: none"> Participate in response organization as assigned.
Cambridge Department of Public Works	<p><i>Pre-Incident:</i></p> <ul style="list-style-type: none"> Develop and maintain memorandum of understanding or agreements for WASH-related equipment, contracts, and vendors. Plan, train, and exercise with CPHD where appropriate. <p><i>During Incident:</i></p> <ul style="list-style-type: none"> Participate in response organization as assigned. Coordinate ordering, deployment, cleaning, and maintenance of WASH-related equipment and supplies. Support site or facility cleaning and trash/debris removal.
Cambridge Department of Human Service Programs (DHSP)	<p><i>Pre-Incident:</i></p> <ul style="list-style-type: none"> DHSP serves as the Lead Agency/Collaborative Applicant for the Cambridge Continuum of Care (CoC), MA-509. Part of this role includes planning, coordinating and communicating with stakeholders working to address homelessness. DHSP acts as pass-through for federal CoC Program funds that primarily supports housing projects and also administers other federal and local funds that support crisis response (emergency shelters, street outreach, showers, meals/food assistance, etc.). DHSP manages the Homeless Management Information System (HMIS), which collects HUD-mandated data from projects receiving ESG and CoC funds (shelter inventory, bed utilization, exits to housing, etc.). Planning, coordination, and funding of relevant programs and projects. <p><i>During Incident:</i></p> <ul style="list-style-type: none"> Communication with key stakeholders, assisting with facilitation of collaboration and information sharing among different entities; administering funding when available (such as COVID relief funds supporting Transition Wellness Center, Medical Street Outreach, etc.) Requesting assistance from subrecipients/grantees (example – increased hours at Warming Center during weather emergencies).

Department/Organization	Responsibilities
Cambridge Inspectional Services Department (ISD)	<p><i>Pre-Incident:</i></p> <ul style="list-style-type: none"> ● Plan, train, and exercise with CPHD where appropriate. <p><i>During Incident:</i></p> <ul style="list-style-type: none"> ● Participate in response organization as assigned. ● Enforce the State Sanitary Code for appropriate food establishments (including restaurants, schools, bakeries, daycares, mobile food trucks, package stores, and retail stores), recreational camps, and swimming pools. ● Respond to complaints received at relevant establishments. ● Support environmental health site assessments and inspections if appropriate.
Cambridge Fire Department	<p><i>Pre-Incident:</i></p> <ul style="list-style-type: none"> ● Develop and maintain memorandum of understanding or agreements for WASH-related equipment, contracts, and vendors. ● Plan, train, and exercise with CPHD where appropriate. <p><i>During Incident:</i></p> <ul style="list-style-type: none"> ● Activate EOC if requested and/or participate in response organization as assigned. ● Coordinate requests for WASH-related resources (e.g., cots, PPE, etc.) ● Support mass dispensing or vaccination response if applicable. ● Support distribution of resources, education, and other related outreach activities. <p><i>Note: For firefighting, chemical release control, search and rescue, evacuation, and medical response, the Fire Department assumes command.</i></p>
Cambridge Police Department	<p><i>Pre-Incident:</i></p> <ul style="list-style-type: none"> ● Plan, train, and exercise with CPHD where appropriate. <p><i>During Incident:</i></p> <ul style="list-style-type: none"> ● Participate in response organization as assigned. ● Perform dispatch and emergency communication tasks. ● Provide relevant security services and control. ● Provide Community Liaison Officers for education and outreach activities. <p><i>Note: For perimeter security, patrols of the area, traffic control, crowd control, and preliminary investigation of possible crimes, the Police Department assumes command.</i></p>

Department/Organization	Responsibilities
Pro EMS	<p><i>Pre-Incident:</i></p> <ul style="list-style-type: none"> ● Plan, train, and exercise with CPHD where appropriate. <p><i>During Incident:</i></p> <ul style="list-style-type: none"> ● Assist CFD with EMS response/operations if applicable/needed. ● Provide WASH-related resources if available. ● Support mass dispensing or vaccination response if applicable. ● Support distribution of resources, education, and other related outreach activities.
<p>Homeless Service Provider(s), including:</p> <ul style="list-style-type: none"> ● Health care for the Homeless ● First Church Cambridge Shelter ● Bay Cove Human Services ● MAAP 	<p><i>Pre-Incident:</i></p> <ul style="list-style-type: none"> ● Plan, train, and exercise with CPHD where appropriate. <p><i>During Incident:</i></p> <ul style="list-style-type: none"> ● Provide organizational services. ● Support education and outreach activities. ● Communicate and coordinate with CPHD. ● Request resource support from CPHD if needed.
Region 4AB HMCC	<p><i>Pre-Incident:</i></p> <ul style="list-style-type: none"> ● Plan, train, and exercise with CPHD where appropriate. <p><i>During Incident:</i></p> <ul style="list-style-type: none"> ● Provide 24/7 Duty Officer resource. ● Develop and share incident-specific talking points or guidance as requested by members. ● Collect and share tools or model practices that may be used by members. ● Serve as a conduit to MDPH for unmet information needs. ● Support regional resource coordination as requested by members.
Massachusetts Department of Public Health	<p><i>Pre-Incident:</i></p> <ul style="list-style-type: none"> ● Plan, train, and exercise with CPHD where appropriate. ● Maintain MAVEN system. <p><i>During Incident:</i></p> <ul style="list-style-type: none"> ● Support development of incident-specific information, guidance, and/or clinical messaging if requested for incidents impacting multiple jurisdictions.

Department/Organization	Responsibilities
Massachusetts Department of Environmental Protection (DEP)	<p><i>Pre-Incident:</i></p> <ul style="list-style-type: none"> ● Maintain policies and guidelines for determining when the deficiency requires a Boil Water Order, Do Not Drink Order, or Do Not Use Order. <p><i>During Incident:</i></p> <ul style="list-style-type: none"> ● Issue a drinking water public health order when a deficiency in the Public Water System has been identified. ● Declare a state of water emergency when needed. ● Support water-driven event response based on plans and procedures.
Cambridge Community Corps	<p><i>Pre-Incident:</i></p> <ul style="list-style-type: none"> ● Plan, train, and exercise with CPHD where appropriate. <p><i>During Incident:</i></p> <ul style="list-style-type: none"> ● Support incident-specific public health education and outreach activities as assigned by CPHD.
Local Businesses	<p><i>Pre-Incident:</i></p> <ul style="list-style-type: none"> ● Adhere to City permitting, State Sanitary Code, and other relevant business and retail requirements. <p><i>During Incident:</i></p> <ul style="list-style-type: none"> ● Adhere to Environmental Health and other Public Health related guidance or restrictions.

IV. Concept of Operations

A. Incident Recognition

CPHD expects to be notified of a WASH-emergency under the following conditions:

1. Infectious Disease Driven Event: CPHD will receive positive lab results in MAVEN or direct communication from a provider.
2. Loss of/Impact to Water Supply: CPHD will receive direct notification from Cambridge Water Department. For water-driven events, CWD will be the lead agency and CPHD will support. CWD will be responsible for making notifications related to the primary water emergency and activating the Water Emergency Operations Center if deemed necessary. Refer to Appendix B for more information.
3. Notification from Police, Fire, or other recognizing entity.

B. Incident Management

For infectious disease driven events, CPHD will be the lead responding agency and will follow activation levels and response actions outlined in the Emergency Operations Plan and in this WASH Annex.

The Chief Public Health Officer will be responsible for determining the response organization, activation of physical or virtual coordination sites (e.g., Public Health Department Operations Center or Emergency Operations Center), and other decisions related to the incident response and management.

Key public health functions related to a WASH-emergency may include:

- Emergency public information and warning (public health education and outreach)
- Information sharing
- Medical countermeasure dispensing and administration
- Medical materiel management and distribution
- Nonpharmaceutical interventions
- Responder safety and health
- Volunteer management
- Public health surveillance and epidemiological investigation

Refer to Section III. Roles and Responsibilities for a list of anticipated response actions by Department/Organization.

C. Incident Notifications and Information Sharing

CPHD will notify internal and external stakeholders of a public health WASH-related incident using the following systems:

- Telephone
- Direct email and/or email distribution lists
- MDPH Health and Homeland Alert Network (HHAN)
- Reverse 911/Code Red
- Website and social media
- Door-to-door and targeted outreach

Partners and stakeholders to be notified may include the following, and may vary based on the incident size, scope, and hazard:

- CPHD staff
- City Departments
- Police
- Fire
- ProEMS
- Hospitals and healthcare facilities
- 4AB HMCC
- MDPH
- Schools and higher education partners
- Community-based organizations
- Businesses

WASH-related reportable diseases tracked in MAVEN include:

- Amoebiasis
- Calicivirus/Norovirus
- Campylobacteriosis
- Cryptosporidiosis
- E.coli
- Giardiasis
- Hepatitis A and E
- Legionellosis
- Leptospirosis
- Shigellosis
- Salmonellosis
- Polio

D. Resources

CPHD will work with partners to secure and provide resources as appropriate based on the incident. Refer to Appendix C for a list of potential WASH-emergency “go kit” supplies.

DPW will support procurement and management of incident related resources or work through a third party vendor. DPW maintains vendor agreements and inventory lists, which are on record and may be requested.

CWD also maintains water-related equipment and supplies that may be beneficial during a WASH-related emergency. These may be requested directly through CWD or through EOC if activated.

E. WASH-related Incident Effects and Impacts

Primary effects of a WASH emergency are captured in the Community Lifelines of Safety/Security; Food, Water, Shelter; Health and Medical; and Communications. Effects include increased demand for EMS, health care, and public health services; compromised water supply and/or sanitation systems; food and housing insecurity; issuing alerts, warnings, and messaging; compromised sense of community safety and, depending on the hazard, the possibility of hazardous materials.



CPHD will work with City Departments and community response partners to support the following anticipated impacts:

1. Prevent illness and injury
2. Reduce the spread of infectious disease
3. Provide public health information and education
4. Support health and medical partners in medical surge
5. Support access to safe drinking water
6. Support access to toilets, showers, sinks, and hygiene supplies

CPHD recognizes that different strategies may be required to reach some individuals or populations with access or functional needs, or who may be disproportionately impacted² by an event. CPHD will develop strategies and engage trusted voices to communicate culturally and linguistically appropriate messages and formats. CPHD Communications and Marketing Division will be responsible for developing and distributing public information in conjunction with incident subject matter experts. Refer to additional details in the CPHD Crisis and Emergency Risk Communication Plan.

A more detailed examination of populations at risk for hazard-related impacts is listed in Appendix D. These populations, impacts, and mitigation measures should be considered when developing Incident Action Plans, objectives, and tasks.

F. Demobilization and Recovery

Demobilization is the release and return of resources that are no longer required for the incident response. This may occur in stages or all at once, depending on the incident.

When the Chief Public Health Officer determines that additional CPHD staff and/or resources are no longer necessary to respond to the WASH-related emergency, the incident may be demobilized.

Demobilization Considerations

- Assess current state of incident and what objectives or functions are still needed.
 - Identify staff and resources still needed.
 - Identify staff and resources that can be released.
- Develop demobilization plan to release staff and resources, with specific dates and quantities.
- Provide clear instructions (if applicable) to staff on return to work, debriefings, or any remaining expectations related to the activation. Identify triggers to reactivate if needed.
- Communicate plan directly to all activated personnel, including any remaining activated (if applicable) and those being deactivated.
- Initiate Recovery Plan and related impact assessments (facility, resource, staff, operations).

Recovery Considerations

² Disproportionately impacted populations refers to when a subset of the population, based on characteristics, such as age, race and gender, are unjustifiably experiencing lower outcomes compared to the total population. In an emergency, disproportionate impacts occur when mitigation measures do not reach some populations.

- Facility/Infrastructure Assessment: what facilities were used in response to the incident and/or damaged by the incident? Are they in pre-incident conditions? If not, what is needed to restore them?
- Resource Assessment: what resources were used in response to the incident and/or damaged by the incident? Were items rented or purchased that need to be returned or paid for?
- Staff Assessment:
 - What staff were activated? What are their needs as they return to daily work?
 - What staff were not activated? What are their needs as activated staff return to daily work?
 - What behavioral health considerations need to be addressed?
- Operations Assessment:
 - What essential functions were continued and/or paused during the incident? What is needed to get caught up?
 - What non-essential functions were continued and/or paused during the incident? What is needed to get caught up?
 - Were any regulatory or grant activities or reporting missed during the incident? What is needed to become compliant?
- AAR/IP development and Improvement Cycle:
 - Identify format, structure, and process for after-action review.
 - Develop After-Action Report.
 - Develop Improvement Plan and assign corrective actions.

Appendix A: Authorities and References

References

The following references were consulted in the development of the WASH-emergency SOP.

- Massachusetts Drinking Water Guidelines and Policies for Public Water Systems, Chapter 12: Emergency Response Planning Requirements Guidance
- Massachusetts Drinking Water Guidelines and Policies for Public Water Systems, Appendix O: Handbook for Water Supply Emergencies, Massachusetts Department of Environmental Protection, Drinking Water Program, rev. March 2022.
- Community Water System Emergency Response Plan Template and Instructions, United States Environmental Protection Agency, July 2019. Note: This relates to AWIA 2018, Section 2013.
- [Massachusetts Water/Wastewater Agency Response Network \(MAWARN\)](#)

The following Authorities and Statutes may be relevant to this Annex:

MGL. C.21G, S.15	Water emergency declaration See also: MassDEP Policy 87-05 Declaration of State of Water Supply Emergency
MGL. C.21G. S.16	State of water emergency; eminent domain; authorization; notice
MGL. C.21G. S17	State of water emergency; orders
MGL. C.21, S.65b	Emergency Action Plans for high and significant dam hazards
302 CMR 10.11	Emergency Action Plans
310 CMR 22:	The Massachusetts Drinking Water Regulations https://www.mass.gov/info-details/issuance-and-removal-of-drinking-water-public-health-orders https://www.mass.gov/lists/emergency-response-for-public-water-systems#general-guidance-
310 CMR 22.04(13)	Construction, Operation and Maintenance of Public Water Systems, Emergencies
MGL. C.40, S.15B	Water supply works, sale or exchange of property
MGL. C.40, S.38	Purchase, development and use of public water supply
MGL. C. 40, S.39C	Construction and maintenance of dams, well, reservoirs and other building; conditions

MGL. C. 40 S.41	Protection of water supply; conditions
MGL. C.40, S.41A	Use of water in emergencies
MGL. C.111, S.2C	Pollution violations; orders of department of environmental protection
MGL. C.111, S.5E	Application of chemicals to control aquatic nuisances; licenses; rules and regulations; violations; penalties; applicability of section
MGL. C.111, S.5F	Aquatic nuisances; control; cost sharing programs
MGL. C.111, S.5G	Water supply; treatment facilities
MGL. C.111, S.17	Disposal of sewage; consultation, advice or experiments; hearing; improvements; definition
MGL. C.111, S.143	Trade or employment attended with noisome and injurious odors; assignment of places; prohibition; appeal
MGL. C.111, S.159	Supervision of inland waters
MGL. C.111, S.160	Examination of water supply; assistance to cities, towns and districts for groundwater aquifers and recharge areas <i>See also, Massachusetts DEP Policy 87-06, Boil Water Order, Do Not Drink Order, Do Not Use Order</i>
MGL. C.111, S.160A	Cross connections between distribution system of public water supply and distribution system of unapproved water supply; certification for inspection and testing of backflow prevention devices
MGL. C.111, S.160B	Water quality violations; orders of department of environmental quality engineering; enforcement
MGL. C.111, S.162	Removal of causes of pollution; petition; hearing; notice; damages; violation of order
MGL. C.111, S.165	Entry on premises; compensation of agents; apportionment
MGL. C.114, S.35	Lands to be used for burial; approval
MGL. C.114, S.36	Use of cemeteries; appeal from order of board of health; hearing
DWP 88-11	Public water system determination
DWP 94-02	Determination of public or private water system type for establishments serving food

Appendix B: Water-Driven Event Activation Levels

For water-driven events, Cambridge Water Department (CWD) will be the lead agency and CPHD will support as deemed appropriate. CWD will be responsible for making notifications related to the primary water emergency and activating the CWD Emergency Response Plan and Water Emergency Operations Center as deemed necessary.

Cambridge Water Department defines the following activation levels per the CWD Emergency Response Plan.

Activation Level and Description
<p>Level 1 – Routine Problem Routine, normal, or localized event that affects 10% or less of the system and is anticipated to be repaired/resolved within 24 hours or less, such as a pipe break, malfunctioning valve, hydrant break, typical storm event, or brief power loss. Cambridge Water Department employees are able to handle the problem, although other employees or outside contractors may be put on alert until the problem is solved.</p> <p><i>Examples: Water main breaks and mechanical problems at pumping stations.</i></p>
<p>Level 2 – Alert/Minor Emergencies An undesired event that affects 50% or less of the system and is anticipated to be repaired/resolved within 72 hours or less. A Level 2 emergency lowers the quality or quantity of the water, or places the health and safety of the CWD, City, and other mutual agencies as appropriate at risk.</p> <p><i>Examples: Local total coliform bacteria detection, major main breaks, multiple main breaks, major mechanical problems at pumping stations or treatment facility, failure of chemical feed systems.</i></p>
<p>Level 3 – Major Emergencies An undesired event of such magnitude that more than 50% of the system is affected and/or is anticipated to require more than 72 hours to be repaired/resolved. The integrity of the entire water system is affected and a Boil Water Order, Do Not Drink Order or Do Not Use Order may be declared.</p> <p><i>Examples: Break in major transmission main, loss or failure of treatment facility, loss of source (dam break, water supply shortage, contamination, etc.), loss of pressure in the system, widespread total coliform bacteria outbreak, fecal coliform or E. Coli detection, or acts of vandalism.</i></p>
<p>Level 4 – Natural Disaster These incidents are generally caused by a widespread meteorological or geological event that disrupts the water system affecting more than 50% of the system and/or requiring more than one week for recovery of services. Such events may cause structural damage to a treatment</p>

facility or contaminate a source with untreated sewage, toxic chemical, or radioactive material. A Water Supply Emergency and/or Boil Water Order, Do Not Use Order or Do Not Drink Order declaration may be required.

Examples: Hurricanes, tornados, earthquakes, and floods.

Level 5 – Nuclear Disaster/Terrorist Act

These incidents involve large and uncontrolled releases of radioactive material or compounds into the environment/water supply source or deliberate acts that impair a water system (i.e. terrorism). In the case of nuclear disaster, surface water supplies within a 50-mile radius of a nuclear power plant experiencing such a release may be immediately contaminated.

Groundwater supplies may remain safe for a period of time. The declaration of a Water Supply Emergency and/or Do Not Drink Order or Do Not Use Order may be required.

Examples: Nuclear power plant release to the environment or deliberate release of highly toxic materials to the water supply.

Appendix C: WASH-Related Supplies

When developing emergency “go kits” or supplies related to WASH emergencies, consider the following items.

- Backpack
- Wool Blanket
- Bath Towel
- Washcloth Tablet
- Rain Poncho
- Beanie
- Wool Gloves
- Pair of Socks
- Hand Sanitizer
- Body Shower Bag
- Personal Hygiene Kit
 - Razor
 - Shaving cream
 - Hand soap
 - Body wash or bar soap
 - Shampoo
 - Conditioner
 - Toothpaste
 - Toothbrush
 - Nail file
 - Comb
 - Handwarmer
- Portable toilet bag
- Toilet Tissue Pack
- KN-95 Mask
- Laundry detergent pods
- Water purification tablets

Bottled water may be added to the kit as deemed appropriate.

Incident-specific informational cards or resources may also be included.

Appendix D: At-Risk and Disproportionately Impacted Populations

A more detailed examination of population impacts and mitigation measures is below, as outlined in Chart 1. In this model, identification of hazard effects (Section IV.E) subsequently informs identification of public health and healthcare impacts, population risk levels, and mitigation measures required to protect and promote community health. In the last two steps, identifying barriers to mitigation measures using the social determinants of health may result in identifying potentially disproportionately impacted populations.

Chart 1: Identification of Potentially Disproportionately Impacted Populations from Hazard Effects



As seen in Table 1, hazard effects were identified based on the community lifelines likely to be affected by the hazard during a water, sanitation, or hygiene related emergency.

Public health and healthcare impacts were identified based on hazard effects, such as an increased demand for EMS services leading to an increase in exposure for first responders during an infectious disease outbreak.

Populations were identified as at-risk if they were exposed to the hazard or its impacts. Populations were deemed at higher risk if a factor elevated the probability that they encountered the hazard and its impacts (e.g., coastal residents during a hurricane) or if a factor elevated the severity of the hazard and its impacts (e.g., medically vulnerable populations).

Mitigation measures in Table 2 were identified based on the anticipated public health and healthcare impacts and using systems-thinking with a modified social ecological model. Mitigation measures have been categorized as: individual measures, public communication measures, municipal and community measures, and systemic and policy measures.

When a mitigation measure does not reach all at-risk populations, a disproportionate impact can occur because individuals experience un- or under-mitigated exposures to hazard effects and impacts. Identification of barriers to mitigation measures can identify populations likely to experience disproportionate impacts. For example, an infectious disease outbreak may require PPE. If an individual does not have the economic capacity to purchase PPE, then the risk of exposure remains under-mitigated. On a population level, these individuals are

disproportionately impacted. Barriers to the mitigation measures were identified using the social determinants of health.

Note: The following list may not include all populations or circumstances and may be subject to change based on the event and other contributing factors.

Table 1: Hazard Effects, Public Health and Healthcare Impacts, and Populations At-Risk

Hazard Effect	Public Health and Healthcare Impacts Requiring Mitigation	At-Risk or Higher Risk Population
Increased demand for EMS services	<ul style="list-style-type: none"> ● Increased infectious disease exposure ● Capacity constraints 	EMS and first responders
Compromised water supply	<ul style="list-style-type: none"> ● No water for cooking > food insecurity ● No water for hygiene > increased exposure and transmission of infectious disease 	Whole population
	<ul style="list-style-type: none"> ● No water for formula or cleaning > increased risk of malnutrition 	Infants and toddlers
	<ul style="list-style-type: none"> ● Increased severity of infectious disease ● Increased risk of fetal distress or demise 	Medically vulnerable (e.g., immunocompromised or pregnant people)
	<ul style="list-style-type: none"> ● Reduced access to water/hygiene infrastructure > increased exposure and transmission of infectious disease 	People experiencing homelessness
		Outdoor workers
	<ul style="list-style-type: none"> ● Increased density > increased exposure and transmission of infectious disease 	Congregate and high-density settings
	<ul style="list-style-type: none"> ● Staff financial and food insecurity secondary to workplace closure after water supply compromise 	Food service staff, small local businesses (e.g., salon), healthcare facility staff (e.g., dialysis)
<ul style="list-style-type: none"> ● Facility closure after water supply compromise > health care and staffing disruptions 	Inpatient healthcare population	
	Healthcare facility staff	
Compromised sanitation systems	<ul style="list-style-type: none"> ● No waste removal > increased disease transmission 	Whole population

Hazard Effect	Public Health and Healthcare Impacts Requiring Mitigation	At-Risk or Higher Risk Population
	<ul style="list-style-type: none"> ● Reduced access to water/hygiene infrastructure > increased exposure and transmission 	People experiencing homelessness
		Outdoor workers
Compromised indoor air quality: mold	<ul style="list-style-type: none"> ● Respiratory irritation or infection 	Medically vulnerable (e.g., people with allergies, asthma, chronic lung disease, or who are immunocompromised)
Food and Housing Insecurity	<ul style="list-style-type: none"> ● Newly unsheltered individuals and families 	'Precariously housed' (e.g., doubled up, staying with friends)
	<ul style="list-style-type: none"> ● Food and housing insecurity subsequent to financial insecurity 	Individuals experiencing a temporary loss of employment due to workplace closure
Increased Demand for Healthcare Services: Injury and Infectious Disease Surges	<ul style="list-style-type: none"> ● Increased infectious disease exposure ● Capacity constraints ● Supply chain delays ● Patient movement delays ● Increased need for Crisis and Emergency Risk Communication 	Healthcare systems staff
Increased Demand for Public Health Services: Injury and Infectious Disease Surge	<ul style="list-style-type: none"> ● Increased infectious disease exposure ● Case investigation + contact tracing surge ● Inspections surge ● Medical countermeasures deployment ● Nonpharmaceutical interventions ● Increased need for crisis + emergency risk communication ● Emergency orders 	Public health staff
Compromised Sense of	<ul style="list-style-type: none"> ● Mental health impacts 	Whole population

Hazard Effect	Public Health and Healthcare Impacts Requiring Mitigation	At-Risk or Higher Risk Population
Safety		In-patient healthcare and long-term care

Table 2: Barriers to Mitigation and Potentially Disproportionately Impacted Populations

Individual Mitigation Measures	
<i>PPE</i>	
<p>Barriers to PPE may include:</p> <ul style="list-style-type: none"> ● <u>Built Environment/Neighborhood</u> Is PPE locally available and accessible? Is it conveniently located for all at-risk populations? ● <u>Economic Stability</u> Are all at-risk populations able to purchase and afford PPE? ● <u>Education Access and Quality</u> Are all at-risk populations able to receive, understand, and act on risk messages (e.g., why and how to use PPE)? ● <u>Social/Community Context</u> Is use of PPE socially and politically acceptable in at-risk communities? 	<p>Disproportionately impacted populations may include:</p> <ul style="list-style-type: none"> ● People with disabilities ● No car household/ transportation desert ● Low-income individuals ● People experiencing homelessness ● People with low-literacy ● People who speak a language other than English ● EMS and first responders ● Public health and health care staff ● Outdoor workers ● Congregate and high density residents
<i>Bottled Water and Oral Rehydration</i>	
<p>Barriers to bottled water and oral rehydration may include:</p> <ul style="list-style-type: none"> ● <u>Built Environment/Neighborhood</u> Are bottled water and oral rehydration solutions locally available and accessible? Are they conveniently located for all at-risk populations? ● <u>Economic Stability</u> Are all at-risk populations able to purchase and afford bottled water or oral rehydration solutions? ● <u>Education Access and Quality</u> Are all at-risk populations able to receive, understand, and act on risk messages (e.g., when and how to use the contents, how to self-triage)? ● <u>Social/Community Context</u> Do at-risk populations trust institutions distributing 	<p>Disproportionately impacted populations may include:</p> <ul style="list-style-type: none"> ● People with disabilities ● No car household/transportation desert ● Low-income individuals ● People with low-literacy ● People who speak a language other than English ● Medically vulnerable individuals ● People experiencing homelessness ● Outdoor workers ● Infants and toddlers ● Historically marginalized populations

bottled water/oral rehydration solutions? Are trusted community spokespeople on site?	
<i>Sanitation Supplies or Go-Kits</i>	
<p>Barriers to sanitation go-kits may include:</p> <ul style="list-style-type: none"> ● <u>Built Environment/Neighborhood</u> Are sanitation go-kits locally available and accessible? Are they conveniently located for all at-risk populations? ● <u>Economic Stability</u> Are all at-risk populations able to purchase and afford the contents of sanitation go-kits? ● <u>Education Access and Quality</u> Are all at-risk populations able to receive, understand, and act on public information (e.g., where facilities are located, who is welcome) ● <u>Social/Community Context</u> Do at-risk populations trust institutions distributing sanitation go-kits? Do distribution locations feel safe and accessible to the whole community? Is the contents of the go-kits culturally relevant? 	<p>Disproportionately impacted populations may include:</p> <ul style="list-style-type: none"> ● People with disabilities ● No car household/ transportation desert ● Congregate and high density settings ● Low-income individual ● People with low-literacy ● People who speak a language other than English ● People experiencing homelessness ● Historically marginalized populations
<i>Boil Water Advisory/Order Compliance</i>	
<p>Barriers to boil water compliance may include:</p> <ul style="list-style-type: none"> ● <u>Built Environment/Neighborhood</u> Do all at-risk individuals have a functional stove to boil water? Are they able to stand at a stove and pick up a pot of boiling water? Is the ambient temperature cool enough to boil large quantities of water safely? ● <u>Education Access and Quality</u> Are all at-risk populations able to receive, understand, and act on risk messages (e.g., how long to boil water, is it safe for bathing)? ● <u>Social/Community Context</u> Do all at-risk individuals have the time available to purify large quantities of water (e.g., single-parents, individuals working multiple jobs)? 	<p>Disproportionately impacted populations may include:</p> <ul style="list-style-type: none"> ● People experiencing homelessness ● People with disabilities ● Low-income individuals ● People with low-literacy ● People who speak a language other than English ● Medically vulnerable individuals ● Infants and Toddlers ● Congregate Settings

Public Communication Mitigation Measures	
<i>Hazard, Emergency Response, and Emergency Order Communications</i>	
<p>Barriers to risk communications may include:</p> <ul style="list-style-type: none"> ● <u>Education Access and Quality</u> Are the format, language/translation, and delivery method accessible and understandable to all at-risk individuals? ● <u>Social/Community Context</u> Do all at-risk populations trust institutions communicating emergency orders or about hazards? Are community spokespeople involved in communication development and delivery? 	<p>Disproportionately impacted populations may include:</p> <ul style="list-style-type: none"> ● People with disabilities ● People with low-literacy ● People who speak a language other than English ● Isolated individuals/communities ● Historically marginalized populations
Municipal and Community Mitigation Measures	
<i>Public/Portable Handwashing</i>	
<p>Barriers to handwashing may include:</p> <ul style="list-style-type: none"> ● <u>Built Environment/Neighborhood</u> Are handwashing solutions locally available and accessible? Is it conveniently located for all at-risk populations? ● <u>Education Access and Quality</u> Are all at-risk populations able to receive, understand, and act on risk messages (e.g., how and when to wash your hands) and public information (e.g., where facilities are located, who is welcome)? ● <u>Social/Community Context</u> Do all at-risk populations trust institutions providing handwashing stations? If staffed, are trusted community spokespeople on site? 	<p>Disproportionately impacted populations may include:</p> <ul style="list-style-type: none"> ● People with disabilities ● No car household/transportation desert ● People who speak a language other than English ● People with low-literacy ● Historically marginalized populations ● People experiencing homelessness ● Outdoor workers ● Congregate and high density settings
<i>Mass Care Facilities</i>	
<p>Barriers to mass care may include:</p> <ul style="list-style-type: none"> ● <u>Built Environment/Neighborhood</u> Are Mass Care centers locally available and accessible? Are they conveniently located for all at-risk populations? 	<p>Disproportionately impacted populations may include:</p> <ul style="list-style-type: none"> ● People with disabilities ● No car household/transportation desert

<ul style="list-style-type: none"> ● <u>Education Access and Quality</u> Are all at-risk populations able to receive, understand, and act on public information (e.g., where facilities are located, who is welcome)? ● <u>Social/Community Context</u> Do all at-risk populations trust institutions providing mass care services? Are trusted community spokespeople on site? 	<ul style="list-style-type: none"> ● People who speak a language other than English ● People with low-literacy ● Historically marginalized populations
<i>IV Fluid Resuscitation</i>	
<p>Barriers to IV fluid resuscitation may include:</p> <ul style="list-style-type: none"> ● <u>Built Environment/Neighborhood</u> Are locations providing IV fluids locally available and accessible? Are they conveniently located for all at-risk populations? ● <u>Healthcare Quality and Access</u> Are there culturally appropriate providers at locations providing IV fluids? Do public health surveillance tools (e.g., screening questions) obtain data respectfully and include culturally pertinent options (e.g., privacy screens for religious individuals)? ● <u>Economic Stability</u> Are all at-risk populations able to afford the fee for service? Are resources equally available to all insurances, including Medicaid/Medicare holders? ● <u>Education Access and Quality</u> Are all at-risk populations able to receive, understand, and act on risk messages (e.g., when and why to seek medical attention, how to self-triage) and public information (where treatment is available, who is welcome)? ● <u>Social/Community Context</u> Do at-risk populations trust institutions providing IV fluids? Are trusted community spokespeople on site? 	<p>Disproportionately impacted populations may include:</p> <ul style="list-style-type: none"> ● People with disabilities ● No car household/transportation desert ● Historically marginalized populations ● Un- or underinsured individuals ● Low income individuals ● People who speak a language other than English ● People with low-literacy
<i>Temporary Bathrooms, Laundry, and Showers</i>	
<p>Barriers to bathrooms and showers may include:</p> <ul style="list-style-type: none"> ● <u>Built Environment/Neighborhood</u> Are bathrooms and showers locally available and 	<p>Disproportionately impacted populations may include:</p> <ul style="list-style-type: none"> ● People with disabilities

<p>accessible? Are they conveniently located for all at-risk populations? Are there single stall/gender-neutral options and family changing rooms in addition to larger, communal gendered facilities?</p> <ul style="list-style-type: none"> ● <u>Education Access and Quality</u> Are all at-risk populations able to receive, understand, and act on public information (e.g., where facilities are located, who is welcome)? ● <u>Social/Community Context</u> Do all at-risk populations trust institutions providing bathrooms and showers? Are trusted community spokespeople on site? 	<ul style="list-style-type: none"> ● No car household/transportation desert ● LGBTQ+ ● Historically marginalized populations ● People who speak a language other than English ● People with low-literacy ● People experiencing homelessness
<p>Systemic and Policy Mitigation Measures</p>	
<p><i>Recovery Wraparound Services</i></p>	
<p>Barriers to recovery may include:</p> <ul style="list-style-type: none"> ● <u>Built Environment/Neighborhood</u> Are all impacted populations able to return home and recover from the event equally? Is temporary housing available and accessible? ● <u>Economic Stability</u> Are financial and food assistance available and accessible? Is there a fee for service associated with mental health resources? Are healthcare resources available during the recovery period? ● <u>Education Access and Quality</u> Are all at-risk populations able to receive, understand, and act on public information (e.g., what kind of assistance is available, to whom, and how/where to sign up) and risk messaging (e.g., why mental health is important to address after an incident)? ● <u>Healthcare Quality and Access</u> Are mental health services available and accessible? ● <u>Social/Community Context</u> Do all at-risk populations trust institutions providing mental health services? 	<p>Disproportionately impacted populations may include:</p> <ul style="list-style-type: none"> ● People experiencing homelessness ● People with disabilities ● No car household/transportation desert ● Low-income individuals ● Un- or underinsured homeowners ● People who speak a language other than English ● People with low-literacy ● First Responders ● Healthcare and Public Health staff

<i>Public Health and Healthcare Staffing Policies and Solutions</i>	
<p>Barriers to implementing staffing policies and solutions may include:</p> <ul style="list-style-type: none"> ● <u>Economic Stability</u> Are policies in place for the rapid hiring of temporary employees? For expedited purchases and procurement? ● <u>Social/Community Context</u> Is there community representation in new and temporary hires? 	<p>Disproportionately impacted populations may include:</p> <ul style="list-style-type: none"> ● Historically marginalized populations
<i>Public Health and Healthcare Surge Policies</i>	
<p>Barriers in implementing surge policies:</p> <ul style="list-style-type: none"> ● <u>Healthcare Quality and Access</u> What cases and clusters do contact tracing and case investigation surge protocols prioritize? Does the allocation of staff time de-prioritize populations or categories of diseases, thereby causing healthcare delays to some populations? 	<p>Disproportionately impacted populations may include:</p> <ul style="list-style-type: none"> ● Historically marginalized populations