

# America's Water Infrastructure Act (AWIA) of 2018

# 2018 AWIA Background

**Increased awareness and preparedness of infrastructure vulnerabilities from an all-hazard prospective driven by recent disasters**

**Hurricane Sandy  
Hurricane Harvey**

**2018 AWIA significantly increases the scope of the 2002 Bioterrorism Act**



# *Basic Requirements*

# America's Water Infrastructure Act (AWIA)

## Sec. 2013 Community Water System Risk and Resilience

*Replaces SDWA Section 1433 (2002 Bioterrorism Act) and requires two documents be prepared and updated regularly for all Public Water Systems serving 3,300 people and more*

### Risk and Resiliency Assessment

*Assessment that provides an all-hazards approach with relative probabilities of occurrences to critical Utility assets at risk and develops an associated management strategies to mitigate such risks*

### Emergency Response Plan

*Guidance document used before and during emergencies that provides Utility staff with well defined response procedures intended to maintain service, minimize disruptions and restore service during times of crisis*

# §2013 Community Water System Risk & Resilience

## Bioterrorism Act (2002)

## AWIA (2018)

Vulnerability Assessment (VA)	➔	Risk & Resilience Assessment
Terrorism or Intentional Act	➔	Malevolent Acts / Natural Hazards / Dependency Hazards
Submit VA to EPA	➔	Prepare RRA & Certify to EPA
Emergency Response Plan (ERP)	➔	Prepare/Update ERP & Certify to EPA
Tampering with Water System is a Federal Offense	➔	No Change

★ Differences with previous vulnerability act

★ Directs EPA to recognize voluntary certified letter on completion of documents

# AWWA Various Standards and Guidance Manuals

G430 Security Practices for Operations and Management

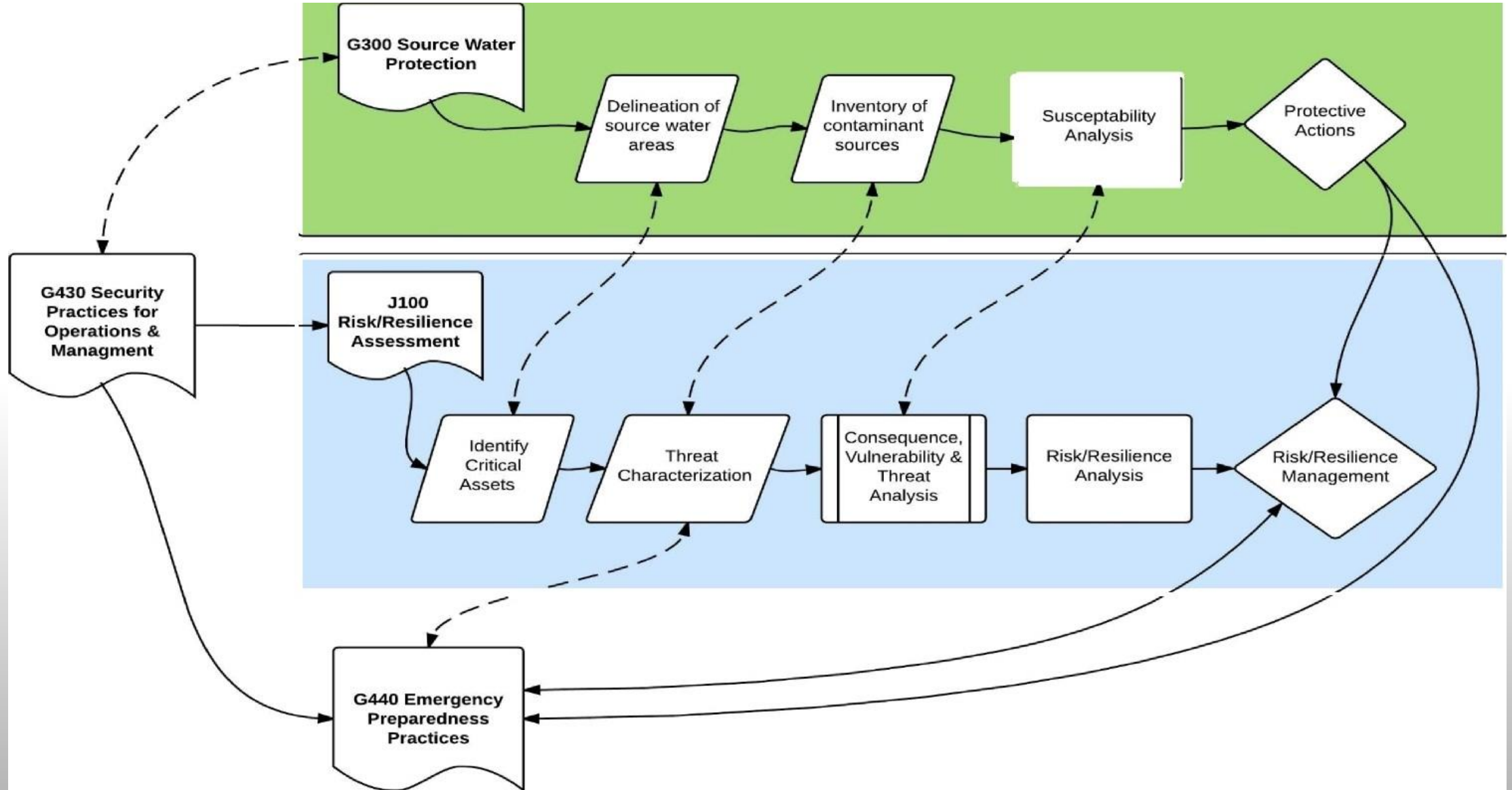
G300 Source Water Protection

**J100 Risk/Resilience Management of Water Systems**

G440 Emergency Preparedness Practices

**M19 Emergency Planning for W&WW Utilities**

# Connecting the Dots



# Compliance Deadlines

Utility Size	Estimated # of Community Water Systems	Risk & Resilience Assessment	Emergency Response Plan
>100K	435	March 31 <sup>st</sup> , 2020	September 30 <sup>th</sup> , 2020
50 - 100K	594	December 31 <sup>st</sup> , 2020	June 30 <sup>th</sup> , 2021
3,300 - <50K	8,295	June 30 <sup>th</sup> , 2021	December 30 <sup>th</sup> , 2021

Must review, update and recertify every 5 years



*Freese and Nichols Approach to  
Meet the AWIA Requirements*

# 3 Phase Approach To Comply with AWIA Requirements

## Step A. Conduct Risk and Resiliency Assessment

*Assessment that provides an all hazards approach with probabilities of occurrences to critical Utility assets at risk and develops a management plan to mitigate such risks*

## Step B. Prepare Emergency Response Plan

*Guidance document used during emergencies that provides defined response procedures intended to maintain service, minimize disruptions and restore service during times of crisis*

## Step C. Certify Compliance with the EPA

*Water Utilities must certify through a letter of promulgation providing evidence of approval or resolution from governing board that both documents have been completed and approved*

# A) Water System Risk and Resiliency Assessment

## 1. Asset Characterization

- Document mission critical functions of the Utility
- Identify critical assets supporting mission critical functions
- Identify critical internal/external supporting infrastructure
- Document existing protective countermeasures on critical assets
- Estimate worst reasonable consequences from asset loss
- Prioritize critical assets based on estimated consequences

# A) Water System Risk and Resiliency Assessment

## 2. Threat Characterization

- **Identify Malevolent Threats**
  - Active Assailant, Workplace Violence, Terrorism, IT Cyber Attack, Bomb Threat, Contamination of the Water System, Unauthorized Entry, etc.
- **Identify Natural Hazards**
  - Tornadoes, Hurricanes, Flooding, Fire, Ice Storms, Earthquakes, etc.
- **Identify Dependency and Proximity Hazards**
  - Chemical Release, Power Outage, Loss of Key Suppliers, Source Water Contamination, Inability/Unwillingness of Key Employees to Come To Work, etc.

# A) Water System Risk and Resiliency Assessment

## 2. Threat Characterization

- Evaluate various threat/asset pairs
  - Group into qualitative categories (small, medium, large)
- Rank threat/asset pairs
  - The Utility shall rank the various threat-asset pairs according to the judged magnitude of the resulting consequences
- Select critical threat/asset pairs to be included in analysis

# A) Water System Risk and Resiliency Assessment

## 3. Consequence Analysis (C) – *Level of Damage Occurring*

- What are the Consequences of an Event/Hazard
  - Number of Fatalities/Serious Injuries
  - Financial Loss to the Utility
  - Duration of Service Denial
  - Severity of Service Denial
  - Economic Loss to Society/General Public
- Develop Worst-Reasonable Case Assumptions for each Threat
- Record Consequence Values (C) for each Threat-Asset Pair

# A) Water System Risk and Resiliency Assessment

## 4. Vulnerability Analysis (V) – *Likelihood of Damage Occurring*

- What is the Vulnerability of a Structure, Equipment or Piping, (i.e. the vulnerability of underground piping to a hurricane is very low, whereas an elevated tank or pump station would be much higher)
- Review Details of Facilities and Facility Layouts
- Conduct Site Visits of Critical Assets to Assess Vulnerability
  - Vulnerability is expressed as the likelihood of an event's having the consequence of major destruction. Utility should include photos and rationale for vulnerability score
- Record Vulnerability Estimates (V) for each Threat-Asset Pair

# A) Water System Risk and Resiliency Assessment

## 5. Threat Analysis (T) – *Likelihood of Event/Hazard Occurring*

- Estimate Likelihood of Malevolent Events
  - Likelihood of malevolent events will be based on attractiveness of the region (high profile locations) or facility (visibility of asset)
- Estimate Probability of Natural Hazards
  - Probability of natural hazards will be based on historical records for the specific location of the asset
- Estimate Likelihood of Dependency Hazards
  - Likelihood of dependency hazards will be based on historical records for frequency and severity of occurrences
- Record Threat Analysis (T) for Each Threat-Asset Pair



# A) Water System Risk and Resiliency Assessment

## 6. Risk & Resiliency Analysis ( $R = C * V * T$ )

- Calculate Risk for Each Threat-Asset Pair
  - Risk (R) calculated as product of Consequence (C), Vulnerability (V), and Threat (T)
- Calculate Resilience Level for Overall Water System

12 Factor Scale (Operational and Financial Scale to Estimate Level of Resiliency)	
Emergency Response Plan Status	Critical Staff Resilience (% of Staff with Back-Up)
National Incident Management System (NIMS) Compliance	Business Continuity Plan (BCP) Status
Mutual Aid and Assistance	Utility Bond Rating Measure
Emergency Power for Critical Operations	GASB Assessment (% of Assets Assessed)
Ability to Meet Min. Water Demands (Time)	Community Unemployment (% National Average)
Critical Parts Resilience (Time to Replace Key Equipment)	Median Household Income (% State Median)

# A) Water System Risk and Resiliency Assessment

## 6. Resiliency Assessment (URI) Approach

- AWWA J100 Appendix H
- 12 Critical Parameters
  - Operational Metrics
  - Financial Metrics
- Weighted by Utility Level of Service Priorities
- Desire to Have A Score of 60 or Greater

AWWA J100 - Water Sector Utility Resilience Analysis						
Utility Resilience Index (URI) Scoring Matrix						
<i>j</i>	Utility Resilience Indicators	Utility Profile	$w_j$	$V_j$	$MAX w_j * V_j$	Utility URI
01	<b>Emergency Response Plan (ERP)</b>			0.1389	0.0000	0.0%
	No ERP		0.00			
	ERP developed and/or updated		0.25			
	Staff trained on ERP (i.e., Table Top)		0.50			
	Resource typed assets/teams defined and inventoried		0.75			
	Functional exercises on the ERP conducted		1.00			
02	<b>National Incident Management System (NIMS) Compliance</b>			0.1561	0.0000	
	No ICS/NIMS Training		0.00			
	ICS 100/200 provided to key staff		0.25			
	ICS 700/800 provided to key staff		0.50			
	ICS 200/300 provided to key staff		0.75			
	Utility certified as NIMS compliant		1.00			
03	<b>Mutual Aid &amp; Assistance</b>			0.1868	0.0000	
	None		0.00			
	Mutual Aid/ Intramunicipal (within own city/town agencies)		0.25			
	Mutual Aid/ Local-Local (with adjacent city/town)		0.50			
	Mutual Aid/ Intrastate (e.g., Water/Wastewater Agency Response Network [WARN])		0.75			
	Mutual Aid/ Interstate and Intrastate		1.00			
04	<b>Emergency power for critical operations</b>			0.0595	0.0000	
	None		0.00			
	Up to 24 hrs		0.25			
	25-48 hrs		0.50			
	49-72 hrs		0.75			
	Greater than or equal to 73 hrs		1.00			
05	<b>Ability to meet minimum daily demand (water) or treatment (wastewater)</b>			0.0966	0.0000	
	None		0.00			
	Up to 24 hrs		0.25			
	25-48 hrs		0.50			
	49-72 hrs		0.75			
	Greater than or equal to 73 hrs		1.00			
06	<b>Critical parts and equipment</b>			0.0878	0.0000	
	3-4 weeks or greater		0.00			
	1- <3 weeks		0.25			
	3-<7 days		0.50			
	1-<3 days		0.75			
	Less than 24 hours		1.00			
07	<b>Critical Staff Resilience</b>			0.0605	0.0000	
	<10%		0.00			
	10-25%		0.25			
	>25-50%		0.50			
	>50-75%		0.75			
	>75-100%		1.00			
F1	<b>Business Continuity Plan</b>			0.0463	0.0000	
	No BCP		0.00			
	BCP under development		0.25			
	BCP completed		0.50			
	BCP fully implemented		0.75			
	Annual commitment of resources & BCP exercised		1.00			
F2	<b>Utility Bond Rating</b>			0.064	0.0000	
	Caa, less than or equal to		0.00			
	B-Ba		0.25			
	Baa-A		0.50			
	AA		0.75			
	AAA		1.00			
F3	<b>GASB Assessment</b>			0.0176	0.0000	
	Less than 20% assessed		0.00			
	21-40% assessed		0.25			
	41-60 % assessed		0.50			
	61-80% assessed		0.75			
	Greater than 81% assessed		1.00			
F4	<b>Median Household Income</b>			0.0459	0.0000	
	≥ 5% National Average		0.00			
	> 2-4 % National Average		0.25			
	+/-2% National Average		0.50			
	< 2-4 % National Average		0.75			
	≤ 5% National Average		1.00			
F5	<b>Unemployment</b>			0.04	0.0000	
	≥ 10% National Average		0.00			
	> 5-10 % National Average		0.25			
	+/-5% National Average		0.50			
	< 5-10 % National Average		0.75			
	≤ 5% National Average		1			

# A) Water System Risk and Resiliency Assessment

## 7. Risk and Resiliency Management

- Define Acceptable Levels of Risk Scores
- Identify Countermeasures or Mitigation Options
  - Prioritize mitigation options based on those that benefit multiple threat-asset pairs
- Develop Costs for Highest Ranking Options
- Calculate Net Benefits or Benefits/Cost Ratio of Options
- Select Mitigation Options to be Included in Future CIPs

# A) Water System Risk and Resiliency Assessment

## 7a. Examples of Countermeasures/Mitigation Options

- Physical Strategies
  - Signage, Cameras (CCTV), Emergency Interconnects, Intrusion Alarms, Pressure Zone Transfer Valving, Elevate Electrical/Generator Facilities, Reinforce Storage Facilities, Enhanced Lighting, Cable Hardening, Multiple Water Sources, Bank Stabilization for Key Water/Sewer Lines, Contaminate Warning System
- Operational Strategies
  - Procedures for Facility Entry, Preventive Maintenance Program (Software/Hardware Upgrades), Mutual Aid Agreements, Staff Training, SOP Development, Information Management, Safety Management Plan

# B) Emergency Response Plan (ERP)

## ERP Overview

Encourages an Interconnection of Various Preparedness Plans for Business Continuity

Use results of the Risk and Resiliency Assessment for input into ERP

Must include management team as well as operators and maintenance personnel input

Updates and recertification are required every 5 years reflecting system changes

Basic requirements are described in M19, Appendix B Page 95



# B) Emergency Response Plan

## 1. Executive Summary

- Defines why the Plan was Developed and how Plan is to be used
- Should Explain Plan is Flexible to be used for all Emergencies

## 2. Letter of Promulgation

- Provides Evidence of Approval or Resolution from Governing Board

## 3. Plan Concurrence

- Provides Evidence that Assigned Emergency or Partner Agencies has agreed with the plan and their task elements. May be in the form of a letter

# B) Emergency Response Plan

## 4. Utility Overview

- Utility Authority
- Utility Roles & Responsibilities
- Utility Service Area (CCN Type Map)

## 5. Scope of Emergency Response Plan

- Clearly Identifies the Purpose of ERP
- Defines Scope of Preparedness and Incident Management Activities

## 6. Authorities and References for ERP Development

- Listing of EPA Documents Utilized
- Listing of AWWA Documents Utilized
- Listing of NIMS or DHS Documents Utilized

# B) Emergency Response Plan

## 7. Situation and Risk Assessment

- Summarizes the Risk and Resiliency Assessment Process
- Includes Descriptions of the Greatest Hazards Identified

## 8. National Incident Management System (NIMS) Based Emergency Organization

- Identifies Roles/Responsibilities During Disaster Event
- Defines Jurisdiction for the 5 NIMS Sections:
  - a) Management, b) Plans/Intel, c) Operations, d) Logistics and e) Finance

## 9. WUEOC and EOC Organization

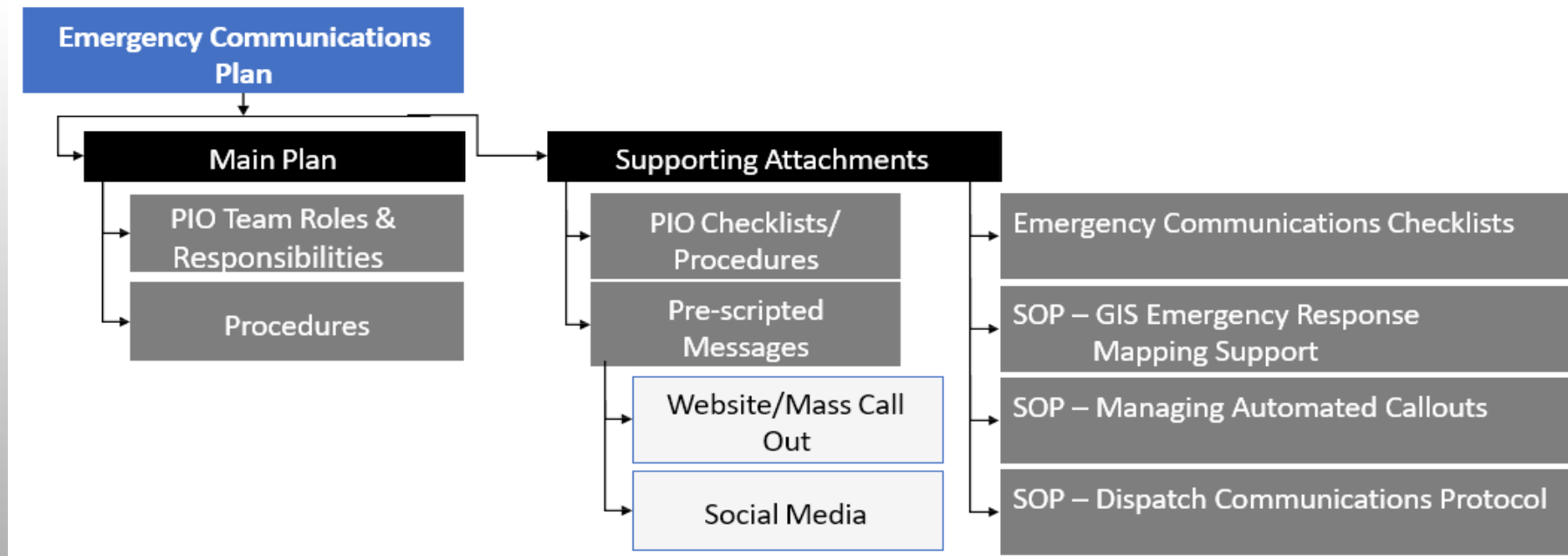
- WUEOC = Water Utilities Emergency Operations Center Location and Readiness
- EOC = Emergency Operations Center (City-Wide) Location and Readiness
- Organizational Basics for Each



# B) Emergency Response Plan

## 10. Concept of Operations

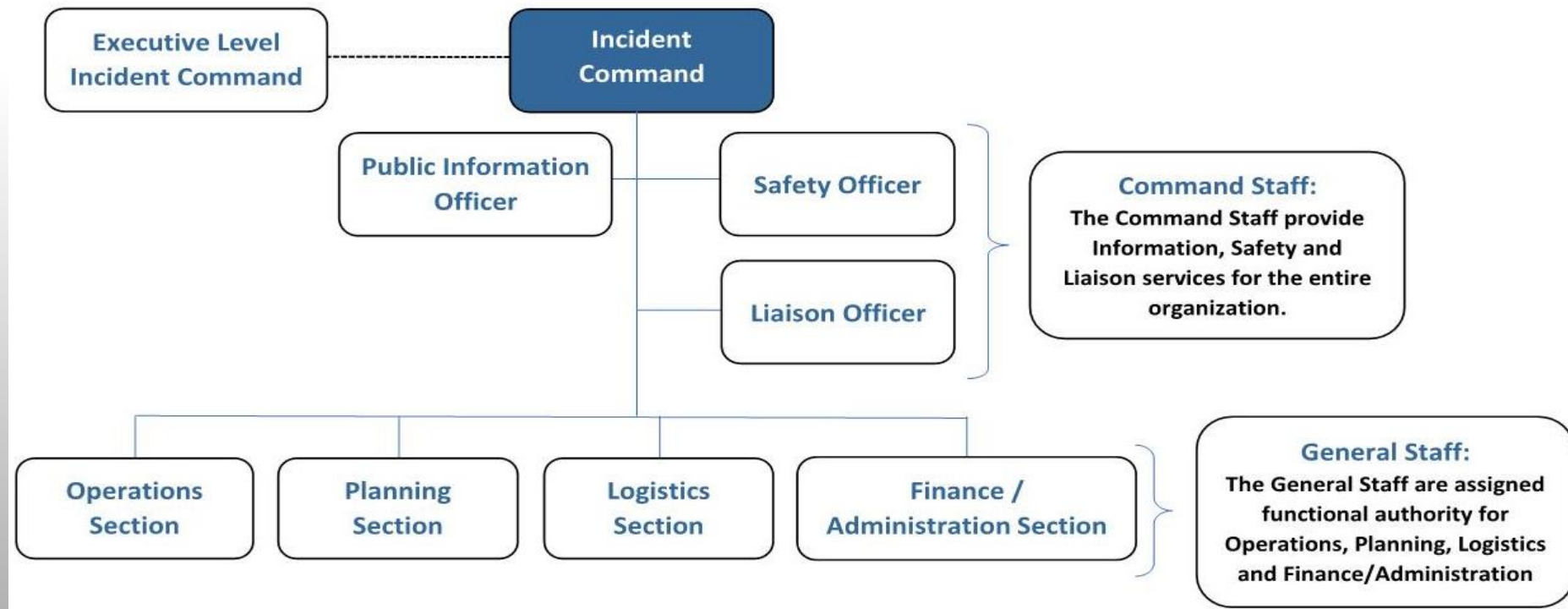
- Process to Contact Emergency Response Personnel
- Identify Public Information Officer (PIO)
- Develop an Emergency Communication Plan (CCP) that Addresses a) Internal Communication with Employees b) Senior Leadership, c) Customers & Public at Large and d) Regulatory Agencies



# B) Emergency Response Plan

## 11. Incident Command System (ICS)

- Identifies Command Staff (Incident Executive Officer, Incident Command, Public Information Officer, Safety Officer and Liaison Officer)
- Identifies General Staff (Operations Section Chief, Planning/Intel Section Chief, Logistics Section Chief and Finance/Administrative Section Chief)



# B) Emergency Response Plan



## 12. Mutual Aid System and Processes

- Establishes Key Partnerships
- Establish Collaborative Relations with Other Utilities
- Develop Mutual Aid Agreements to Enhance Resiliency (Ex. TXWARN etc.)
- Develop WARN (Water Agency Response Network) Operational Plans

## 13. Recovery Overview, Organization, Damage Assessments

- Includes a General Recovery Concept of Operations
- Organization Roles/Responsibilities During Recovery
- Defines the Level of Damage During and After Event

## B) Emergency Response Plan

### 14. Recovery Documentation, Reports and Funding Assistance

- Captures Hazard Event Documentation Process
- After-Action Questionnaire/Report to Internal Office of Emergency Services
- Funding Applications to FEMA on Hazard Mitigation Grants or TWDB on Emergency SRF with Zero Interest Loans

**FEMA**



**Texas Water  
Development Board**

### 15. Training and Exercises

- Identifies Discussion (Table-Top) Based Exercises Needed
- Identifies Operational (Field) Based Exercises Needed
- Develop a Matrix of Job Positions vs Training Courses vs Yearly Calendar
- Evaluate Training Regularly and Conduct Refresher Classes Periodically

# B) Emergency Response Plan

## Appendixes

Appendix A. Emergency Action Checklist for Specific Hazards

Appendix B. Preliminary Damage Assessment Forms

Appendix C. Contact Lists

Appendix D. Glossary of Terms

Appendix E. Supporting Documentation

Appendix F. Emergency Communications Plan

# C) Certify Compliance with the EPA

## 1. Develop Letter of Promulgation

Provides Evidence of Approval or Resolution from Board or City Council for Both  
A) Risk and Resiliency Assessment and B) Emergency Response Plan

## 2. Identify Community Water System ID

## 3. Certify Completion Before Compliance Deadline

## 4. Submit Using EPA Secure Online Portal

