

Project Number: DCP 1607 HS1

Project Name: STATEWIDE RESILIENCE MASTER PLAN (SRMP) Owner / Client: Massachusetts DCAMM

In partnership with: Massachusetts Emergency Management Agency (MEMA)



# DCAMM STATEWIDE RESILIENCE MASTER PLAN

July 13, 2016

1:00 - 3:00 PM



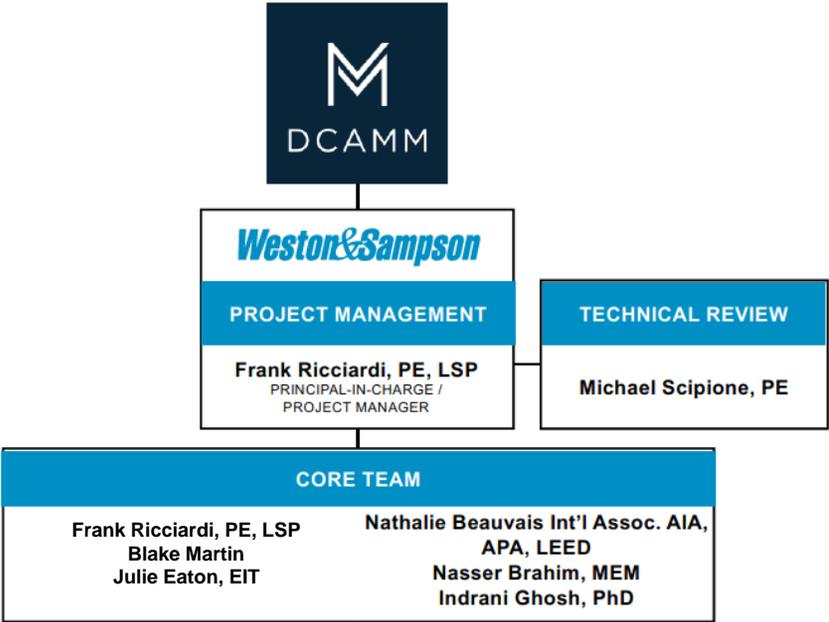
DIVISION OF  
CAPITAL ASSET  
MANAGEMENT &  
MAINTENANCE



**Weston&Sampson**<sup>®</sup>



# INTRODUCTION OF TEAM MEMBERS



### CONSULTANT TEAM

DCAMM (Programming) Project Manager: **Tabitha Harkin**  
MEMA Contacts: **Marybeth Groff, Sarah White, Hazard Mitigation Planning (MEMA)**  
Prime Consultant: **Weston & Sampson**  
Sub Consultant: **Kleinfelder**  
Design Team Leadership: **Frank Ricciardi, P.E., LSP**  
**Nathalie Beauvais, Int'l Assoc. AIA , APA ,LEED AP**

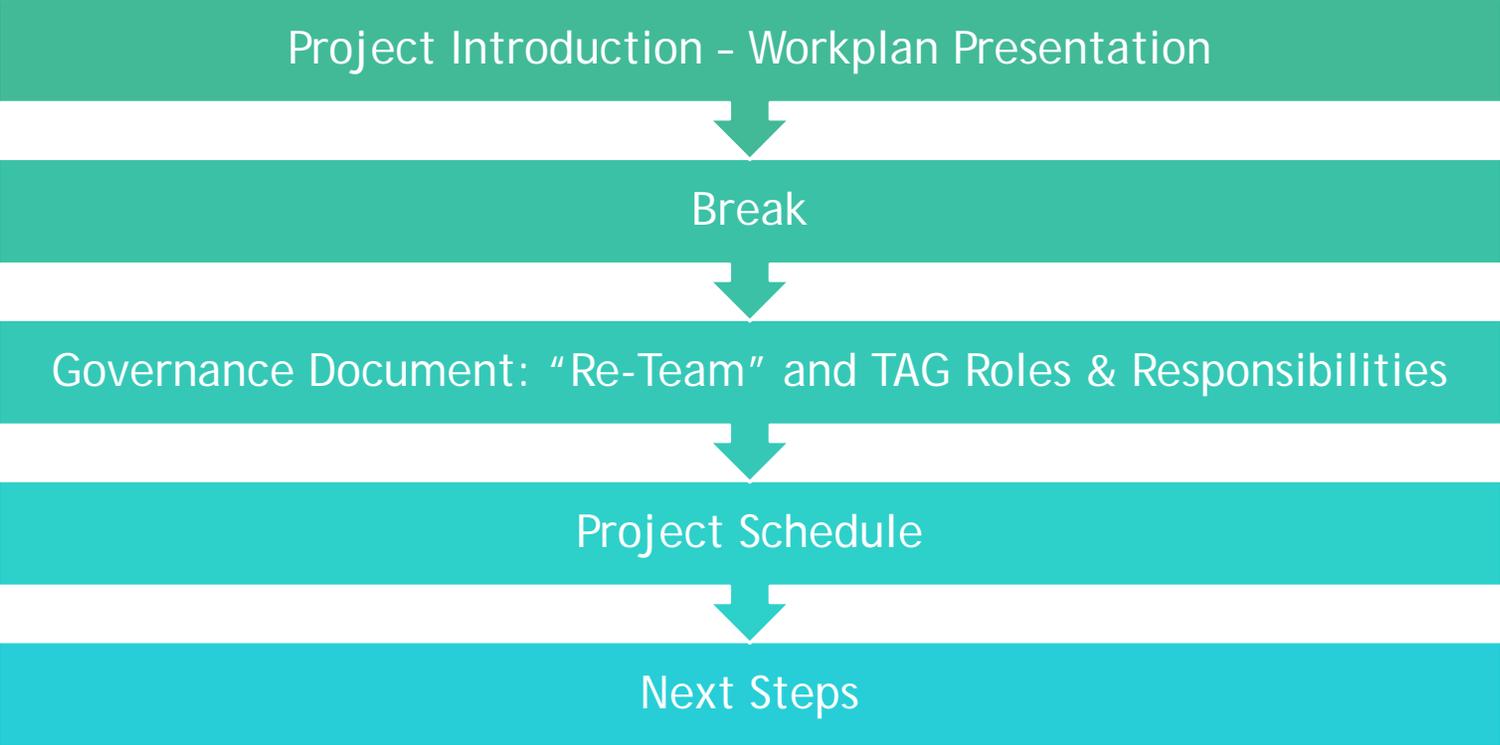
### RESILIENCE WORKING STAKEHOLDERS GROUP ("RE-TEAM")

Internal DCAMM Stakeholders/PMs (FMM, OPDC, eTeam etc.) and MEMA

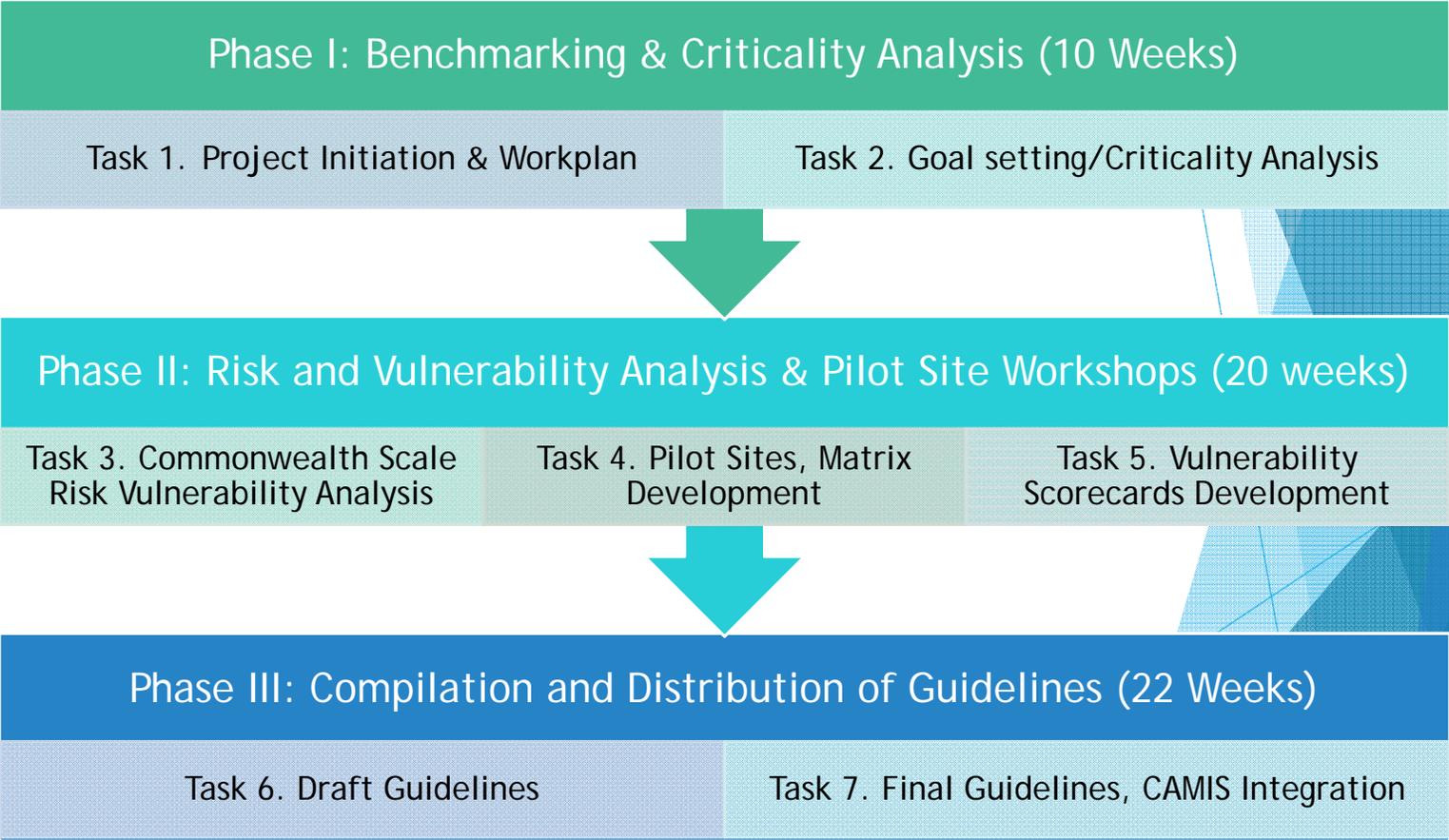
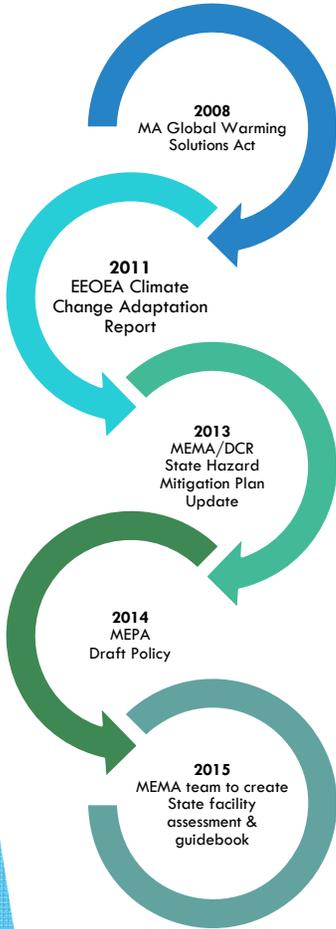
### TECHNICAL ADVISORY GROUP (TAG)

External stakeholders (State agencies, academia, private entities, and non-profits)

# PRESENTATION OVERVIEW

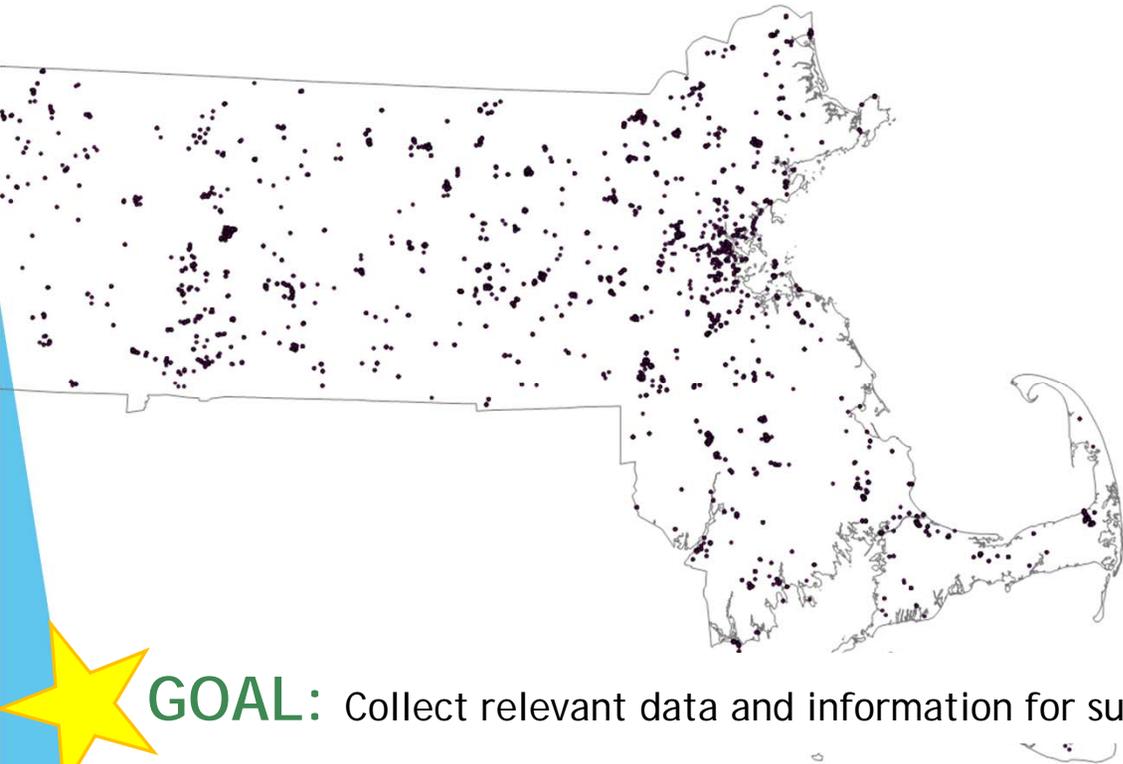


# PROJECT OVERVIEW



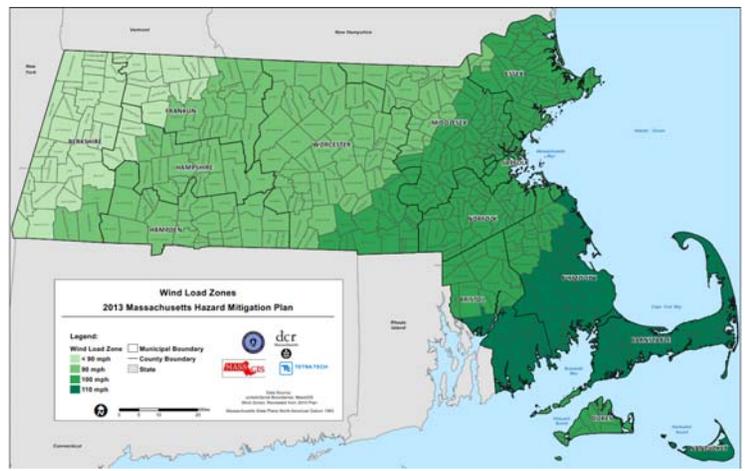
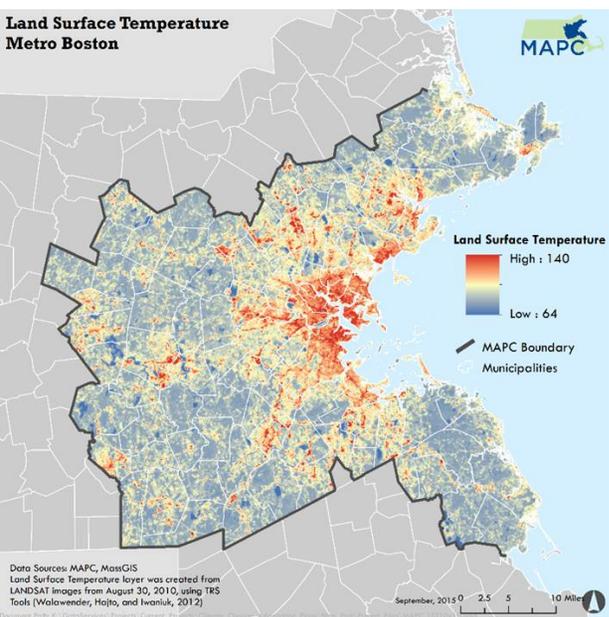
# PHASE I Task 1: Data Collection and Analysis

- ▶ Annotated Bibliography and library of Resilience Best Management Practices (over 90 articles, reports, checklists and policy plans to utilize as best management practices)
- ▶ Analysis facility data from CAMIS and address data gaps.

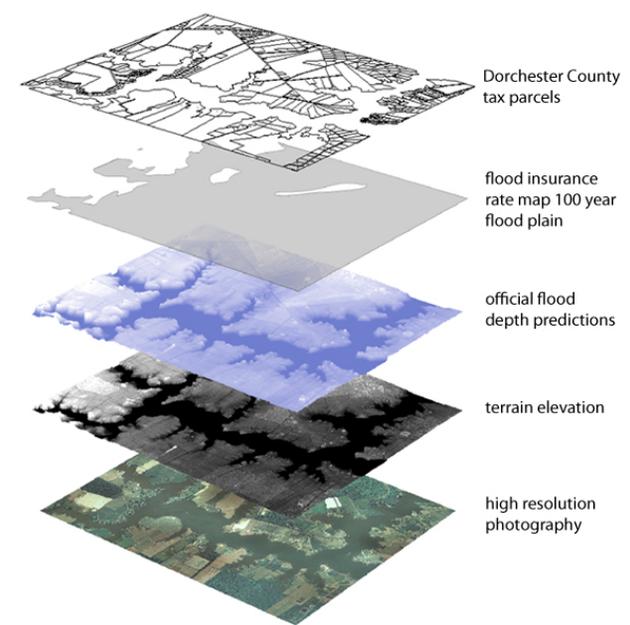


**GOAL:** Collect relevant data and information for subsequent phases of study.

# PHASE I Task 1: Geographic Information Systems (GIS) Setup



## Flood Insurance Rate Maps (FIRMs)

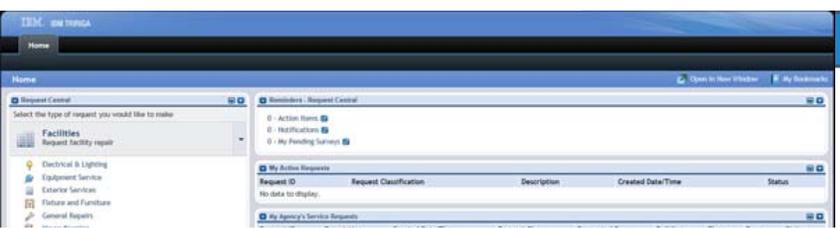


[https://www.climate.gov/news-features/features/next\\_flood](https://www.climate.gov/news-features/features/next_flood)

**GOAL:** Setup GIS as a file geodatabase for future analysis.

# PHASE I Task 2: Portfolio Criticality Analysis

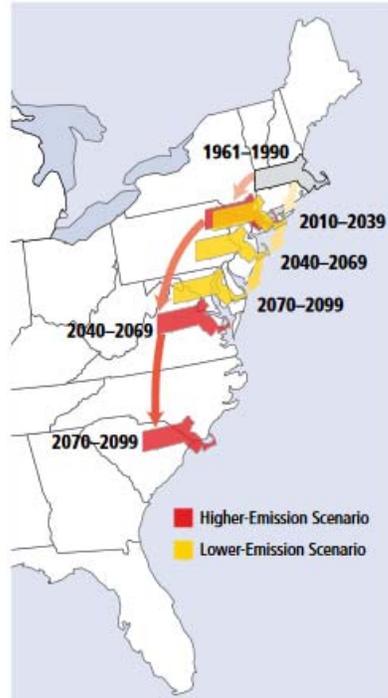
- ▶ At a macro level, identify which building categories are most critical to DCAMM’s mission and the Commonwealth.
- ▶ At a macro level, identify which populations/user groups are most at risk.



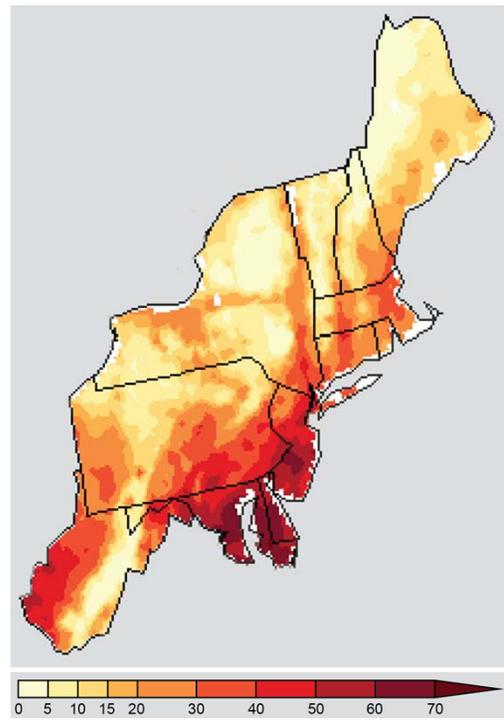
C	E	H	I	S	T	U	V	W	Z	AA
TRINAMETX	TRIPARENTP	TRICITYTX	TRIBUILDIN	CSTBASEMEN	CSTBUILDIN	CSTBUILD_1	CSTBUILD_2	CSTCONSTRU	CSTIMPROVE	CSTIMP
Pump House	Western Massachusetts Fire Training Academy	Springfield	6500 - Pump House-water related, not gasoline		268DFS1308	Construction	2 - Minor Building			6500
Shed	Western Massachusetts Fire Training Academy	Springfield	7300 - Shed		268DFS1306	In Use	2 - Minor Building		268B80DFS1306	7300
Training Structure - 2	Western Massachusetts Fire Training Academy	Springfield	8300 - Training Facility		268DFS1303	In Use	2 - Minor Building	Conc Frame-Infill Shr Walls	268B80DFS1303	8300
Clinic/Youth Guidance	Worcester State Hospital	Worcester	3801 - Hospital/Clinic	FALSE	335DMH0790	In Use	1 - Major Building	Unreinforced Masonry	335B45DMH0790	3801
Admin Building	Western Massachusetts Fire Training Academy	Springfield	0100 - Administration		268DFS1307	Construction	1 - Major Building	Steel Frame-Unreif Masry Walls		0100
Burn House	Western Massachusetts Fire Training Academy	Springfield	8300 - Training Facility		268DFS1304	In Use	2 - Minor Building	Conc Frame-Infill Shr Walls	268B80DFS1304	8300
Center For Health Education	Holyoke Community College	Holyoke	0100 - Administration	FALSE	256HCC1300	In Use	1 - Major Building	Steel Frame-Unreif Masry Walls	256B75HCC1300	0100
Masonry Building Office/Garage	Western Massachusetts Fire Training Academy	Springfield	1505 - CLASSROOM/OFFICES		268DFS1300	To Demo	1 - Major Building	Conc Frame-Infill Shr Walls	268B80DFS1300	1505
Seven Hill Camp Joy	Worcester State Hospital	Worcester			335DMH1301	In Use	1 - Major Building		335B45DMH1301	
Training Structure - 1	Western Massachusetts Fire Training Academy	Springfield	8300 - Training Facility		268DFS1302	In Use	2 - Minor Building	Conc Frame-Infill Shr Walls	268B80DFS1302	8300
Storage Trailer	Lexington - Arlington Storage Depot - D4	Lexington	7800 - Storage + Storage Shed + Storage Shack	FALSE	428MHDPB13	In Use	2 - Minor Building	Steel Light Frame	428B60DOTPB13	7800
Naval Reserve Center	UMD - School of Marine Science	New Bedford	9910 - University Academic and Research	FALSE	668UAMD0704	Inactive	1 - Major Building	Concrete Unknown Subtype	668B75UAMD0704	9910

**GOAL:** Identify critical Commonwealth assets to focus subsequent tasks.

# PHASE II Task 3: Climate Projections & Modeling



Source: Massachusetts: Confronting Climate Change in the Northeast.



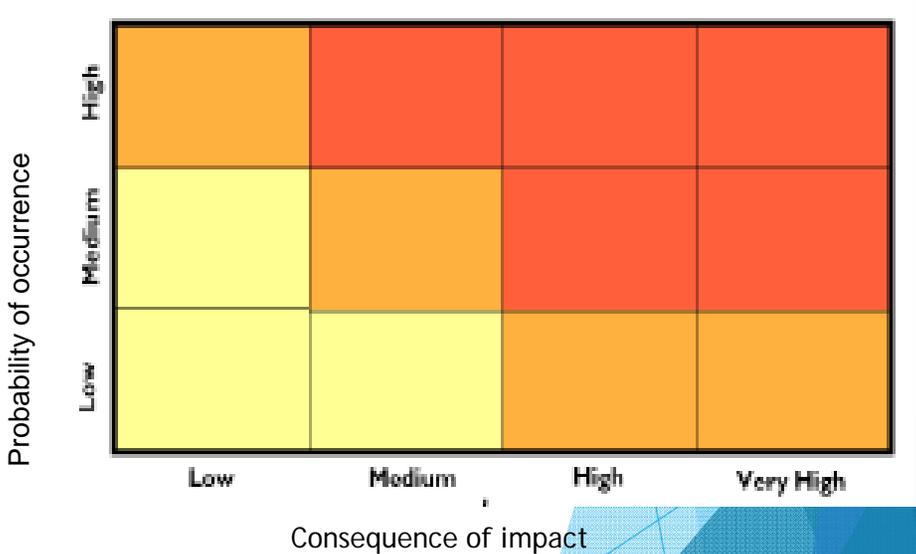
Source: U.S National Climate Assessment Report, 2014

**GOAL:** Agree upon climate projections and model to be used for project and modeling

# PHASE II Task 3: Risk and Vulnerability Assessment

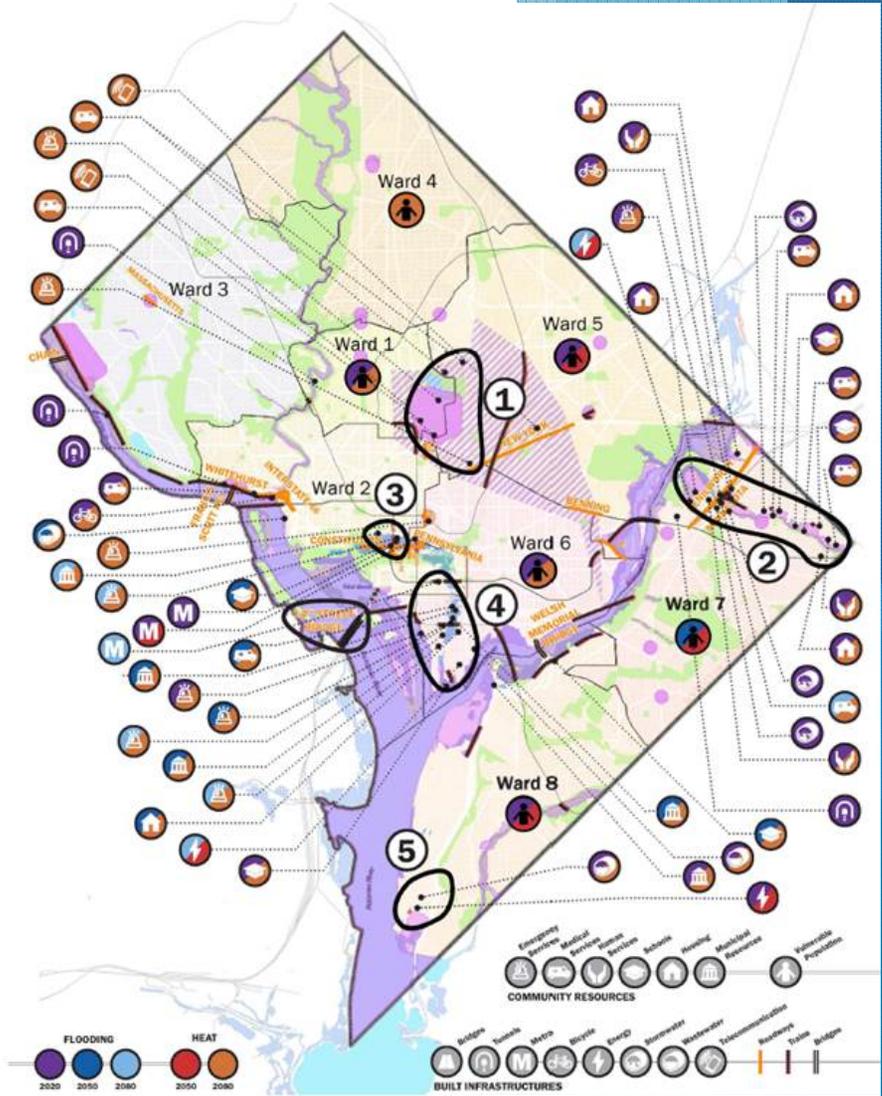
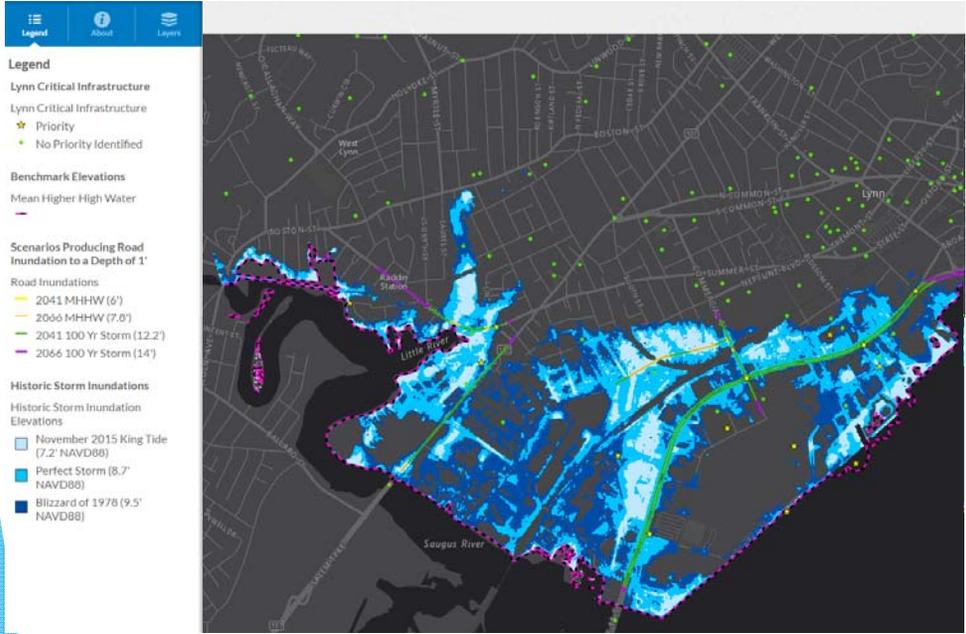
**Risk Severity Matrix**

Probability/Frequency	High (10% per year)				
	Medium (1% to 10% per year);				
	Low (0.1% to 1% per year)				
	Very Low (less than 0.1% per year)				
		Minor	Serious	Extensive	Catastrophic
		<b>Severity of Consequence</b>			

**GOAL:** Identify Commonwealth assets at highest risk for impacts related to Climate Change.

# PHASE II Task 3: Risk and Vulnerability Assessment



# PHASE II Task 3: Table Top Exercises



College/University



Courthouse/State Police



Hospital/Health Care/  
Correctional Facilities



Mechanical/Electrical



**GOAL:** Hold three (3) table top workshops with selected stakeholders to verify information gathered to date and test scenarios based on RVA selection.

# PHASE II Task 5: Vulnerability Scorecard Development

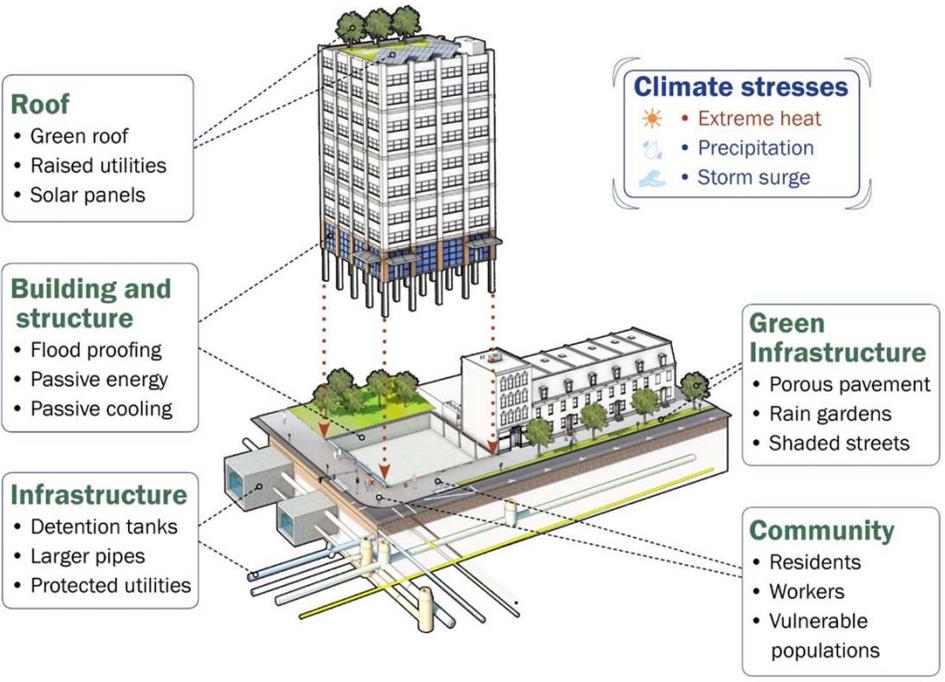
- ▶ Hazard Consequence/Probability Matrix
- ▶ Vulnerability Scorecard & Assessment Checklist
- ▶ CAMIS Database Integration
- ▶ Policy Recommendations & Implementation Model

Type	Name	Flooding – 2030s			
		10 yr 24-hr (5.6 in.)		100 year 24-hr (10.2 in.)	
		Vulnerability	Risk	Vulnerability	Risk
	Sancta Maria Nursing Facility	V1		V1	
Health Centers	Cambridge Family Health	V1		V1-V3	
	Cambridge Family Health North	V1		V1-V3	
	North Cambridge Health Center	V1		V1-V3	
	Senior Health Center	V1		V1-V3	
	Windsor Street Health Center	V4	R3	V4	R2
	Teen Health Center at Cambridge Rindge and Latin	V1		V1-V3	
	East Cambridge Health Center	V1		V1-V3	
Ambulance Services	Professional Ambulance Services	V5	R4	V5	R3
Municipal Offices	Public Health Department	V5	R4	V5	R3

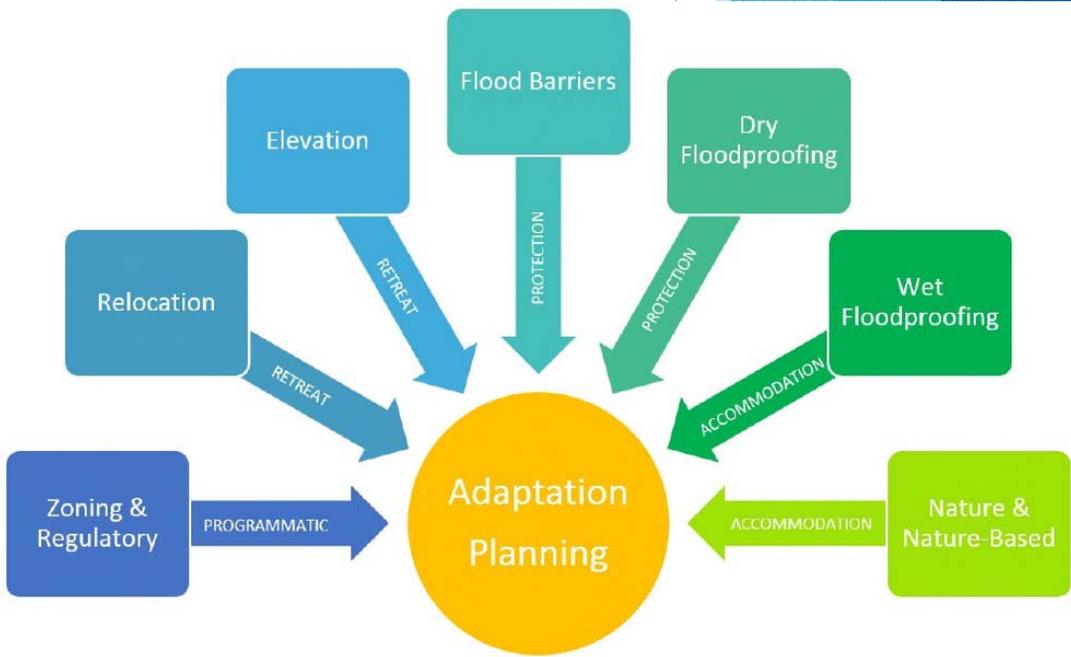
**Critical Services vulnerability and risk from inland flooding by 2030s**  
 (V5 – Most Vulnerable, V0 – Least Vulnerable; R4 – Highest Risk, R1 – Lowest Risk)

**GOAL:** Develop scorecard that can be used to assess vulnerabilities of Commonwealth assets.

# PHASE III Tasks 6+7: Development of Resiliency Guidelines



Source: Kleinfelder for the City of Cambridge, 2015



Source: Weston & Sampson for Lynn EDIC, 2016

# PHASE III Tasks 6+7: CAMIS Integration

Building: 316DOC9214 Campbell Bldg New River Academy - Mozilla Firefox

https://camis.dcp.state.ma.us/WebProcess.srv?objectId=750000&actionId=750011&propertyId=208133&projectId=1&specClassType=6&specId=15334210&specTypeId=10002100&action=Edit&managerType=query&altGuiListId=-1&inline=false

Building: 316DOC9214 Campbell Bldg New River Academy

General Projects Contact Details Graphic Area Measurements Notifications Notes & Documents GIS Includes Reports

(Required): General Information for this Building.

**General**

ID 1003614 Status Active Image Display Image Image

\* Name Campbell Bldg New River Academy

Description

Site Name Lancaster Complex Osp Site Code DCP10

Hierarchy Path \Locations\Sites\Lancaster Complex Osp\316DOC9214 Campbell Bldg New River Academy

**Primary Address**

Geography Lookup \Geography\North America\United States\Massachusetts\Worcester\Lancaster

Address Description Po Box 7

Address Number 220 Street Name Old Common Rd. Municipality Lancaster

County Worcester State Massachusetts Zip Code 01523

Neighborhood

GIS Latitude 42.4442 GIS Longitude -71.6555 Elevation

**Location Graphic**

No Graphic Available

**Details**

Common Name

Legal Name

Building Code 316DOC9214 Improvement Code 316B11CAM9214

Building Status Inactive

Tenure State Owned Arc ID 13572 Inactive Status MOTHBALL (WARM)

Manual Gross Area 13,700 square-feet Overall Condition Adequate

Number of Floors 3 Replacement Cost \$5,270,317.17

Basement  Construction Type Unreinforced Masonry

Surplus Property

Under Legislation

Parking Spaces (Open) 0

Parking Spaces (Covered) 0

Parking Spaces (Accessible Open) 0

Add Vulnerability Score Information

# Project Team Relevant Project Experience



## CLIMATE CHANGE VULNERABILITY ASSESSMENT & ADAPTATION PLANNING

lynn economic development and industrial corporation, lynn, massachusetts

### Reed Street Sewer Lift Station Vulnerability and Risk



**Consequence of Failure**

**Risk:**  
High consequence of failure to Lynn wastewater system

Severity	Score	Criteria Describing Consequence				
		Public Safety, Emergency Services	Public Health, Environment	Repair Cost	Reduced Economic Activity	Public Services; Duration
5	5	Regional Emergency	Regional Emergency	>\$20 MM	Regional Emergency	>1 Month
4	4	City Emergency	City Emergency	\$2 MM - \$20 MM	City Emergency	15-30 Days
3	3	High	High	\$200 K - \$2 MM	High	7-14 days
2	2	Moderate	Moderate	\$20K - \$200K	Moderate	1-6 days
1	1	Low	Low	<\$20K	Low	<1 day

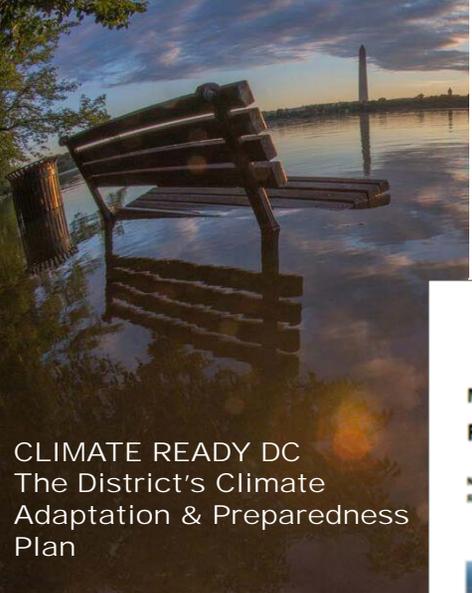
**Risk Score**

Facility	Consequence Score	Probability 2016	Probability 2041	Probability 2066	Weighted Risk Score
Reed Street Sewer Lift Station	64	0.01	0.01	0.1	2.37





# Project Team Relevant Project Experience



CLIMATE READY DC  
The District's Climate  
Adaptation & Preparedness  
Plan

Draft report, to be issued fall 2016. Kleinfelder and Perkins + Will for DC DEOE

		Probability	
		Low	High
Consequence	High	<b>Score R3</b> • Youville Hospital • Public Health Department • Professional Ambulance Services • Police Headquarters • Fire Company 2 • Fire Headquarters (2070)	<b>Score R4</b> • Public Health Department • Police Headquarters • Professional Ambulance Services
	Medium	<b>Score R2</b> • Windsor Street Health Center • Tobin School • Morse School (2070) • Kennedy / Longfellow School (2070)	<b>Score R3</b> • Windsor Street Health Center
	Low	<b>Score R1</b>	<b>Score R2</b>

\*(2070) indicates that an asset is highly vulnerable in the 2070s scenarios, but not in the 2030s scenarios.  
 Source: City of Cambridge Climate Change Vulnerability Assessment Report, section on City's Critical Services



Source: Tabletop Exercise, Massport with Kleinfelder, 2015

# BREAK

# Governance Document (Re-Team and TAG Roles & Responsibilities)

## SRMP Resilience Working Stakeholders Group (“Re-Team”)

- ▶ DCAMM
  - ▶ Office of Planning, Design, and Construction
  - ▶ Office of Real Estate Management
  - ▶ Office of Facilities Management and Maintenance
  - ▶ Office of General Counsel
  - ▶ User Agencies
- ▶ MEMA
- ▶ Executive Office of Health and Human Services
- ▶ Department of Mental Health
- ▶ MA Board of Library Commissioners

## SRMP Technical Advisory Group (TAG)

- ▶ Academic Institutions
- ▶ DCR
- ▶ EOEAA
- ▶ MAPC
- ▶ MassDevelopment
- ▶ MassDOT
- ▶ MassPort
- ▶ MBTA
- ▶ Municipalities with Adaptation Planning Experience
- ▶ MWRA
- ▶ Nonprofit Agencies

## Re-Team

The goals of the SRMP Re-team group are to

- ▶ Develop policy and design strategies for DCAMMs portfolio which enable fortification, resilience, and retreat from the stressors of climate change and societal disturbances in order to ensure an optimal level of service to the public
- ▶ To be a collaborative Commonwealth partner in planning for resiliency
- ▶ To facilitate the education of staff and stakeholders on the subject of risk and resilience planning
- ▶ Be 'early adopter' and support the project team in seeking early win for implementation of the SRMP recommendations.

# Re-Team

The SRMP Re-team stakeholders group has the following project roles and responsibilities:

- ▶ DCAMM staff will identify policy and procedural changes necessary to prioritize resilient design on new and renovation projects;
- ▶ Identify which building categories and user groups are most critical to DCAMM’s mission and create ranking system
- ▶ Collect and develop illustrative GIS maps which depict potential risk areas from climate events such as flooding, sea level rise, storm surge and heat and highlight areas of critical need
- ▶ Identify which facilities will be selected for further evaluation under the Risk and Vulnerability Assessment (RVA)
- ▶ Develop strawman vulnerability assessment.

## Re-Team

- ▶ Hold (3) table top workshops with selected stakeholders to verify information gathered to date and test scenarios
- ▶ Review major findings from Phase II
- ▶ Review published BMP's
- ▶ Prepare draft guidelines
- ▶ Present findings to date and guideline development
- ▶ Release draft outlines for comment
- ▶ Present final product

# Technical Advisory Group (TAG)

The SRMP TAG goals are to

- ▶ identify any weaknesses, omissions, or enhancements that can be addressed in the data available to assist in understanding systematic relationships for DCAMM facilities
- ▶ review major findings as well as project deliverables
- ▶ contribute specific technical knowledge and experience
- ▶ attend several workshops.

## Technical Advisory Group (TAG)

The SRMP TAG has the following project roles and suggested areas of contribution to the project:

- ▶ Hold (3) table top workshops with selected stakeholders to verify information gathered to date and test scenarios
- ▶ Evaluate/comment on major findings from Phase II.
- ▶ Review published BMP's.
- ▶ Support adoption of the final product.

# Project Schedule

## Upcoming Meetings and Workshops

- ▶ Early August - Goal Setting Workshop (re-team only)
- ▶ September - Present RVA methodology and climate change projections
- ▶ October- Present RVA findings and vet pilot site selection (re-team only)
- ▶ Table top workshops will be held sometime from the end of October to November.
- ▶ Late December - Consequence and probability analysis (re-team only)
- ▶ Early January - Present Major Findings from Phase II
- ▶ Late January - Presentation of Findings to Date and Guidelines Development (re-team only)
- ▶ Late February - Draft Guidelines Released for Comment (re-team only)
- ▶ Late March - Presentation of Final Product

## Next Steps

- ▶ Survey to assess DCAMM facility criticality.
  - ▶ Comments and Considerations?
- ▶ Goal Setting Workshop next month.
  - ▶ Present portfolio assessment and draft criticality ranking in order to define goals for portfolio performance criteria and service needs and propose project deliverables. Solicit feedback on draft materials.
  - ▶ Refine draft criticality ranking and goal setting documentation according to feedback received and compile summary document of goals for resilient design guidelines including planning event horizons.