



Office of Sustainability

## 2019 CLIMATE ACTION PLAN UPDATE:

# A Climate Resilient MIT

### MODELING AND ADAPTING FOR A CHANGING CLIMATE

---

Growing a climate resilient MIT involves understanding what risks and disruptions may impact the campus in order to prepare the campus community for the impacts of climate change. These potential impacts include:

- Flooding from more frequent and extreme rains
- Flooding from storm surges and rising sea-levels
- Extreme heat events

**A climate resilient MIT** is an Institute that continues to fulfill its mission in the face of these impacts. Recent disruptive weather events—both localized and regional—have helped to raise the awareness of and vulnerability to flooding in the region. To build a climate resilient MIT, we seek to understand and prepare for the flood risk to campus as well as extreme heat events.

The MIT Climate Resiliency Committee, managed by the Office of Sustainability is tasked with assessing, planning, and operationalizing a climate resilient MIT. The Committee is a collaboration among faculty; engineering and facility staff; risk, insurance, and climate science experts; emergency management; and students individually and collectively driving efforts that grow a climate resilient campus.

# FRAMEWORK OF RESILIENT SYSTEMS

Managing the uncertainty of these climate risks requires understanding challenges and identifying adaptive opportunities through integrated “layers of resilience”: community, buildings, infrastructure, and site. These layers are both inter-dependent and collectively critical to supporting MIT’s mission.



# COMMUNITY

**24,000** people (approx.) WILGN57 DP

\$650M  
research revenue



# BUILDINGS

**170**  
buildings (approx.)



## UTILITIES

**17 miles**  
of utilities (approx.)



SITE

## Types of Flood Risk Facing MIT

### MANAGING UNCERTAINTY

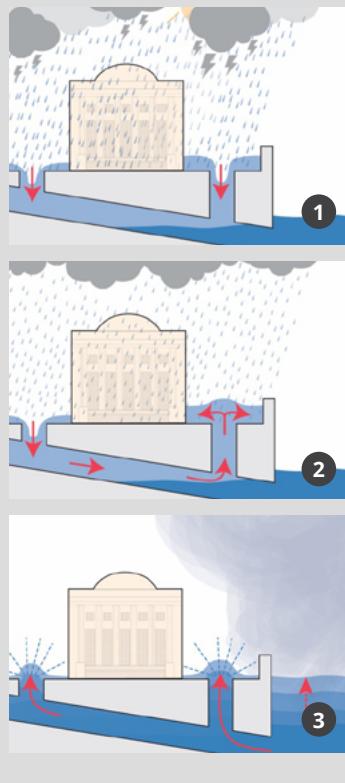
Experts from the MIT Joint Program on the Science and Policy of Global Change are collaboration partners contributing new research to reduce the uncertainty for operational decision-making.

#### FLOOD RISK PROBABILITIES, PRIORITIZATION AND CONSEQUENCES

This resiliency collaboration evaluates probabilities and modelling campus exposure to:

- 1. Flash floods of 1-3 hour intense rains**
- 2. Day-long rain events from tropical storms, hurricanes and nor'easters**
- 3. Storm surge and sea level rise**

Flood risk modelling is also “stress testing” probable campus impacts to predict potential consequences to the community, buildings, utilities, and site. Outcomes include prioritization of campus systems and locations in need of adaptation.



### SCALING STRATEGIES TO MITIGATE RISKS: BUILDING, CAMPUS AND CITY SCALES

The team is exploring potential adaptation strategies for mitigating risks at campus and city scales through the MIT Climate Resiliency Committee, Cambridge Compact for a Sustainable Future, the City of Cambridge Climate Preparedness and Resiliency Plan, and the City of Cambridge Climate Resilience Zoning Task Force. Strategies being advanced across campus and city scales include:

- **Collaborative flood risk mapping** at campus, city, and regional scales
- **Business continuity planning** across campus and city-wide systems to ensure continuity before, during, and after major climate disruptions
- **Construction of** surface and underground stormwater management systems
- **Planning, zoning, and design** standards for protecting people and the campus

## CAMPUS OUTCOMES TO DATE

---

- **DEMONSTRATION** of campus as test bed through engaging research and operations experts
- **STRENGTHENED** resiliency collaboration with City of Cambridge
- **REDUCED** uncertainty about campus flood risks, seasonality and joint probability of events
- **IDENTIFICATION** of building-scale flood vulnerability
- **ENGAGED** steering committee, senior leadership, and students via classroom projects, campus resiliency tours, and guest lecture
- **INFORMED** major renovation and capital projects

## ON THE HORIZON

---

These additional risk management activities are emerging:



**Harmonized flood risk models among MIT campus and City of Cambridge**



**A tool visualizing a range of campus flood risks scenarios**



**Engagement with City of Cambridge to explore climate resilience zoning**



**Studies of joint probability of events (rain and river and sea level rise/storm surge)**



**Projected, expected annual damage costs to property and research activities**



**Baseline evaluation of campus heat risk**