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# WORKSHOP SUMMARY

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**SUBJECT:** Climate Change Vulnerability Assessment (CCVA) Public Workshop  
**DATE, LOCATION:** January 29, 2014, Senior Center, Cambridge, MA  
**WRITTEN BY:** Eric J. Roberts and Ona Ferguson, Consensus Building Institute

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On January 29, 2014, the City of Cambridge held a public workshop as part of the Cambridge Climate Change Vulnerability Assessment (CCVA) process. Approximately 80 people participated in the meeting. The project is being led by a team of consultants led by Kleinfelder and a steering committee of City staff. Another public workshop will be held at the end of the project to share results. The Consensus Building Institute facilitated the workshop. Participants are listed in Appendix A. Workshop materials and project updates are available on the project website:

<http://www.cambridgema.gov/CDD/Projects/Climate/climatechangersilienceandadaptation.aspx>

## ***Welcome, Introductions, and Workshop Goals***

John Bolduc, City of Cambridge Environmental Planner and CCVA Project Manager, welcomed the workshop participants and briefly described the workshop goals. The purpose of the workshop was to introduce the CCVA process; share findings to date about existing conditions, climate projections, and public outreach efforts; and, gather input on anticipated community impacts to include in the assessment.

## ***Climate Change Vulnerability Assessment – Purpose, Participants & Outreach***

Several City of Cambridge staff members gave an overview of the intent and purpose of the CCVA from their department's perspective and an update on project outreach activities in 2013.

### ***Project Intent and Purpose***

Susanne Rasmussen, City of Cambridge Director of Environmental and Transportation Planning, welcomed the participants on behalf of the Community Development Department (CDD). The City launched the CCVA process based on recommendations from the Climate Protection Action Committee (CPAC) to assess climate preparedness and vulnerability. The CCVA will enable the CDD to learn how climate change could impact public safety, public health, and the City budget. Understanding these impacts and investing thoughtfully in advance will help the City prepare Cambridge to effectively respond to possible climate change related events.

Owen O'Riordan, Commissioner of the Cambridge Department of Public Works (DPW), said the DPW is concerned about climate change impacts as they relate to local and regional infrastructure such as telecommunications, energy systems, transportation, and water systems. Although past DPW work did not consider the potential impacts of

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climate change, the DPW is actively involved with the CCVA and working with the Massachusetts Department of Transportation and the Boston Sewer and Water Commission to understand how Sea Level Rise (SLR) and storm surge might impact Cambridge.

Sam Lipson, Director of Environmental Health at the Cambridge Public Health Department, briefly spoke about the need for the City to anticipate the impact of climate change on the City's social infrastructure, and public and environmental health. More extreme weather events could stress community resources in unprecedented ways. Changing climate patterns may increase the prevalence of some diseases – such as mosquito and tick borne illness – as the disease vector's habitat range expands. Anticipating these impacts will be critical to serving the community in times of need.

### *Project Leadership and Participants*

Mr. Bolduc described the City's two phase process of preparedness planning. Phase one, the vulnerability assessment, will be completed in 2014 and result in an assessment report describing Cambridge's most vulnerable social and physical assets and infrastructure. During this phase the best available science and technical information will be used to understand how people and infrastructure might be impacted under various future climate scenarios and identify priority planning areas. After the analysis of existing conditions and future climate scenarios, vulnerabilities will be ranked based on sensitivity and adaptive capacity to identify and prioritize actions that can be taken to prepare for anticipated changes. Public engagement during this assessment will help develop a shared understanding of the vulnerabilities. Phase two will build on phase one and will be a process to decide how the City should begin preparing to address climate change impacts. The preparedness planning will occur between 2014 and 2015 and will result in a climate preparedness and adaptation plan developed with significant public input.

Mr. Bolduc also described the project team and stakeholders. An interdepartmental City of Cambridge steering committee oversees the project. Kleinfelder, an architecture, engineering, and science consulting firm, is leading the vulnerability assessment with a team of sub-consultants with topical expertise. The project team is also drawing expertise from several groups made up of local expertise and projects in the region, including an Expert Advisory Panel (reviewing the technical approach), a Technical Advisory Committee (of major stakeholders in Cambridge sharing information with the city), and other regional and state initiatives including the Metropolitan Area Planning Commission, state agencies, other cities, and academic initiatives.

Jennifer Lawrence, Sustainability Planner for the City of Cambridge, presented the City's outreach efforts to date for the CCVA process. Instead of hosting one or more public meetings that residents would have to attend, City staff went to approximately 40 meetings of community groups to introduce the CCVA. The City talked to approximately 900 people at those meetings. Participants at those meetings and anyone who went to the project website were invited to complete a survey to provide their thoughts about climate change and Cambridge.<sup>1</sup> To date, approximately 315 respondents completed

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<sup>1</sup> Link to survey: [www.surveymonkey.com/s/climateprep](http://www.surveymonkey.com/s/climateprep)

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the survey. Of those respondents, 83% indicated that they believe climate change will affect them. Ms. Lawrence noted that the survey respondents represented a wide diversity of city residents.<sup>2</sup>

Mr. Bolduc and Ms. Lawrence responded to concerns expressed about the equitable allocation of benefits across all neighborhoods and ensuring coordination with neighboring cities. The allocation of benefits will be addressed during the preparedness planning phase. Ms. Lawrence said the City had not yet conducted outreach in Belmont but invited people to work with her to identify appropriate groups to contact.

### ***Project Overview***

Lisa Dickson, Principal at Kleinfelder, presented an overview of project activities.

- Existing Conditions (underway) – During this step, the team is identifying community assets and critical infrastructure – such as energy and transportation systems – and collecting data on existing conditions.
- Climate Scenarios (spring 2014) – The team will use the information on existing conditions, along with temperature, precipitation, sea level rise, and extreme weather data, to develop climate change scenarios.
- Risk Assessment (summer and fall 2014) – The team will then complete a risk assessment by identifying focus areas and comparing them across economic, social and environmental impacts to develop prioritized planning areas.

The project team is using Geographic Information Systems (GIS) to overlay and analyze the links between physical and social infrastructure. As much of this data will be made public as possible, but some data may be redacted for security and proprietary reasons. The project team is working with surrounding communities and state agencies to analyze the impacts to water, transportation, telecommunication, and energy infrastructure systems. Project members participate on the state adaptation subcommittee. Mr. Bolduc offered to discuss the region wide collaboration efforts in more depth after the meeting. All this work, compiled in the final CCVA documents, will provide the basis for the preparedness (or adaptation) planning that John Bolduc described above.

The Army Corp of Engineers (USACE) hurricane inundation maps, which illustrated the potential impacts from a category two storm but not SLR impacts, were shown at the meeting. The maps served as an example for the group activity and are not part of the actual assessment.

Mr. O’Riordan responded to a concern about the use of ADCIRC (Advanced Circulation) modeling and how it relates to FEMA flood models. In 2010, updates were made to the FEMA Middlesex County maps of the Alewife Brook and Charles River. Those maps were adopted by the City Council and are complied with for development purposes. The Massachusetts Department of Transportation, the Boston Sewer and Water Commission, and the City of Cambridge are coordinating efforts to align the assumptions of the ADCIRC model, which the City of Cambridge will use to assess the risk of SLR and coastal storm surge issues in the Charles River and Mystic River/Alewife

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<sup>2</sup> A preliminary summary of the survey responses was available to meeting participants.

watersheds. The ADCIRC model is a hydrodynamic model used to simulate the extent, depth, and duration of flooding under different SLR and storm surge scenarios. The model being developed for MassDOT/Cambridge will provide a more accurate representation of topographic data and account for the Charles River and Mystic River dams, buildings, and numerous other structures. This model will provide a greater level of detail than other coastal models and a useful analysis of storm surge flooding for infrastructure managers and property owners.

Mr. O’Riordan and Mr. Bolduc responded to a question about how the CCVA process is relating to the Global Warming Solutions Act (GWSA). The DEP is looking at how to administer the GWSA in the Wetlands Protection Act (WPA) but they have not changed anything yet. The City administers the WPA but does not set the rules.

### ***Discussion of Community Impacts***

Participants, grouped at tables demarcating five areas of Cambridge, were asked to consider how two possible future climate scenarios might affect their lives and the lives of their neighbors, kids, or others in specific parts of the city. The two broad scenarios were:

- 1) Heat Wave Scenario – In the heat wave scenario, the temperature in Cambridge is greater than 90 degrees Fahrenheit for 10 consecutive days and the power goes out for 10 hours.<sup>3</sup>
- 2) Flooding Scenario – In the flooding scenario, a category two hurricane hits greater Boston and causes flooding in Cambridge for 24 hours.

Small groups worked for an hour and the themes of their discussions, captured by note takers, are presented here:

#### ***Scenario 1: Heat Wave Impacts***

Participants said the following groups would be vulnerable to heat wave impacts:

- Asthmatics or people with difficulty breathing
- Elderly and others who are isolated or of impaired mobility
- Young children
- Those living in high rise apartments or in public housing
- Non-English speakers
- Bed ridden or people with chronic illness
- People suffering from obesity

*How will people stay cool?* Participants anticipated a range of impacts or changes that might occur during a heat wave. To avoid the heat, some participants said they would seek cooler locations in private facilities such as their basements, porches, bathtubs, private pools, or in their yards with sprinklers. Others envisioned seeking refuge in restaurants or at universities. Some said they would run the air conditioning more and

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<sup>3</sup> Some participants noted that the heat would not impact them nor would a power outage of 10 hours. However, many participants thought an extended power outage would cause more severe impacts.

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others thought people might sit in their cars while running the air conditioning. Similarly, several participants would seek refuge from the heat at public facilities with air conditioning, city pools, beaches, shaded areas of the city, or cooling centers. Some participants suggested they would leave the city if it became too hot.

*How will people move around?* Participants also imagined possible changes in how they move about the city. Some said they would ride their bike more slowly or travel to work much earlier than normal. Some thought they might walk or bike more, while others thought they would bike or walk less to avoid sweating profusely. Some people anticipated driving their car or taking public transportation more frequently.

*Other possible behavior changes?* Several participants suggested behavior changes they or others might make in cases of prolonged heat. If air quality is poor, some people may stay indoors. Others would dress more lightly, take multiple showers a day, or change their clothing more often. Some might even decide to sleep at air-conditioned work buildings.

*What impact would a power outage have?* Participants also noted the impacts they would experience from a power outage during a heat wave. Many participants said they would not have access to information since their phones would lose charge and home Internet would not function. Similarly, many people suggested that they would not work because their work relies on computers. Some people anticipated they would have to climb stairs since the building elevators would stop operating. Others noted that there would be little to no water pressure above a building's fourth story since city water pumps are electrical. The lack of refrigeration would cause medication and food to spoil. Additionally, traffic would become congested and public safety would become an issue as traffic lights and street lamps no longer function. Places with populations of impaired mobility, such as assisted living facilities, would have to evacuate if they do not have backup generators.

Participants listed several other potential impacts of the heat waves including: the economic impact of running cooling centers for 10 days, decreased productivity of manual laborers, people becoming agitated with temperature and lack of sleep, water supply issues caused by increased water use for cooling, some schools would not be in session, some parents would pull kids out of school, and the increased number of people spending more time outdoors could increase the frequency of West Nile virus cases. One group of residents thought that Area Nine would manage a heat wave better than other areas due to the tight knit community and amount of shade available. The Strawberry Hill/West Cambridge area would no longer have bus service since the buses serving this area are electrically operated.

*What would help the community adapt?* Though this was not the focus of this particular meeting, some participants proposed several actions to help the community prepare or adapt to the heat including: a coordinated volunteer outreach program to have neighbors check on each other, ask vulnerable populations to register in advance for assistance in case of heat emergencies, establish a communication system that is not reliant on electricity, install solar powered street lamps and provide solar powered cell phone charging stations, provide low income residents with aid for additional AC operation,

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establish partnerships with private buildings to provide more cooling centers, among others.

### *Scenario 2: Flooding Impacts*

Participants commented that the following groups would be vulnerable to flood impacts:

- People of impaired or limited mobility, especially those living in assisted living facilities.
- Low income families and individuals, especially those living in large apartment complexes or public housing.
- Non-English speaking community members
- Students who are unfamiliar with the area
- People without motorized transportation
- People without flood insurance

*How would people prepare for a flood?* Some participants anticipated how they might prepare for or react to the flood. Some would stock up on food and water or begin to store tap water in big pots if they knew a large storm was approaching. Others would move belongings to the second and third floors, if possible. Some would seek shelter at higher elevations in the city including the upper floors of MIT buildings, while others would evacuate the city prior to the storm. Still others said they may hear the warnings to evacuate, but stay to protect their home from looters.

*What impacts would occur during the storm or as floodwater rise?* Participants envisioned varying impacts on property during this time and noted that flood impacts would be more or less severe depending on whether or not the water came from the ocean or the river, or if it is highly contaminated with sewage, chemicals from labs or the MIT nuclear reactor, or fuel from gasoline tanks. They also thought that a flood during the winter months would be more devastating than a summer flood. Participants imagined water flooding basements and destroying heating systems, electrical systems, any emergency equipment stored there, and severely weakening structure foundations. Some anticipated electrical fires burning homes. Others anticipated that the plumbing in their homes would cease to function. Other anticipated damages during a storm and flood include: downed trees and power lines, roofs ripped off homes, and a loss of electricity.

*What post-flood impacts might occur?* Several participants anticipated the period after the flood would be more challenging than the flood itself due to the health, transportation, and economic impacts. Health impacts might include the lack of clean water, lack of access to food, spoiled food and medicine due to lack of electricity, spread of disease and especially disease transmitted by mosquitoes or rats that moved to higher ground, and illness associated with mold as it grows on the damp building materials. As for transportation, travel patterns would change depending on the flooded locations. Some people envisioned riding bikes or walking more due to flooded vehicles, while others did not. Many anticipated that public transportation would be limited or non-existent. Participants also noted that ambulances and other emergency vehicles may not be able to access the roads they need, including the central artery tunnels.

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*What would the economic impacts be?* The anticipated economic impacts of the flood included the high costs for repair or replacement of homes, businesses, or government buildings. Homeowners without flood insurance would have a particularly difficult time recovering. In areas of the city like Kendall Square, many businesses would shut down and lose productivity. After the flood, participants envisioned a housing shortage and sky rocketing rental prices. A few participants believed that large portions of the city would be uninhabitable again due to toxic contamination in the floodwaters.

*What neighborhood-specific impacts do people anticipate?* Participants in Cambridgeport and Strawberry Hill/West Cambridge noted several specific impacts in their neighborhoods. For example, Cambridgeport may have approximately 55,000 people living in the area given the MIT dorms, hotels along Memorial Drive, and homes in the area. Many of these individuals are members of vulnerable populations and most, if not all, would need shelter after a large flood event. In Strawberry Hill/West Cambridge, participants said Memorial Drive, Route 2, and the Mass Pike would be at risk. Additionally, people might seek refuge in Mt. Auburn Cemetery and Bunker Hill and resources at the Star Market or Fresh Pond Market.

*What would help the community to adapt?* Though this was not the focus of this particular meeting, some participants proposed actions to help the community prepare for or adapt to a flood. Ideas included the distribution of flood maps to raise awareness of where flooding is likely to occur and information about the potential impacts and how to prepare for them. Participants also suggested neighborhood drills, neighborhood resource banks for emergency situations, and neighborhood based volunteer disaster relief teams. Participants also suggested investment in stormwater storage systems on public lands and the implementation of zoning changes to ensure flood safe building practices and increased utilization of porous concrete.

To prepare residents for storm impacts in the days and hours before a storm, participants suggested the City announce when and where the storm and flooding might occur, and provide guidance on when to bunker down, when to evacuate, and the best routes to leave the city. Information about the composition of the floodwaters would be useful as early as possible, too.

As soon as possible after the flood, residents suggested clearly communicating the difference between 'Do Not Drink Water' and 'Sanitize Water First' orders, installing pumps on major roadways to remove water, and beginning to collect large debris items such as washer machines or other ruined appliances.

### **Next Steps**

Mr. Bolduc thanked everyone for their participation and described the next steps. The City will finish the technical analysis and vulnerability assessment, then convene a public meeting to present the outputs and collect citizen feedback. In the meantime, ongoing updates will be made through the website and email listserv and people are welcome to contact the city with specific questions at any time. In 2014, the city will request public participation in climate change preparedness and adaptation planning.

## APPENDIX A: Meeting Participants

### **Participants**

Beth Adams  
Michael Allen  
Erin Baldassari  
Brad Bellows  
Chris Beupere  
Carri Boiselle  
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Caitlin Bowler  
Katherine Bubriski  
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Dennis Carlone  
Mike Connolly  
Brian Conway  
Elaine Cope  
Peter Crawley  
Jill Crittenden  
Bill DeSimone  
Nina Dillon  
Gary Donytryk  
Alison Field-Juma  
Lauren Fisher  
Mike Ginieres  
Decia Goodwin  
John Gravelin  
John Hawkinson  
Sarah Hill  
George Mokray  
Nick Hambridge  
Joseph Hunt  
Claude Jacob  
Steve Kaiser  
Isabel Kaubisch  
Jeffrey Keilman  
Lori Kennedy  
Hoi Jung Kim  
Margaret Kurth  
Parvaneh Kossari  
P.E. Kutcher  
Liz Layton  
Craig Lee  
Stephen Lenkauskas  
Ed Lyman  
Doug MacDonald  
Sarah Mandlebaum  
Ellen Mass  
Maureen McCaffrey

Tina Miller  
Craig Kelly  
Jim Newman  
James Nelson  
Susan Pacheco  
John Pitkin  
Jill Pinsky  
Susan Redlich  
Susan Ringler  
Keren Schlomy  
Sam Seidel  
Carolyn Shipley  
Matthew Soule  
Sue Stafford  
Paul Tammaro  
Kurt Tramosch  
Andrew Vitvitsky  
Sally Watermulder  
Kathy Watkins  
Tim Weiskel  
Martha Wermen  
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Bill Wolff  
Fred Yen  
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Rick Niles, AMEC  
Owen O'Riordan, DPW  
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