RESILIENT MYSTIC COLLABORATIVE

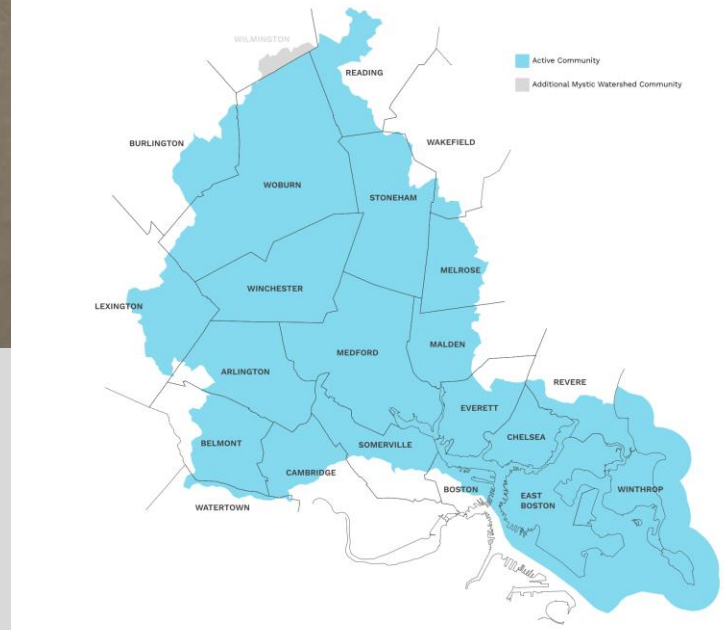
About Our Work Climate Data

21 communities. One watershed.

We partner on climate challenges no single municipality can solve alone

Learn More

Photo credit: Chris McIntosh

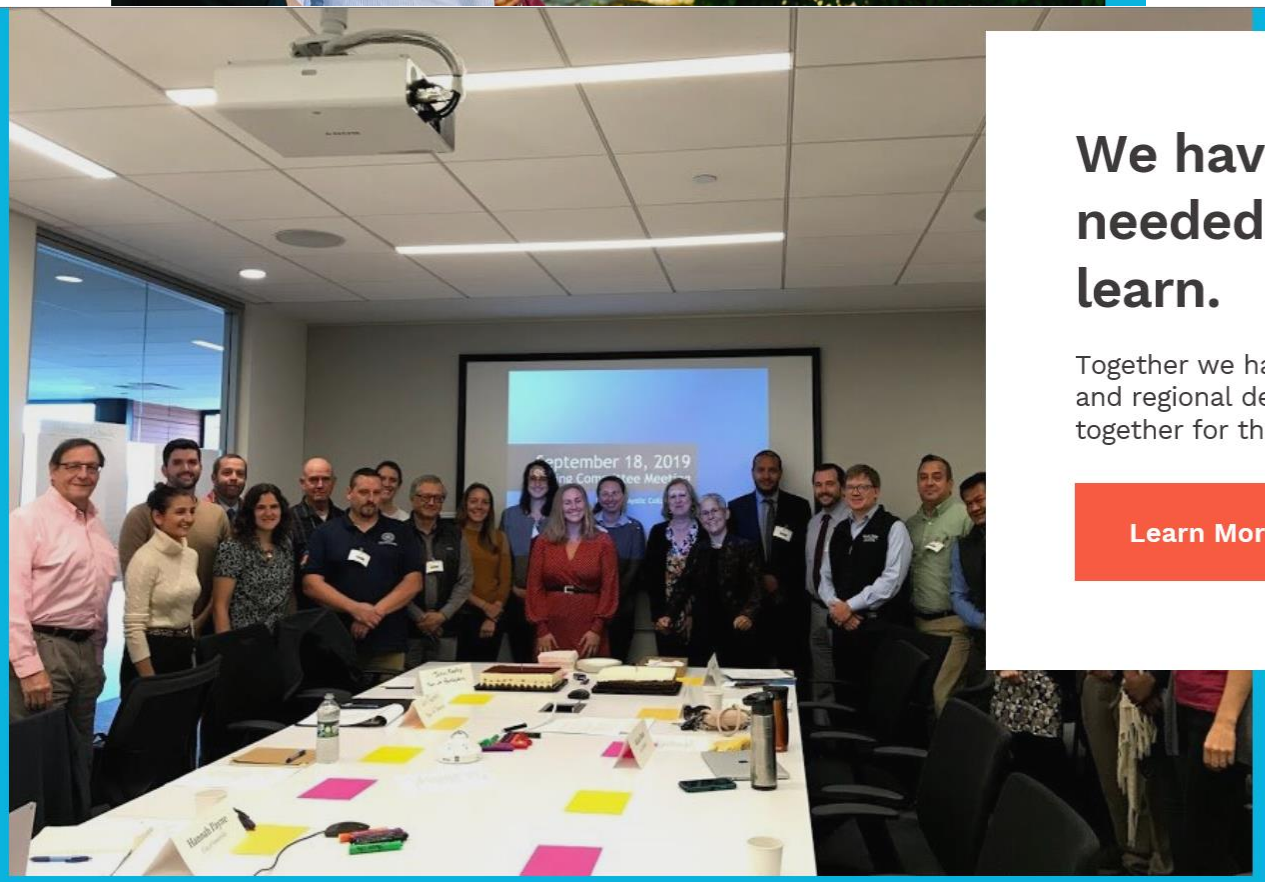


Katherine F. Watkins, PE
Assistant Commissioner / City Engineer
City of Cambridge, DPW

We are mutually supportive.

We share knowledge, resources, and a love of place. The 21 communities that make up the Mystic River Watershed together are the size of Brooklyn, NY. We come together to not come apart.

Learn More



We have the structure needed to succeed and learn.

Together we have crafted the vision, capacity, and regional decision-making needed to stay together for the long run.

Learn More

RMC supporting RMAT's effort to increase resiliency

Mia G. Mansfield
Director of Climate Adaptation and Resilience
MA Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900, Boston MA 02114
617-626-1162 (w) 857-338-4392 (c)
Via email: Mia.mansfield@mass.gov

September 9, 2020

Dear Ms. Mansfield,

Thank you for the opportunity to comment on the Resilient MA Action Team's Climate Resilience Design Standards & Guidelines project. We are commenting as senior agency staff from among the 20 municipalities that comprise the Resilient Mystic Collaborative (RMC). The RMC is a voluntary partnership among cities and towns within Greater Boston's Mystic River Watershed. We work on regional climate preparedness projects and policies that no one community can undertake alone. Mass EOEEA's climate resilience efforts—including the MVP grants program, and now RMAT—are essential to our success.

General comments
We very much support RMAT's efforts to increase resiliency throughout the state and provide clear guidance to be used for state infrastructure and grant funded projects. This is a critical undertaking and we applaud both your efforts and your progress. Having clear guidance for project designers is critical to getting climate change incorporated into projects early and consistently.

We also strongly encourage you to ensure that the final tool provides clear, straightforward guidance and information without becoming too much of a black box. It's important to clarify (and keep updated) the best available climate projections, and separately apply criticality and/or risk factors to recognize the relative socioeconomic cost of a structure being damaged. Ultimately, it should be clear to project developers and managers what external environmental conditions (flooding, wind, heat) will cause their project to fail or require retrofits, and approximately when they should begin to expect such conditions.

Note: as climate change accelerates, our ability to project future conditions throughout the lifespan of projects will worsen. Our standards and guidelines will need to move from its current framework of "predict and prevent" to something more adaptive. As you work to establish these initial guidelines and any subsequent regulations, please take advantage of the wealth of academic and practitioner expertise in this region to develop a next-generation framework based on adaptive management (not that we know what that looks like right now, either!).

Sincerely,

Kathy Watkins, PE
City Engineer, Cambridge

John Lysey, PE
Town Engineer, Lexington

Alicia Hunt
Director Energy & Environment, Medford

Oliver Sellers-Garcia
Director Sustainability and Env., Somerville

Jay Corey, PE
City Engineer, Woburn

Emily Sullivan,
Environmental Planner, Arlington

Yem Lip, PE
City Engineer, Malden

Alexander Rozycki, PE
Senior Civil Engineer, Reading

Gregory M. St. Louis, PE
ED Public Works & Engineering, Everett

Alexander Train
Director Housing and Comm. Dev., Chelsea

RMC supporting DEP's effort to increase resiliency

Kathy Baskin
Assistant Commissioner, Bureau of Water Resources
Massachusetts DEP
1 Winter St, Boston, MA 02108

Re: Stormwater Advisory Committee

April 2, 2020

Dear Assistant Commissioner Baskin,

Thank you for the opportunity to contribute to discussions on updating rainfall data in the Stormwater Handbook to represent current and future projections. In order to contribute to this process, engineers from ten municipalities (Arlington, Cambridge, Chelsea, Everett, Lexington, Malden, Medford, Melrose, Winchester, and Woburn) participating in the Resilient Mystic Collaborative have developed recommendations to improve state data and policies. Recommendations are summarized below.

1. **MassDEP needs to develop statewide downscaled rainfall projections based on global climate models.** We strongly support Mass DEP's efforts to develop statewide downscaled future projections of extreme precipitation based on global climate models. This would be the best science to use for stormwater management and modelling efforts.

2. **Until statewide downscaled rainfall projections can be completed, using the upper bound of NOAA 14 90% confidence interval could be used as a proxy for 2070 rainfall projections. Using 90% of the upper bound of NOAA 14 90% confidence interval could be used as a proxy for 2030 rainfall projections.** Mass DEP staff have floated using 90% of the upper bound of NOAA Atlas 14 (NOAA14) 90% confidence interval values as a "safety factor" to take into account climate change-enhanced rainfall intensity.

Working with climate scientist Dr. Katharine Hayhoe, Cambridge has completed a downscale model.[1] Figure 1 and Table 1 compare downscaled precipitation projections (in inches) with TP-40, NOAA14 and other measures of rainfall intensity.

Sincerely,

Kathy Watkins, PE
City Engineer, Cambridge

John Lysey, PE
Town Engineer, Lexington

Tim McGivern, PE
City Engineer, Medford

Beth Rudolph, PE
Town Engineer, Winchester

Jay Corey, PE
City Engineer, Woburn

Wayne Chouinard, PE
Town Engineer, Arlington

Yem Lip, PE
City Engineer, Malden

Elena Proakis Ellis, PE
City Engineer/Ass't DPW Director, Melrose

Gregory M. St. Louis, PE
ED Public Works & Engineering, Everett

Louis V. Mammolette, PE
DPW Deputy Comm./City Engineer, Chelsea

William J. Renault, Jr., PE
Town Engineer, Wakefield

Beth Rudolph, Town Engineer, Winchester

Winchester supports the proposed change, and has been officially **requiring applicants to use the Cornell rainfall data** since the FEMA maps became effective in June 2010.

Flooding is occurring now and is increasing

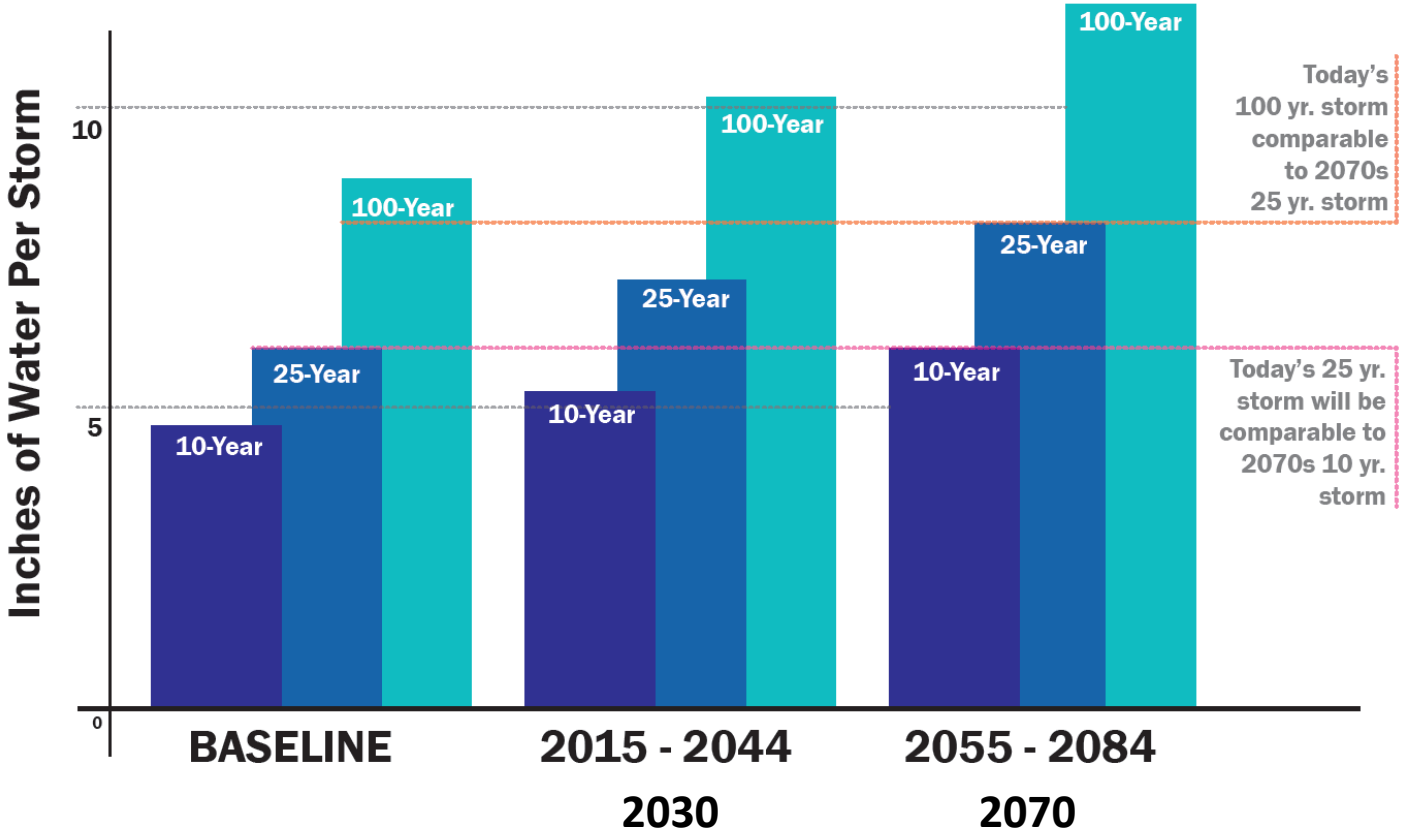

Cambridge

Somerville


Winchester

Future Projections: Increasing Rates of Precipitation & Frequency of Larger Storms

Climate scientist Dr. Katharine Hayhoe completed a downscale model for Cambridge.
2030 and 2070 Projections. Advocate for statewide downscale model.



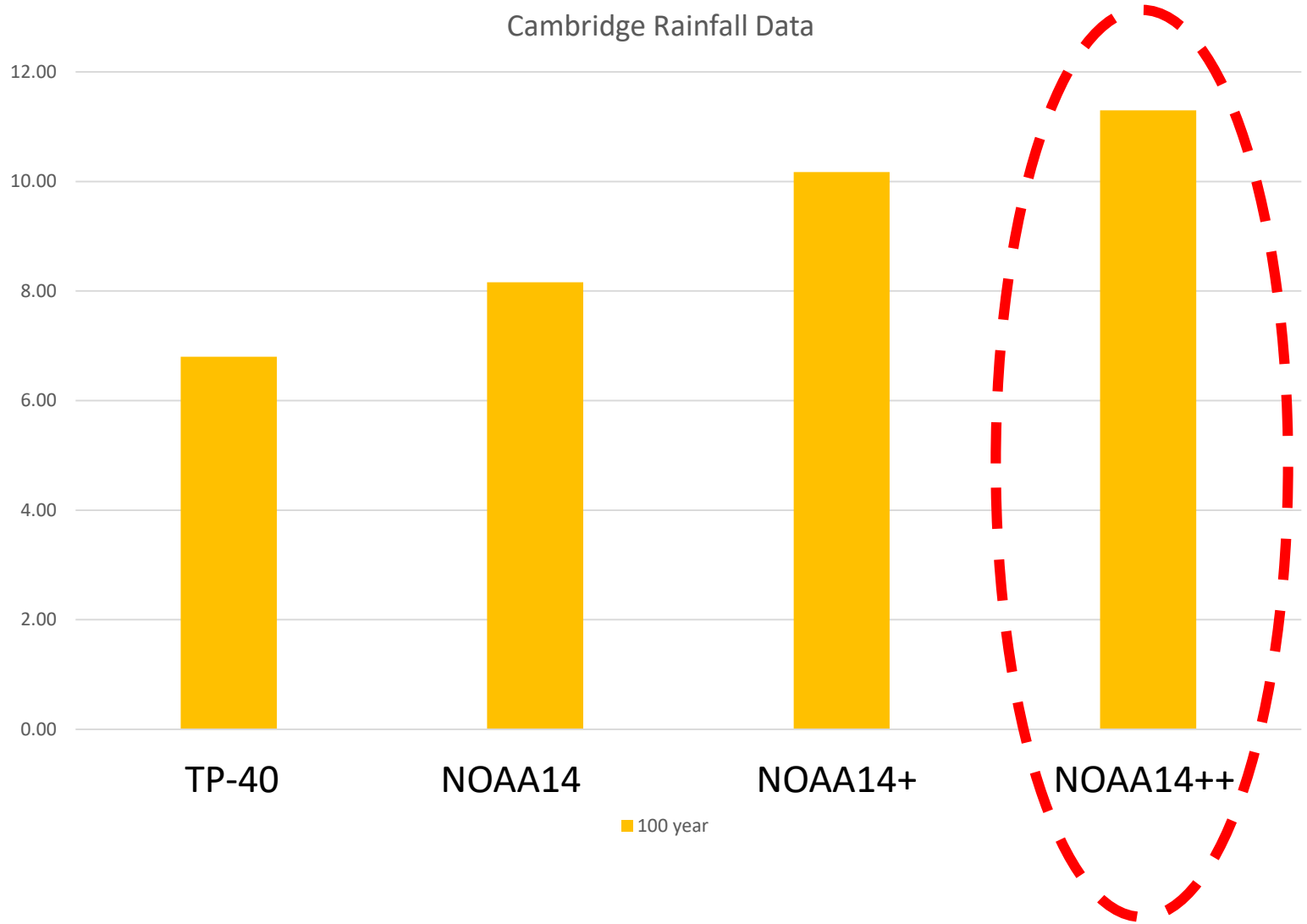
Greg St. Louis, Executive Director Public Works, Everett

The Commonwealth needs to **protect its constituents** from these effects by providing more accurate criterion for permitting agencies to uphold and for designers to adhere to; **so that tax payers do not bear the burden of resultant flooding.**

Source: Kleinfelder based on ATMOS projections (November 2015)

Recommend Full NOAA 90%ile

Go beyond NOAA Atlas 14+ to NOAA14++. Based on current data but provides increased level of protection and factor of safety.

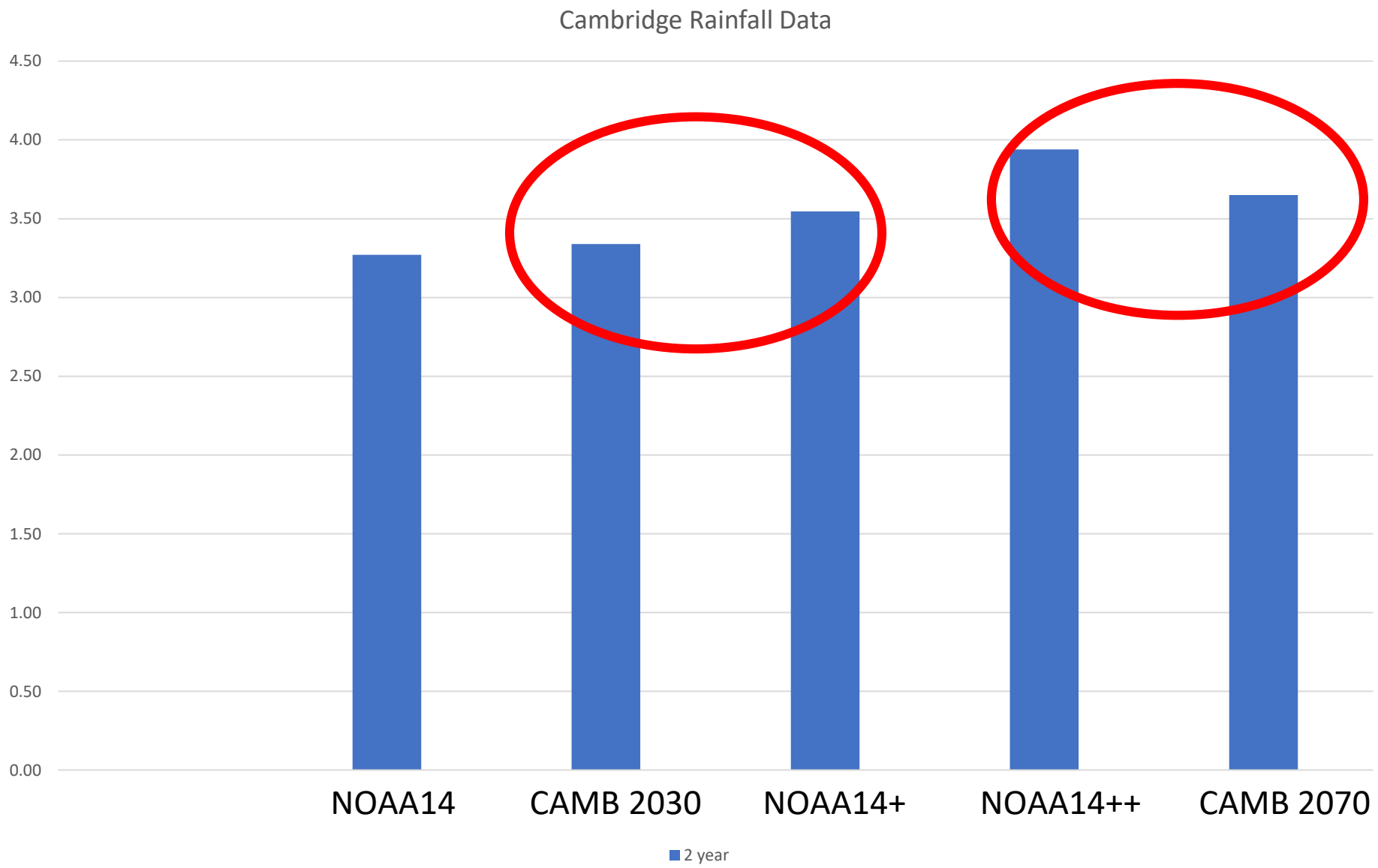


NOAA14
mid-range of 90% Confidence Interval

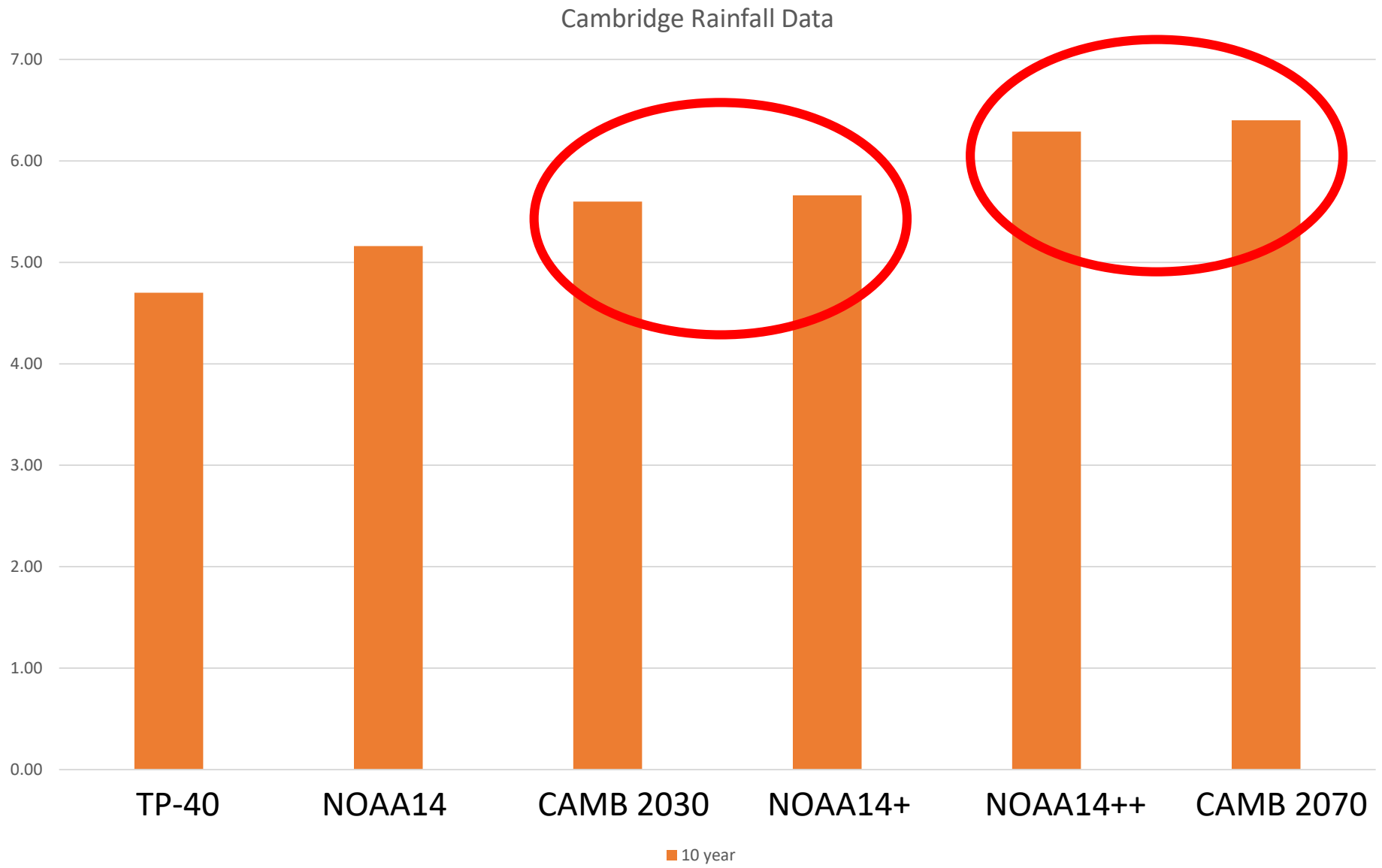
NOAA14+
90% of Upper Bound of 90%ile Confidence Interval

NOAA14++
Upper Bound of 90%ile Confidence Interval

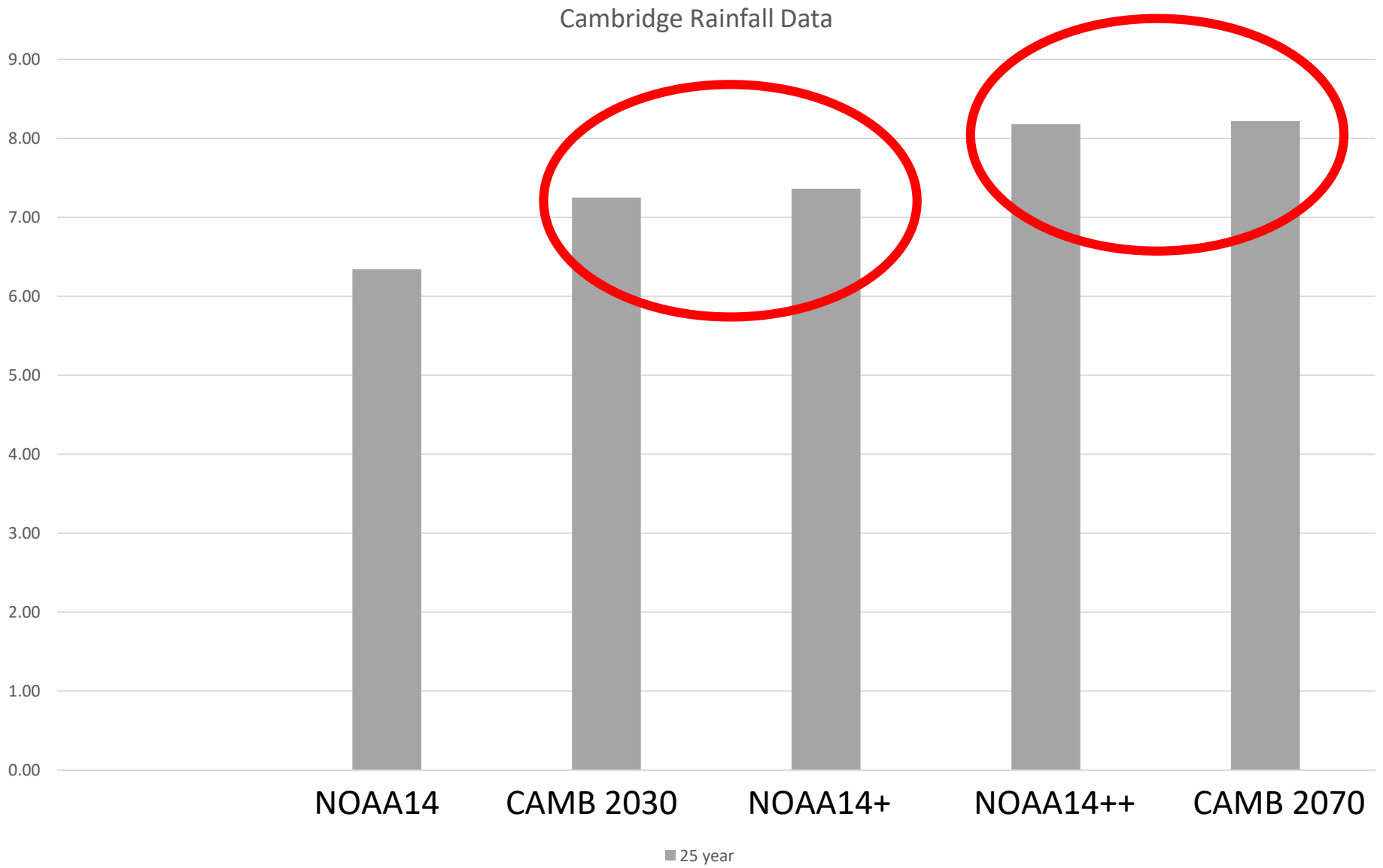
Cambridge Specific Data – 2 Year Storm



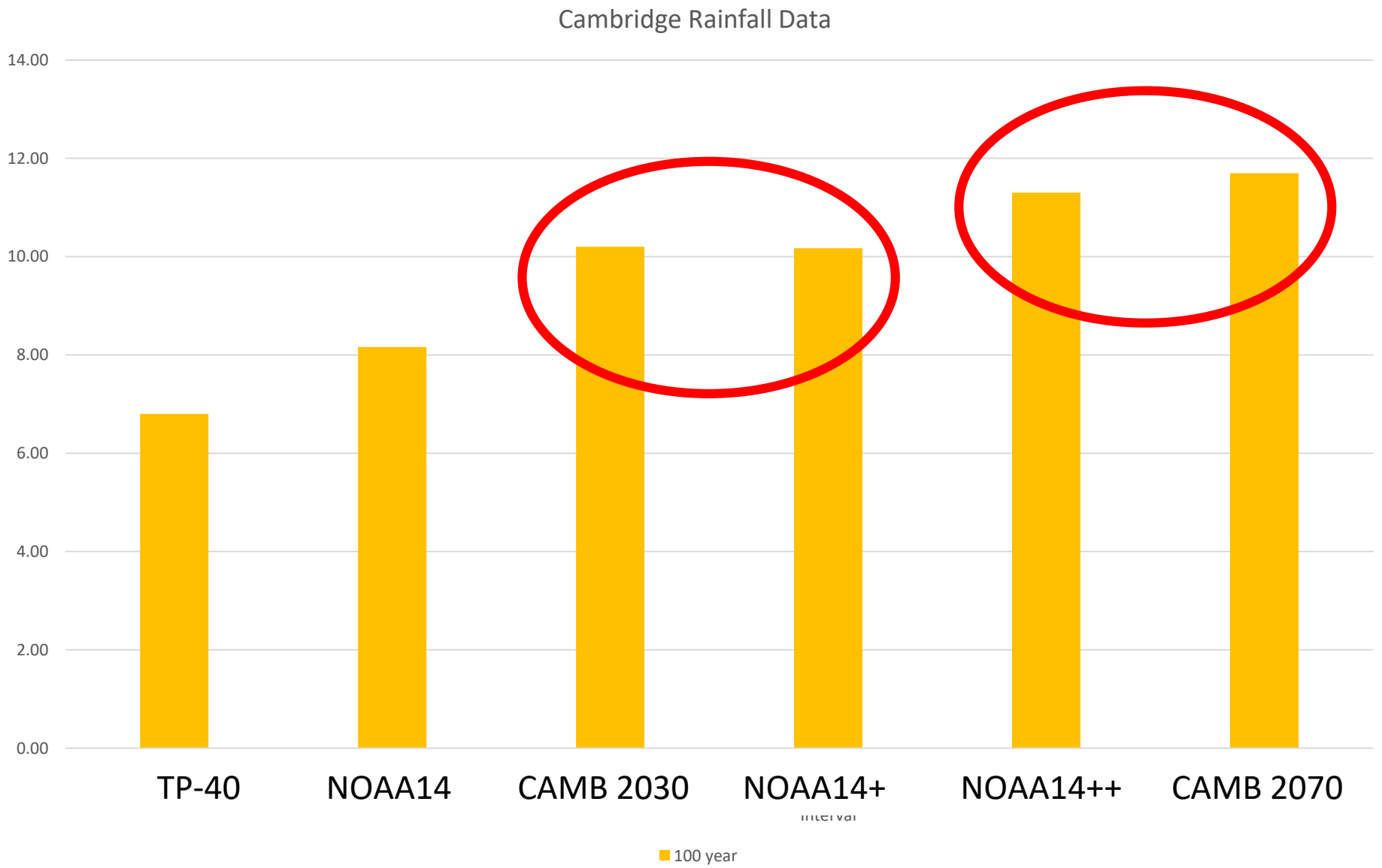
Cambridge Specific Data – 10 Year Storm



Cambridge Specific Data – 25 Year Storm



Cambridge Specific Data – 100 Year Storm



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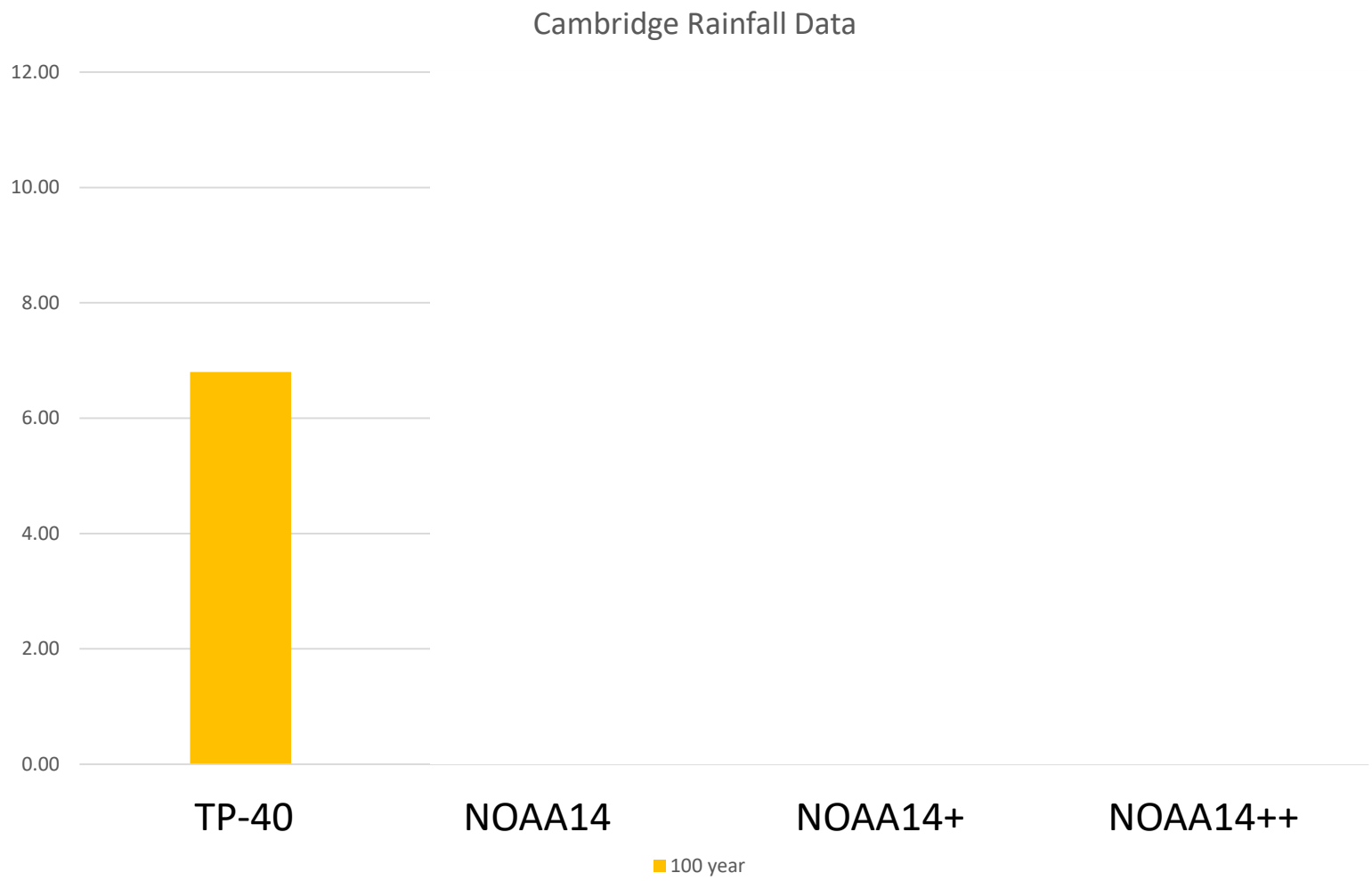

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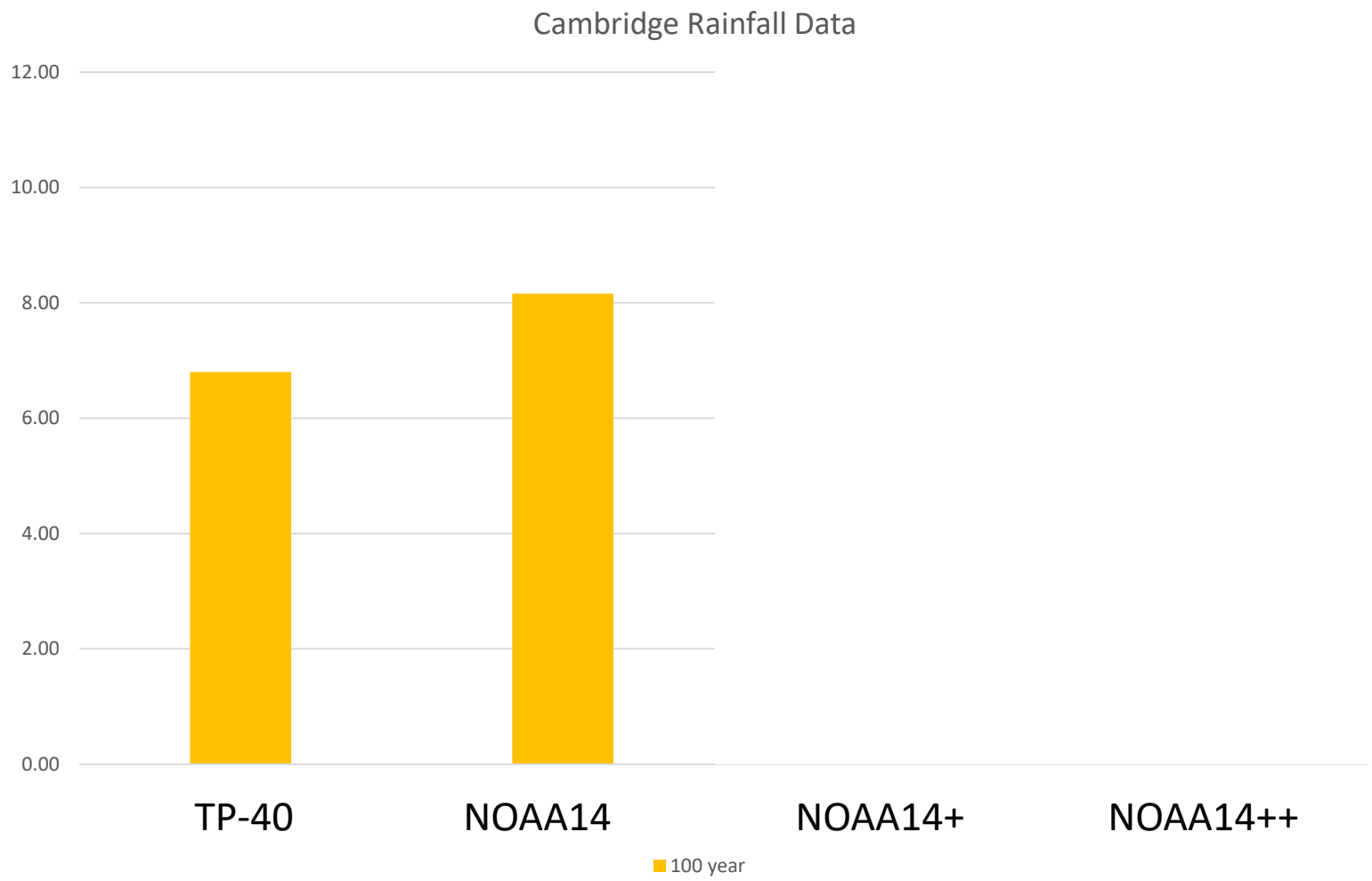

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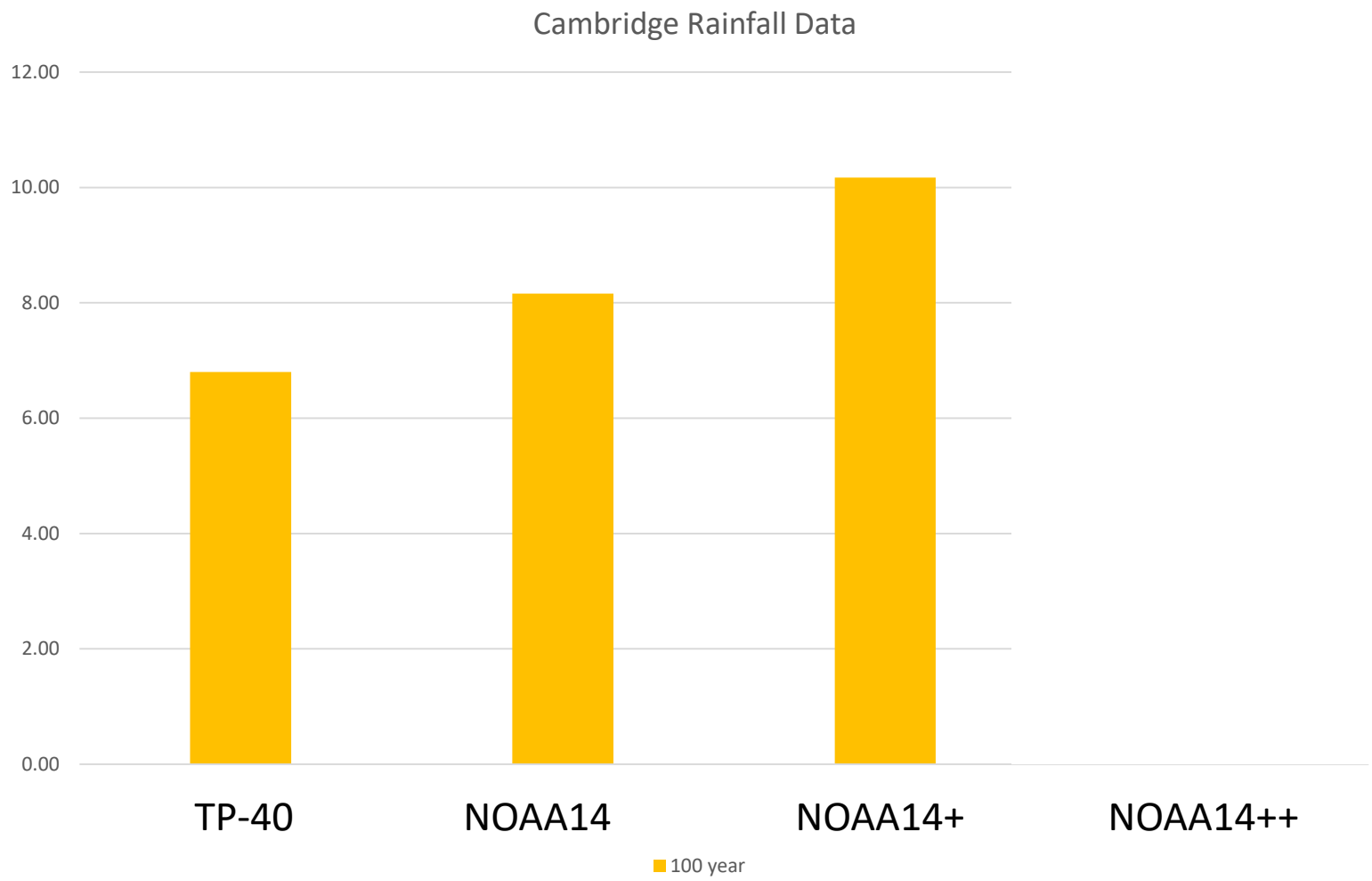

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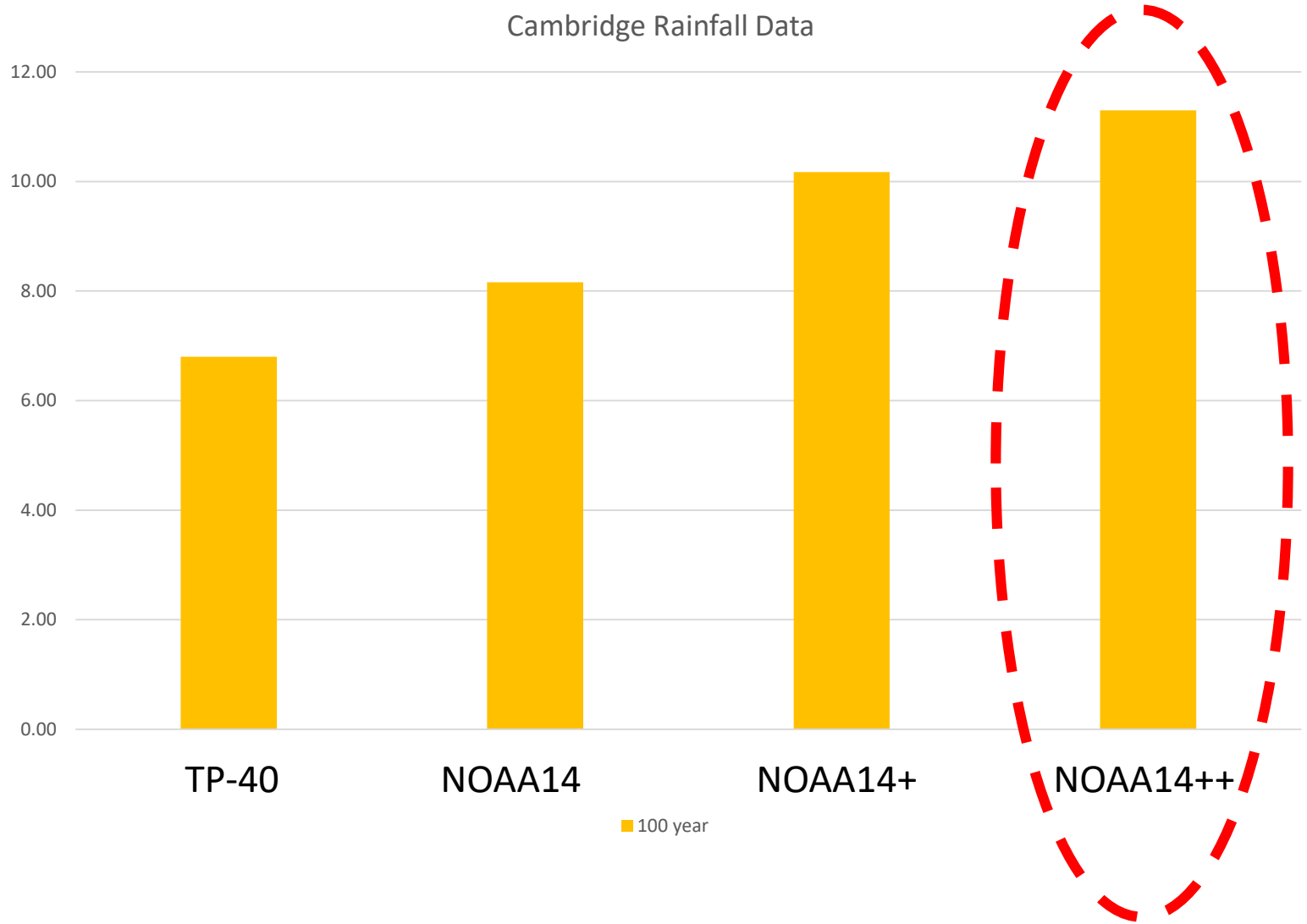


John Livsey, Town Engineer, Lexington

It is **past due and prudent for the state as well as the municipalities to lead the way** and require that designs not only are proper for our current realities but will also **accommodate the projected future rainfalls.**

To have **consistency throughout Massachusetts** as well designs meeting realistic projected futures instead of storms of the distant past we will be working toward making the **infrastructure much more sustainable and resilient**.

What are we doing with this information?

Engaging with regional efforts.

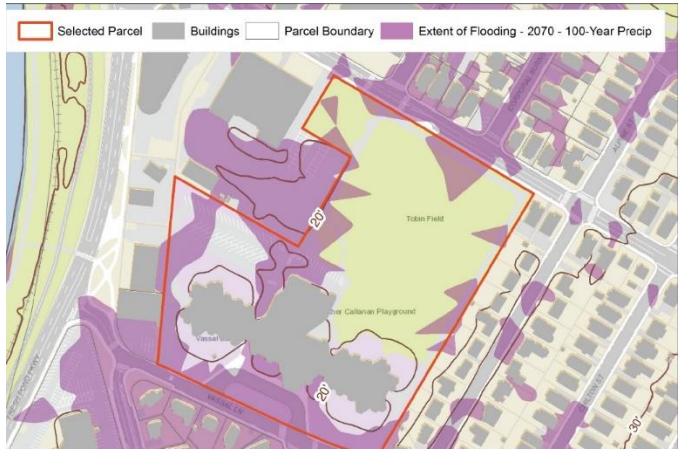
Modifying designs for city infrastructure.

Update development standards and regulations. Individual communities cannot reduce flood risk alone, so these state efforts are critical.

Source: Kyle Klein, City of Cambridge

Flood Protection Guidance – Beyond FEMA

Cambridge FloodViewer provides accessible flood extent & elevation data (Precip & SLR/SS)



Cambridge Design Flood Elevation Guidance

- Build/protect to 2070 10% annual risk
- Recover from 2070 1% annual risk

Address: 197 Vassal Ln
Map-Lot: 260-80

FloodViewer City of Cambridge, MA

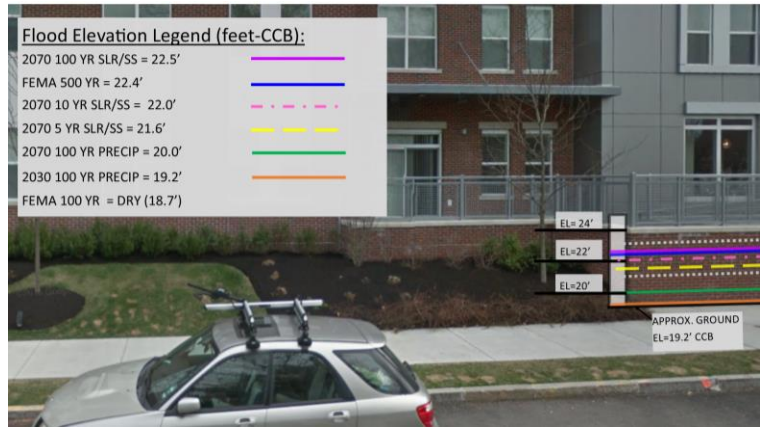
(Elevations in ft-CCB[1]) **Flood Elevation Data**

Minimum Ground Elevation:	16.9
Maximum Ground Elevation:	28.6
2070 100-Year SLR/SS Flooding:	22.5
2070 100-Year Precipitation Flooding:	24.1
2070 10-Year SLR/SS Flooding:	22.1
2070 10-Year Precipitation Flooding:	22.6
2030 100-Year Precipitation Flooding:	23.9
2030 10-Year Precipitation Flooding:	22.2
Present Day 100-Year Precipitation Flooding:	23.5
Present Day 10-Year Precipitation Flooding:	21.9
FEMA 100-year Flood Elevation:	N/A
FEMA 500-year Flood Elevation:	22.4

The Flood Viewer has been developed as an informational tool for the Cambridge community to assess climate change threats from flooding and to prepare for it by implementing specific strategies.

Use this tool to help understand the risk of flooding to your property and how to protect against it.

Learn more at: CambridgeMA.gov/FloodViewer



Flood Protection Guidance

Cambridge Design Flood Elevation Guidance

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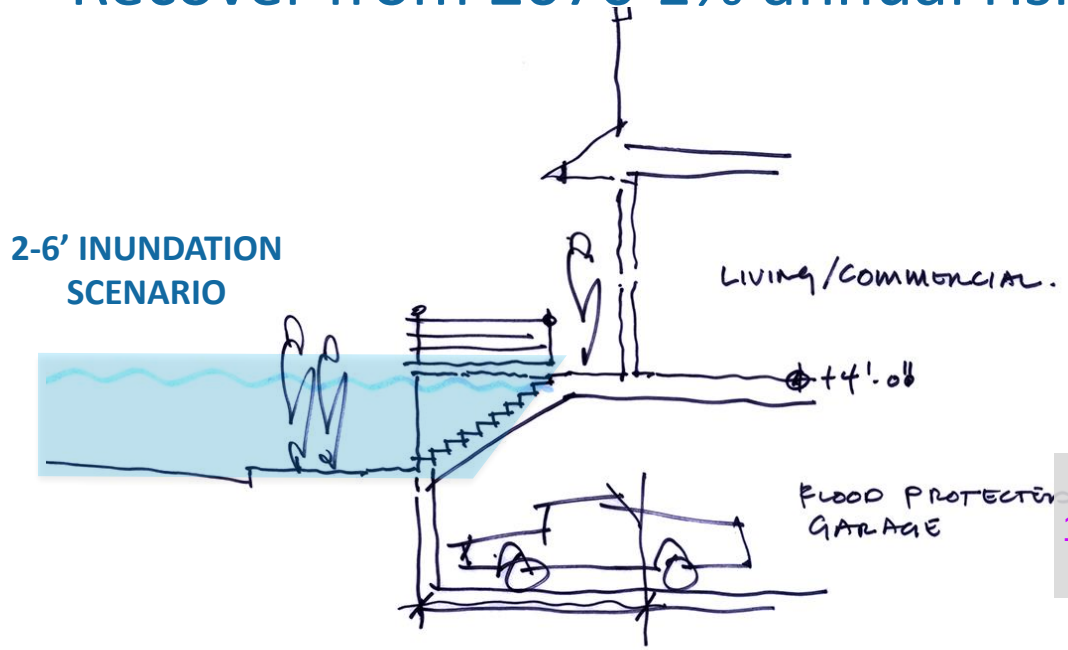
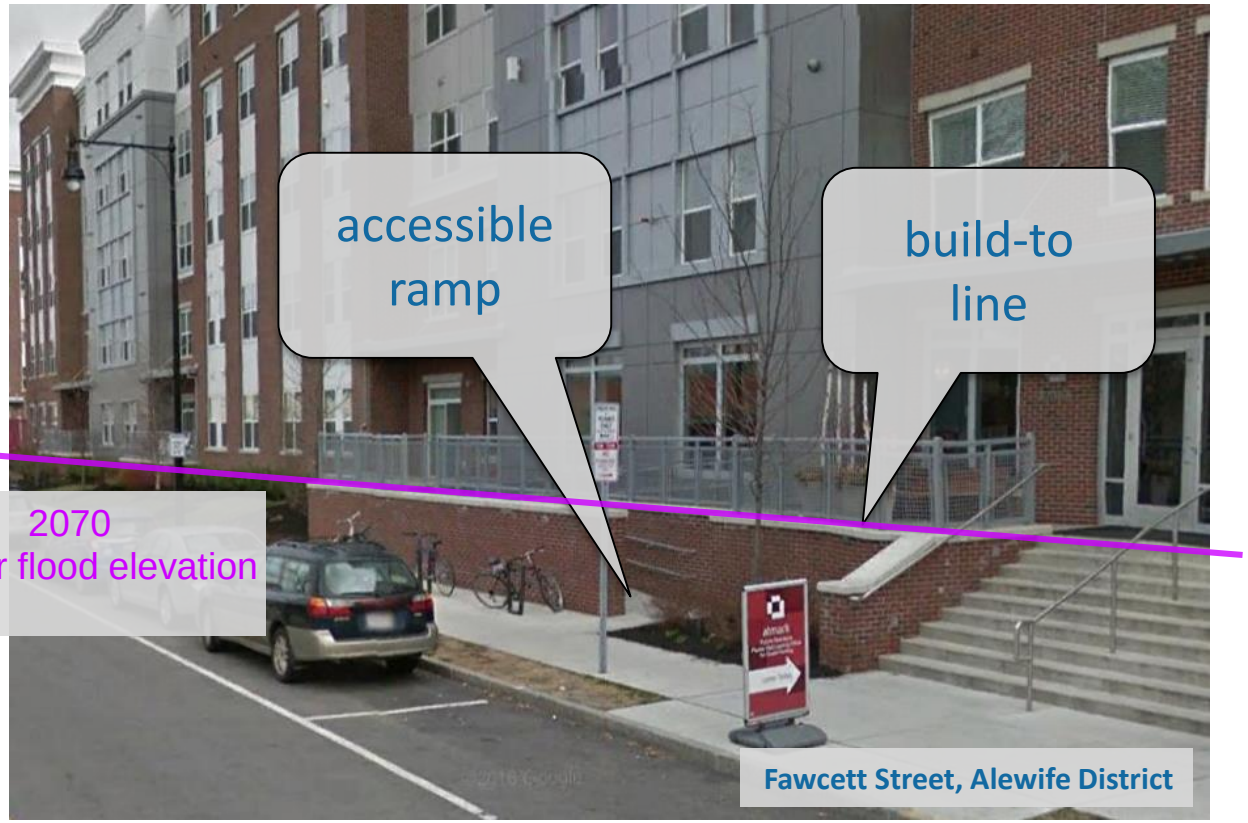




Stormwater Management – What and How?

Conservation Commission

Cambridge – NOAA Atlas 14, minimally

Lexington – Cornell

Winchester – Cornell

Stormwater Control Permit:

Projects before Planning Board and City Engineer Discretion. 2030 precip – going towards 2070 precip. Strong support from community.

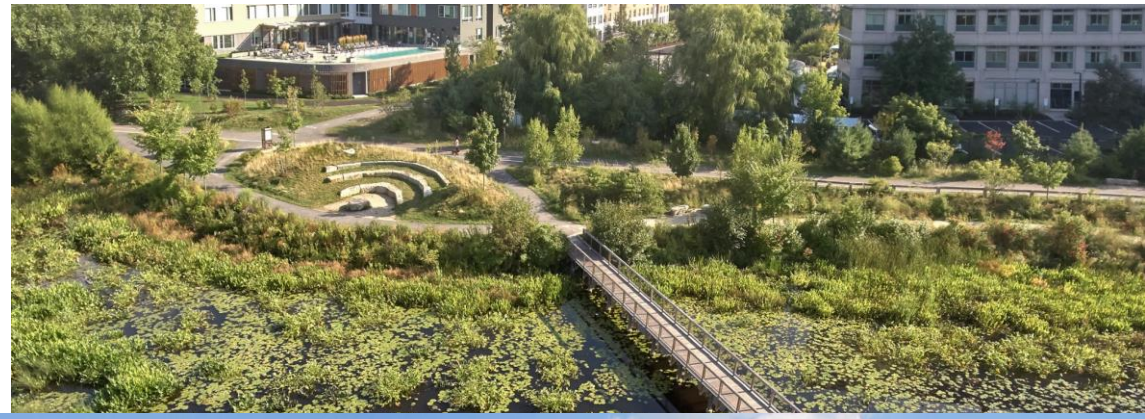
Building Permit Pre-Review – all major renovations and basement additions (requirements match scale of project).

Next Steps

Update zoning and stormwater regulations.

Managing Stormwater

Managing Stormwater in Dense Environments



Managing Stormwater in Dense Environments

- *Cambridge Crossing Commons*

Managing Stormwater in Dense Environments

- *Moulton Street Parking Lot, VHB Consultants.*
- *One Broadway Landscaping area, VHB Consultants.*
- *Longfellow Road Open Space, City of Cambridge.*

Managing Stormwater in Dense Environments

- *Mass + Main Development / Under Parking Lot & Walkway*
- *Source: VHB Consultants*

Managing Stormwater in Dense Environments

- *City of Cambridge 400,000 gallon stormwater tank*
- *Source: Kleinfelder + Stantec Consultants*

Environmental Investment Makes $$ Sense

MOODY'S
INVESTORS SERVICE

ESG considerations

Environmental

The city is committed to addressing environmental risk associated with flooding and heat exposure. To date, the most comprehensive mitigation projects include improving natural barriers around the Alewife neighborhood as well as heat mitigation efforts through its urban canopy-public shade tree investment program. Longer term the city expects to release its Climate Change Preparedness and Resilience Plan in 2020 that includes net zero action plan for government, residential and commercial development.

S&P Global
Ratings

We believe Cambridge's greatest credit risks are threats to its vibrant and growing economy. In particular, rising sea levels from climate change could directly affect taxable properties. The city has a history of proactively addressing future challenges, and, to this end, management maintains a number of long-term plans that generate shorter term decision-making.

The city is currently developing a "Climate Change Preparedness & Resilience (CCPR) Plan," described by management as its blueprint for reducing greenhouse gas emissions and addressing flood risk and storm water management. Management expects to complete this plan in the spring of 2020. In addition, Cambridge conducted a "Climate Change Vulnerability Assessment" to identify its specific vulnerabilities and inform the CCPR. Finally, the city has also undertaken efforts to reduce residential trash disposal, plant and maintain new trees throughout the city, and expand curbside organics collection.

RMC strongly supports state efforts to update standards & improve resiliency

2010 Cambridge

2010 Somerville

2018 Winchester