



April 26, 2021

Lisa Rhodes
Wetlands Program Chief
Massachusetts Department of Environmental Protection HQ
1 Winter Street
Boston, MA 02050

Re: Homebuilders & Remodelers Association of Massachusetts (HBRAMA) Comments on Proposed Changes for Massachusetts Stormwater Handbook and Massachusetts Stormwater Regulations

Dear Ms. Rhodes:

The Homebuilders & Remodelers Association of Massachusetts (HBRAMA) expresses our gratitude for allowing Guy Webb and myself to represent our association on the Stormwater Advisory Committee and to offer comments and questions at each of the meetings and through this summary letter. Although we have serious issues with this process as noted below, we believe and appreciate that MassDEP does, indeed, want to involve various stakeholders and it is our sincere hope that all of this effort provides comments that MassDEP will truly entertain and strongly consider.

As a summary, HBRAMA offers the following:

1. It is my personal opinion that the Stormwater Advisory Committee has been of little use to MassDEP and that this process has been a significant waste of time for a large group of very busy people possibly due to the time limitation, the structure of the meetings, and the clear objective from the facilitator and MassDEP that the group is simply a receiver of information, for feedback only, on previously drafted planned proposals. The Committee should be renamed the Stormwater Advisory Sounding Board.
2. We strongly oppose any changes to the present exemption of 1-4 residential lots or changing the requirements for maximum feasible compliance for 5-9 residential lots.
3. We concur with MassDEP in the concept of updating the precipitation rates to NOAA Atlas 14 but we do not agree with the unscientific future projections of using the Monte Carlo method, 90% confidence level of the higher value what has been termed NOAA Atlas 14 PLUS.
4. We join NAIOP, DCR, and MassDOT in our belief that the proposed changes do not align with EPA MS4 (MS4). This is one of the few stated goals for the changes proposed and remains unmet. We do not agree with the changes proposed to Standard 3: Recharge especially eliminating the differing rates for differing soil classifications. This change will have the effect of eliminating Standard 4: Water Quality Treatment. We note that NAIOP, DCR, and MassDOT have similar comments on recharge and water quality. We also have concerns on other issues related to this re-alignment including maintenance, off-site mitigation, and TMDL.

5. Costs: We oppose the entire concept of substantially increasing the size of stormwater management facilities to accommodate NOAA Atlas 14 or NOAA Atlas 14 PLUS and the corresponding massive costs projected by the consultant to MassDEP through only one similar hypothetical example. Housing costs in the Commonwealth are already just about the highest in the nation and adding \$18,500 (and probably more) to the cost of a single home due to these regulatory changes is absolutely ridiculous and is certainly not in the interests of solving the housing problem as often expressed by the Governor, the Lt. Governor, most of the legislators and virtually everyone involved in maintaining a thriving state economy.

The following discussion provides more detail on the summary comments above, concurrently enumerated.

1. Those of us that were members of the previous MassDEP Stormwater Committees, especially during the preparation of the Stormwater Handbook, note that this process is quite different and we are not “part of the process” for developing the proposals but merely sounding boards. Perhaps this is due to the structure required from the Covid 19 pandemic with fully Remote Meetings via computer but it should be noted that there are probably quite a lot of unmade comments and effort left out.
2. MassDEP did not present anything on changing a key factor in the development of small housing projects (1-9 lots) that often have conditions which severely limit or restrict the designer’s ability to comply with the Stormwater Standards. These small projects were singled out in the development of the original Stormwater Handbook and specifically allowed exemptions in Volume 1, Chapter 1 on pages 2 and 3. These are small land development projects with four or fewer lots allowed as fully exempt and five to nine lots meeting maximum feasible compliance criteria. I note that we had no discussion at all on this issue by MassDEP within these meetings and for the subject matter itself. This was only discussed for seconds in my inquiry from a written notation with a suggestion to provide any comments on this in writing. Well – here they are. HBRAMA screams and objects, as loudly as it can, that these provisos should not be revised. I have checked with other engineers and contrary to the answer to my question, these conditions are indeed used in the field at the local level though maybe not brought to the level of MassDEP through appeals.
3. Precipitation Projections:

It is understandable that MassDEP is joining others in re-assessing the precipitation rates used in the design of stormwater systems since the rates utilized are over 60 years old. As we know, any changes in the precipitation rates will directly and proportionately impact the runoff rates. As suggested by Tom Maguire, I have done my own research and read and/or perused several studies including these below:

- a. NOAA Atlas 14 Precipitation-Frequency Atlas of the United States Volume 10 Version 3.0: Northeastern States Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, Vermont Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Deborah Martin, Orlan Wilhite, U.S. Department of Commerce National Oceanic and Atmospheric Administration National Weather Service Silver Spring Maryland 2015 revised 2019
- b. Changes in precipitation with climate change Kevin E. Trenberth* National Center for Atmospheric Research, Box 3000, Boulder, Colorado 80307, USA, published March 31, 2011
- c. Easterling, D.R., K.E. Kunkel, J.R. Arnold, T. Knutson, A.N. LeGrande, L.R. Leung, R.S. Vose, D.E. Waliser, and M.F. Wehner, 2017: Precipitation change in the United States. In: Climate Science Special Report: Fourth National Climate Assessment, Volume I [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 207-230, doi: 10.7930/J0H993CC.
- d. Changes in Extreme Precipitation in the Northeast United States: 1979–2014 MACY E. HOWARTH, CHRISTOPHER D. THORNCROFT, AND LANCE F. BOSART Department of Atmospheric and Environmental Sciences, University at Albany, State University of New York, Albany, New York (Manuscript received 25 July 2018, in final form 7 January 2019), published April, 2019, p.673.

- e. National Weather Service, NOAA Atlas 14 Precipitation Frequency Atlas of the United States Power Point Presentation, Presenter: Michael St. Laurent (date?)

The bottom line is that I concur that the precipitation rates need to be updated and should be based on the tremendous research done by the U.S. Department of Commerce, National Weather Service by the National Oceanic Atmospheric Administration in their NOAA Atlas 14 Precipitation-Frequency Atlas of the United States Volume 10 Version 3.0: Northeastern States Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, Vermont (NOAA Atlas 14). As you are presumably aware, NOAA 14 updates began in 2004 with the approach developed in the 1990's and will eventually include all of the US states (50) and Puerto Rico once the last 5 states are completed in Volume 12. Massachusetts is in Volume 10 completed in 2015.

NOAA Atlas 14, Volume 10 for the northeastern US (New England & New York) was scientifically developed by the Hydrometeorological Design Studies Center within the Office of Water Prediction of the National Oceanic and Atmospheric Administration's National Weather Service using 7,629 stations with analysis performed over no less than 70 years of data. Conversely, NOAA Atlas 14 PLUS is completely unscientific and the concept is "pulled out of the air" using the Monte-Carlo statistical method. If MassDEP does continue to propose NOAA Atlas 14 PLUS then a proper peer review should be performed with results presented to the Stormwater Advisory Committee prior to regulatory changes. We also suggest changes to the regulations that will limit or minimize any unwarranted and undesirable potential side effects of increasing stormwater conveyancing systems caused by the use of NOAA Atlas 14 or especially NOAA Atlas 14 PLUS (this issue of conveyances will be discussed again below).

NOAA Atlas 14 recognizes that errors may be inclusive in their results from i) record length, ii) missing data, iii) quality control of the data, and iv) spatial coverage of the data. Further, uncertainty is inherent in the results due to i) distribution fitting, ii) optimization & consistency checks, iii) regionalization, and iv) interpolation. So, in the near future NOAA intends to expand from the Stationary Atlas 14 method and replace it with non-stationary approach that can "efficiently translate future climate scenarios"¹. Further, the upgrades and updates to NOAA 14 are proposed to be updated on a regular cycle (10 PLUS years) with more stations and with longer records using modern methods, as well as other improvements. In this way, future changes are "baked" in to NOAA Atlas 14. Thus, this is one major reason that NOAA Atlas 14 PLUS is not needed (see below), it is intended and expected to change and adapt to future conditions.

- A. First, HBRAMA accepts NOAA Atlas 14 for updated precipitation rates to be used in the Commonwealth.
- B. However, **HBRAMA does not support NOAA Atlas 14 PLUS.**
- C. My initial comments on the precipitation change to the NOAA Atlas 14 PLUS was outlined, in detail, in my email of November 18, 2020, which is presently available for review on the SAC website. In particular, I questioned the trend line plotted by Tom Maguire by i) analyzing the Nantucket Station and accounting for the gaps in data and ii) using something like the 85th percentile to eliminate the outliers which produces a substantially different trend line.
- D. The mean standard deviation of the provided data on the provided Massachusetts precipitation over Time Chart with 13 stations equates to 7.68 - which is over 33% - suggesting that establishing a trend

¹ National Weather Service, NOAA Atlas 14 Precipitation Frequency Atlas of the United States Power Point Presentation, Presenter: Michael St. Laurent (date?)

line for use in creating specific regulatory policies for projections into the future is not scientifically accurate. This requires peer review.

- E. MassDEP's concern regarding the future changes in precipitation due to the effect of climate changes are indeed being considered and addressed by NOAA. In fact, the current Atlas 14 approach, developed in 1990s is based on assumptions that extreme precipitation characteristics do not change in time. NOAA is already planning future changes to the NOAA Atlas 14 method which will be replaced with a non-stationary approach that can efficiently translate future climate scenarios into a product useful for NOAA Atlas 14, amongst other changes. In essence, there is clearly no need for the PLUS since NOAA is already addressing future changes.
- F. Effect of larger peak flow rates: The change in precipitation, whether it be NOAA Atlas 14 or NOAA Atlas 14 PLUS will impact hydrology and hydraulics of proposed stormwater systems. It is important that we understand the impacts that these changes will cause so as to properly consider the impacts, environmentally and fiscally.

1) In brief, there are 3 significantly differing types of effects that larger peak flows will cause.

- a. Culvert flow – culvert flow is most often impacted by inlet or outlet controls. Inlet control backs up the runoff and has the potential to cause major roadway erosion and cave-ins if the culvert is undersized and flow is forced to overtop the roadway and cause scouring. This was the concern mentioned by Vandana Rao of the Office of the Environmental Secretary and also stated by MassDEP as the main reason to review the peak flow rates. I concur that these storm related failures are of serious concern. The increases in peak flow rates will help to properly size culverts. However, with the “stream crossing standards” currently utilized, most new culverts are already being oversized to accommodate wildlife. The hundreds of thousands of existing culverts in Massachusetts will certainly be taxed by larger flows but this is primarily an existing problem in-the-field and will not be significantly altered by increasing theoretical design rates of flow. So, in summary, higher peak rates caused by NOAA Atlas 14 or NOAA Atlas 14 PLUS will generally not be an issue for new culvert designs.
- b. Stormwater Management Facilities: Stormwater management facilities are designed to pass various storm frequencies. Orifices, weirs, or other devices are used at differing elevations to allow outflow at prescribed modeled conditions. Larger peak flows can readily be accommodated in the design. Since both pre and post development rates of runoff will be proportionately increased, there will be changes but they should be proportional or if impacted, then slight modifications are to be expected most of the time. So, for controlling the peak flows the changes provided by NOAA Atlas 14 and NOAA Atlas 14 PLUS are expected to be minimal.

However, recharge requirements will have an impact on the sizing of these facilities that are designed to recharge and these may be very significant. This was shown true on the hypothetical scenarios in the report prepared by CEI² (see later comments). Since I presume that MassDEP is seeking comments and also possible solutions, let me present a solution to the infiltration problems caused by increasing precipitation rates so much. I think that MassDEP should consider increasing the 72 hour drawdown requirement used for sizing these basins or eliminating it as a requirement altogether. This 72 hour drawdown issue is based on the possibility of

² MassDEP Stormwater Handbook Updates Scenario Analysis Project Report BWR-DWM-2018-14-CW TECH SERVICES by Comprehensive Environmental, Inc., November 30, 2020

successive storms and eliminating any crossover impact but I don't believe this is based on science either; it was just by a quick analysis of the annual storm patterns. It is my supposition that eliminating the 72 hour drawdown will have a large impact in not oversizing various BMP's.

- c. Conveyancing systems: Conversely to above, catch basin inlets and stormwater piping systems will be impacted greatly with significant increases in peak flow rates. This is a significant concern as was brought up at the meetings by SAC member Sandy Brock, Rob Rosseen, and myself.
- i. First, catch basins in roadways along the grade (not at the low points) can only capture what is intercepted. In Massachusetts, we usually use 24" wide grates, so we can only capture the first 2 feet of the flow along the curb line in the road at straight grades. At large storms with large contributory area, the flow path down the road or in the parking lot is often wider than 2' so there is constant by-pass. This is oftentimes (in my discussions with others, almost always) not accounted for and the full flow is somehow expected to find its way into the catch basin. With larger design flow rates, more by-passing should be modeled. Ultimately all of this is captured at the low point, where we do typically analyze inlet capacity. I am suggesting that designers will need to start modeling catch basin inlets along the street and flow path to reduce pipe sizes in the streets and parking facilities. This is not typically done presently and there is no easy way for this to be done using HydroCAD or other programs. It will be a somewhat manual process with forced secondary flows. If not done, then pipe sizes will be artificially increased causing various problems with other utilities and needlessly increasing costs.
- ii. Increasing conveyancing pipe sizes in roadways and on sites within an established vertical cross section is not a simple matter. Consider that the underground electric and other utilities are at 30" cover, gas is at about 30" at the opposite side of street (usually), next is the storm drain for which cover is usually 36"-48". If this was a 12" – 15" pipe then the bottom would be near 5 feet. This works good for water mains which are "set" at 5' cover for both the main and the laterals to the houses, then sewer starting at around 6-7' deep. If the drain pipe were to be increased to 24" or larger then there would be water/drain conflicts throughout the roadway. To solve this, water mains would then need to be deeper, lowering the sewer too. This can have environmental impacts such as lowering water tables in the area, which by the way, is directly contrary to one of the main objectives of these changes. Further, most water departments want the water lines to be 5' minimum and 5.5' maximum. They do not want to go looking for the water pipes if there are leaks or breaks. This is just one issue of increasing conveyance pipe sizes.

Larger drain pipes are not a good solution. I highly doubt that there are any significant extra flooding or other impacts that any new (within last 20 years) storm drain pipe has had anywhere in the Commonwealth. (if so, I would like more information). This is different than the roadway erosion of an undersized, existing cross culvert mentioned by Ms. Rao. Yet, this one change could directly impact hundreds or thousands of projects. Plus, there are the added cost of the larger materials (oil, concrete, or steel), transport (carbon), stone, fill, etc. all of which are negative to the environment.

My guess is that the regulators proposing this massive change to the rate of runoff are not considering all of the side effects that this will cause to the

conveyancing systems. But we should be considering this from a constructability, cost, and environmental impact. I spoke to several of my peers when considering this comment and we are all in agreement that by-pass catch basin flow is not presently being accounted for and that larger conveyances will have virtually no benefit and are seemingly not the cause of any drainage problems currently. In reviewing the notes of Meeting 3, in response to Sandra Brock's question (and my follow up comment) as to conveyancing systems, MassDEP and EEA acknowledged that the proposed changes will generate larger pipe sizes and also implied that this is a side effect and not necessarily the goal, specifically stating "the goal of the proposed standards, however, is to increase retention of increasing precipitation on site through increased attenuation of peak runoff and through recharge, thus minimizing impacts to off-site conveyances".³ I remain concerned that the larger pipe sizes required as a side effect will provide absolutely no benefit while adding significant costs and potentially huge constructability problems. This issue should be addressed in the regulations especially since many municipalities rely heavily on the Stormwater Manual. An idea, that I have not vetted, may simply be that MassDEP specifically states a recommendation that pipe conveyances be sized to handle the 10 year storm frequency only (not the 25 or 100 year events).

In summary, HBRAMA supports NOAA Atlas 14 but strongly objects to NOAA Atlas 14 PLUS. If MassDEP wants to pursue NOAA Atlas 14 PLUS then a formal peer review should be employed. The standard deviation and other errors should be reviewed and documented in any issued regulatory change with availability of public comment. Something must be done to avoid artificial increases in pipe conveyancing sizes for no positive gain and no benefit whatsoever. Finally, changes or limitations to the details of the regulatory requirements should be made to ensure reasonably sized stormwater facilities.

4. Alignment with MS4 Permit:

A. General Comments:

1. HBRAMA concurs with comments received from NAIOP, Mass DCR, and MassDOT all of which commented that the proposed changes do not align with MS4. In some cases the proposed changes are more stringent and in others they do not align at all with different sets of definitions, different options, and different design requirements. This will simply cause confusion. All four comment letters, this included, respond that these changes do not meet MassDEP's goal of alignment with MS4 whatsoever.
2. HBRAMA also concurs with various commenters request for outside peer review to assess the impacts of these changes on stormwater system siting and design. Although MassDEP did study some simplistic hypothetical examples these were based on the proposed precipitation changes and not on the MS4 alignment.
3. The timing of these changes in relation to the July 1, 2021 MS4 deadlines are an issue to which MassDEP is certainly aware. Since the time requirement will not coincide these changes do not have the same urgency as they did at the onset of this Committee's work so MassDEP should re-evaluate these changes pursuant to the comments received and do the proper outside peer review.

³ Meeting #3 Notes, 9-22-2020, pp 5-6

B. Standard 3: Recharge:

1. HBRAMA does not agree with the proposed changes to the recharge requirement of 1 inch across all soil types and suggests MassDEP not to make any changes to the present use of different depths for differing soils.
2. The recharge requirements of full draw down of the 1 inch volume within 72 hours in certain soils, especially C and D soils, will require much larger storage devices, whether above or below ground, which will impact the overall area of treatment and costs. The impact has not been evaluated by MassDEP, especially the cost to benefit (ratio).
3. The proposed standard does not align with MS4 as MassDEP does not allow retainment, only recharge. MassDEP's proposed regulation does not allow for the benefits of evaporation, transpiration, or water reuse. Further, the MS4 Permit allows some flexibility in meeting the requirements by using the EPA developed curves instead of demonstrating retainment. MassDEP's proposal needs amendment to, at the very least, alignment with MS4, but also to address the soil problems identified by other commenters as outlined in comment C.1 above.
4. HBRAMA concurs with NAIOP and MassDOT comments that Standard 3 should be reconfigured to provide the desired recharge volume on an annual basis and not by a set formula driven volume to meet MassDEP's stated goal of an annualized recharge volume.
5. MassDEP should maintain the "maximum extent practicable" standard for C and D soils.
6. HBRAMA concurs that the proffered figure of 70% annual precipitation is unsupported and is ripe for some sort of peer review. The supporting data and/or research for this vital statistic and assumptions made for this important standard should be presented and peer reviewed.

C. Standard 4: Water Quality Treatment:

1. For new sites, it is unclear if Standard 4 is even required anymore if the changes to Standard 3 are proposed, as is. This standard would be applicable for very specific conditions, such as D soils, ledge, hazardous waste sites, and others in instances where the standard would be met to the maximum extent practicable. But then the treatment options are limited as MassDEP is not utilizing the EPA MS4 curves.
2. The result of the changes to Standard 3 and Standard 4 leaves doubt to the development of projects where recharge is not feasible, is not allowed, or causes negative impacts to abutting properties (e.g. break-out, slopes). This may involve a significant amount of presently developable properties, both new and re-development. The impacts of 'land takings' should be considered by MassDEP with consultation of the Office of Attorney General.

D. Maintenance and Improvement Projects:

1. HBRAMA concurs with comments received from NAIOP, DCR, and MassDOT all of which commented that more clarification is needed on maintenance or roadway / walkway improvement projects that should continue to follow the Stormwater Standards to the maximum extent practicable.

E. Off – Site Mitigation

1. Different than the EPA MS4 Permit, MassDEP does not allow off-site mitigation for certain post-construction treatment and for treatment at a watershed scale. This does not align with MS4 and is a potential large scale inhibitor for re-development projects covered by a TMDL.

F. Supporting TMDL

1. HBRAMA concurs with comments received from NAIOP, DCR, and MassDOT all of which commented that MassDEP has not provided any specifics yet, as admitted, but any changes should follow Appendices F and H of the MS4 Permit with a watershed approach to meet the goals of consistency.

5. Costs:

HBRAMA is not opposed to updating regulations where deemed appropriate but we are vehemently against massive increases in costs of regulatory compliance without corresponding environmental benefits. Much of the proposed changes by MassDEP, through the discussion above, will ultimately affect every project with increasing costs. That concept is objectionable but understandable. Some changes require some increases in cost. However, some of these changes proposed by MassDEP will have an enormous and spectacular increase in cost without even the tiniest of environmental benefit. That situation is objectionable and unacceptable.

MassDEP should be commended for reaching outside their normal domain and engaging Comprehensive Environmental, Inc. of Bolton, MA 01740 to develop three hypothetical scenarios to test out the effect of these changes⁴. Certainly, one can endlessly debate the scope and particulars of the scenarios studied, but given the limitations of what was studied, it is even more instructive to recognize that of the three scenarios presented: a linear roadway project, a 26 lot open space residential housing subdivision, and a tight, urban lot development, only one had any significant cost increase: the residential housing subdivision project.

Table 1 below outlines the cost conclusions of the 3 scenarios studied. It is amazingly obvious that the roadway project and the urban, small lot project are essentially unaffected yet the residential subdivision project increases stormwater expenses by over 50% to a staggering \$18,500 per lot. What! This scenario also used and studied 26 private, on-lot rain gardens as part of the system, which SAC member John Woodsmall clearly indicated would not be allowed in his town and many other towns since the municipality would not be able to enforce hundreds or thousands of future private rain gardens required for proper stormwater management.

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⁴ MassDEP Stormwater Handbook Updates Scenario Analysis Project Report BWR-DWM-2018-14-CW TECH SERVICES by Comprehensive Environmental, Inc., November 30, 2020

Scenario		Cost Increase from TP40 to NOAA Atlas 14	Cost Increase from TP40 to NOAA Atlas 14 PLUS
1	26 Residential Lot Open Space Subdivision – per lot	\$12,912	\$18,500
2	Roadway Widening with sidewalk, bike path, shoulder - 1500 ft. – total project	\$4	\$4
3	Redevelop Manufacturing Bldg to 300 Unit residential on Urban, Small Lot – total project	\$137	\$710

Table 1: CEI (MassDEP Consultant) Hypothetical Scenario Cost Results

This table speaks for itself. It is absolutely unacceptable and ridiculous to propose cost increases of this magnitude to housing in the Commonwealth of Massachusetts. We are all educated enough to know that housing costs in this state are amongst the highest in the country and virtually everyone wants housing costs to decrease, including Governor after Governor. An increase of \$18,500 per house is simply unimaginable and I’m sure that the politicians, including the Governor, will oppose this sort of regulatory cost.

I believe that with some changes in the policy, in the proposed regulations, and in other regulations that these costs can be reduced dramatically. That is my point in all this. Just looking at the enormity of the problem of cost should push MassDEP to investigate different approaches to these laudable changes but re-designed so that cost increases are palatable.

Conclusion:

Guy Webb and I are only 2 voices out of 17 on the SAC but the impact of these regulations to our homebuilders is arguably more than any one group, as the scenarios clearly indicate. It does not go unnoticed that MassDEP has received 4 comment letters of the 5 groups that are involved in building and construction (not ASCE) with many parallel and consistent comments. Two of these four “building” groups are fellow state agencies to MassDEP with clear stated objections to many of these changes, MassDOT and MassDCR. I venture to say that, while we all understand the need for change especially in response to noted conditions, the building community objects to these specific changes in an overall perspective and certainly vehemently objects to some of these changes as specifically noted. And all of us request a peer review. This, alone, should not go unnoticed by MassDEP.

HBRAMA again thanks you for allowing us to participate and I thank you for allowing these comments to be received, reviewed, and engaged. I remain available for discussion or clarification.

Sincerely,



Jeffrey A. Brem, PE
 Representing Home Builders and Remodelers of Massachusetts (HBRAMA)