CHAPTER 500 STAKEHOLDER ENGAGEMENT | TECHNICAL COMMITTEE MEETING #7 MINUTES

RE: **Chapter 500 Stakeholder Engagement, Technical Committee Meeting #7**

DATE: Thursday, December 12, 2024

TIME: 1:00PM-3:00PM

LOCATION: Remote via Microsoft Teams

INVITEES: Kerem Gungor, Cody Obropta, Jeff Dennis, Tracy Krueger, and David Waddell (Maine DEP)

Bina Skordas (FB Environmental Associates)

Chapter 500 Technical Committee & Steering Committee

Summary:

The presentation from Chapter 500 Technical Committee Meeting #7 focused on updates, feedback, and the testing of new stormwater management standards through example projects. It covered progress since the previous meeting, including edits to the long memo, a kick-off meeting for a vegetated stormwater buffer project, and plans for updating the stormwater manual. A new hotel development project in Scarborough served as a case study to evaluate standards such as runoff volume reduction and stressor-specific treatment. Challenges related to site constraints, such as high seasonal water tables and flat terrain, were explored. The presentation concluded with discussions on next steps, including finalizing the long memo and planning additional meetings as needed.

Meeting Agenda:

TOPIC
1. Project Timeline & Activities Overview & General Updates
2. Long Memo Updates & Outstanding Items
3. Testing & Evaluating New Standards: Example Projects
4. Discussion & Next Steps a. Final Long Memo Distribution b. Additional Meetings (as needed)

Project Timeline & Activities Overview & General Updates

- Technical Committee began meeting in December 2023. Feeling the framework is in a better place than last year. Tail end of process currently.
- Work done since the last (sixth) Technical Committee meeting (12/6):
    - Comments received via e-mail:
        - December 6th: Sean Donohue (MTA) sent his comments on the short memo.
        - December 9th: Doug Roncarati (Portland) sent his comments and suggested language for the long memo.
        - December 11th: Maine Turnpike Authority (MTA) is working on its comments on the long memo and planning to send them in by December 17.
    - DEP project team meeting on 12/11:
        - Testing and evaluating new Chapter 500 standards: new development project in Scarborough
        - Edits on the long memo

        - Retained a contractor for the performance curves, vegetated stormwater buffer performance project kick-off meeting scheduled for December 27th
            - Andy Johnson: I ran a quick example using a 10,000-square-foot impervious cover development we are currently working on and applied the New Hampshire performance curves. The results were interesting and raised questions about whether they align with the intended goals. For example, bioretention systems without underdrains, which infiltrate highly, ended up being smaller than those required under current standards. Conversely, bioretention systems with underdrains require more than twice the size compared to current standards. Similarly, the results seemed to favor smaller wet ponds or gravel infiltration trenches over bioretention with underdrains, which I find concerning. These outcomes suggest nuances in how the performance curves guide designers, potentially pointing them toward less effective or undesirable solutions. I'll share the comparative analysis spreadsheet, which highlights these differences, for further consideration when finalizing the performance curves to ensure they guide designers appropriately. I'll send it to you, Karem.
                - Jeff Dennis has similar concerns
        - Stormwater manual update proposal evaluation date scheduled
- FBE's work will be wrapping up at the end of December. Bina Skordas and her team will be putting together a stakeholder engagement consensus report between now and January as part of our agreement with FBE.

Long Memo Updates & Outstanding Items

- **Updates:**
    - Flow charts (redevelopment added). Received some feedback in terms of showing redevelopment, hence why it was added.
    - Site Law & Chapter 375 (which is beyond the scope of this work). What is related is that site law needs to comply with stormwater management (chapter 500) and Erosion and Sedimentation Control (chapter 375)
        - No Unreasonable Alteration of Natural Drainageways standard in Ch. 375 that applies exclusively to site law project. Under new chapter 500 proposal, planning for protection of natural drainage which overlaps with the chapter 375 rule
- **Outstanding: Things to Work On**
    - Basic & General Standards:
        - Need for Alternatives Analysis to ensure exhaustion of alternatives and justification for final alternative chosen
        - Ensuring initial steps of standards are evaluated by designer. Will want to bring to attention of this committee again
    - Redevelopment: will be part of Ch. 500 and receive credit to comply with standards as opposed to new development
        - Runoff Volume Reduction
        - Nutrients: Nitrogen and Phosphorus
    - Chloride Control
    - Operation & Maintenance: discussed in subcommittees. Becoming a more important item for us to consider. Karem would like to hear suggestions and comments on this.
        - Five-year recertification: compliance with this requirement is not where it's supposed to be.
        - Advanced stormwater systems
- **Comments on O&M:**

- **Andy:** I think there's an opportunity to address a key gap by implementing a simplified annual form that property owners could fill out and submit to confirm that someone has visited the site and performed necessary maintenance. This doesn't need to be overly complicated, but it would help ensure compliance by making it clear that action is required each year. Often, property owners either don't realize they need to do anything for five years or simply haven't done anything in that time. This small step could close that gap and provide a mechanism to track whether maintenance is being done, even if further discussions are needed on whether the work being done is sufficient.
- **Angela:** Agree with Andy. I mean we have the older you know the MS-4. We have our older sites that are the five year research and those people have no idea that this is even a requirement. So even like you said, even if it's an online portal that someone's at least acknowledging they have a stormwater facility, I think is huge on an annual basis might help a lot.
- **Doug:** To help reduce confusion, I recommend including a note in the Chapter 500 regulations reminding property owners and contractors that MS4 communities may have separate annual inspection requirements, distinct from the five-year recertification process. This would clarify responsibilities for property owners, consulting engineers, and contractors. Additionally, a process like Portland's, adapted from South Portland, could be beneficial. In Portland, property owners must complete a one-page form with a sign-off and certification as part of their annual reporting. They can also attach proprietary submittal forms, photos, and checklists from their contractors. This provides a useful check and reminder while ensuring all necessary details are documented. However, a broader issue is ensuring that property owners, site managers, and contractors have a clear understanding of the site's infrastructure and maintenance requirements. Often, changes in personnel lead to gaps in knowledge, and contractors may not fully understand what's on site. Tracking maintenance and providing engineering designs to contractors could help address this breakdown and ensure consistency across projects. While it's not a simple process, implementing these measures can provide clarity and improve compliance.

Testing & Evaluating New Standards: Example Projects

- Figure 1 (Appendix). Will be referring to the standards by their "Standard Code"

New Basic Standards - Example Project

- Karem discussed the New Stormwater Management Law Permit Application in Scarborough. New Hotel with both Basic and General Standards applying
  - Pre-Development Drainage Plan: not a lot of grade over site, no proposed fill. Stream abutting project parcel. But project parcel has no stream or natural drainageway on site.
  - Post-Development Drainage Plan: Figure 3 (Appendix).
- Impervious cover that replaces undeveloped areas (forest, meadows) needs to be compensation for runoff holding increase
  - Figure 3 (Appendix). Assuming site is HSG
  - In long memo, required runoff volume reduction is 35
- Figure 1 in Appendix, Karem walked through each of the standards to apply them to the new hotel in Scarborough.
- **Comments on B8 Standard Applicability:**
  - **Sean:** What conceptually does 35% post development runoff volume mean for treatment measure?
  - **Todd:** It would be beneficial to require more detailed information about the conditions at the primary discharge point, including the distance between the pipe outlet and the receiving water, as well as the length and specifications of the level spreader. Problems frequently arise between the discharge point, level spreader, plunge pool (if present), and the actual resource, particularly on steep slopes with friable soils. To address these issues, it may be prudent to require the drainage easement to extend all the way to

the receiving water body. This would ensure that the operator of the easement and discharge point has proper access to manage and maintain the area effectively. If extending a pipe all the way to the stream is not feasible, the drainage easement should cover the entire area between the discharge point and the receiving water body. In many cases, there is a significant distance between the piped outlet and the stream, particularly on steep slopes where burying a pipe over several hundred feet is impractical. Even with level spreaders, these systems often fail over time, causing water to find its own path down the slope, resulting in severe erosion all the way to the receiving water body. Ensuring the easement extends to the stream would allow for better management and mitigation of these risks.

- **Jeff:** To address steep slopes where a level spreader may not be feasible due to the need to cut into the slope to create a shelf, alternative approaches should be considered. A regenerative step-pool system could provide a viable option for safely conveying water down to the stream. Alternatively, a deep manhole could be installed to drop the water closer to the elevation of the stream, with an outfall at that lower point. These alternatives could minimize disturbance and mitigate challenges posed by steep slopes while ensuring proper water management.
- **Dave:** Within stream buffer, would require an NRPA permit.
- **Doug: I**n Portland, there's an example of a proposed discharge system that would send runoff down an extremely steep slope for several hundred feet through a protected natural area to a river. Such designs are inherently flawed, as they are prone to failure, leading to habitat destruction and pollution being transported into the river. It raises concerns about whether access for maintenance would even be feasible in this setting. It's critical to either ensure these systems are designed correctly to prevent environmental damage or reconsider implementing them entirely to avoid significant ecological harm.
- **Angela:** This site presented significant challenges throughout a year-long process due to its poor conditions, including unsuitable soils and difficult grading requirements. The outfall location was constrained by overlapping setbacks: a 75-foot natural resource buffer and a 25-foot grading setback near the spillway and level spreader, pushing the design to the absolute limits of the site. The developers were forced to reduce the building footprint and abandon their original plan to pump stormwater due to site constraints. While this was an extremely difficult case to resolve, it serves as a worst-case scenario and highlights the need for careful design considerations. I'm glad to see this example being reviewed, as it underscores the complexities involved.
- **Rodney:** Not all drainage easements are equal, particularly when comparing simple water discharge easements to those requiring constructed features. For cases involving construction, municipalities should ensure extended mapping is conducted to account for potential site challenges, such as bedrock obstructions or wetlands that could complicate pipe installation. This kind of foresight can prevent unexpected issues, such as needing to extend a pipe months later, which might involve significant additional work or property impacts.
- **Jeff:** For NWD-1 buffers, since these are easily identifiable and based on existing database lines, the setback should be respected regardless of whether the stream is on the property in question or not. This avoids the need to access other properties and ensures consistency in applying the standard.
    - **Tracy:** Should a property boundary adjustment allow someone to avoid addressing an NWD-1 setback, even if they remain within the setback zone? This seems like a potential loophole that warrants further consideration to ensure the intent of the regulation is upheld.
    - **Cody:** The same loophole exists for significant vernal pools. It's just an unfortunate reality that you can't really regulate what's on someone else's property if they're not doing the project. So it's just a challenge.
    - **Doug:** There's a risk that insufficient oversight could result in drainage systems creating problems for neighboring properties. Concentrating runoff into a single point—especially in unnatural ways—can cause nuisance flooding, erosion, or pollution on adjacent properties. It's critical for property

owners and reviewers to ensure designs avoid these impacts, respect natural drainageways, and comply with local standards to prevent harm.
        - **David Waddell:** Even if a site didn't meet setbacks on an adjacent property, it would still likely fall under the sensitive and threatened standards, requiring compliance with those stricter measures. In these cases, developers would typically indicate that they've met the basic standard to the extent practicable for the site, which seems to align with how the process is currently interpreted and applied. If others interpret this differently, feedback would be welcome.
- Developing large portion of site with little undeveloped portion left for stormwater measures. We can address this by providing more options for nonstructural retention measures, like stormwater buffers. Will be challenge if you want to develop most of your site.
- **Comments on B9 Standard and General Standards (G1, Figure 2):**
    - **John Kuchinski:** Most engineers designing a site, particularly when working with stormwater pipes, are already performing some type of stormwater calculations as part of the process. While this might not always extend to calculations for ditches, stormwater pipe design typically involves these analyses to ensure proper functionality.
    - **Angela:** Locally, the concern was significant enough that we required calculations for the 25-year storm event, as initial designs showed runoff spilling directly toward the stream. Implementing this requirement ensured better containment and control of runoff. Adopting a 50-year standard would be an even greater improvement for long-term protection.
    - **John:** Is garage space usually cost 10 plus times more than a surface space? So if you put in a surface space of 5000, you're going to be spending $50,000. You know, rough order of magnitude for a garage space. So it gets very expensive for a garage.
        - **Andy:** Proposing structured parking or innovative solutions like covering parking spaces with solar panels has been explored but is often prohibitively expensive. Costs can range from $40,000 to $50,000 per parking space, which can make projects unfeasible. Even with favorable soil conditions, the expense often leads to projects being abandoned. While these ideas, like solar panel-covered parking areas, are creative and align with sustainability goals, their practicality remains a significant challenge.

<u>New General Standards – Figure 2 (Appendix)</u>

G1 - Nature-based/Low Impact Development (LID) stormwater treatment

- The designer will demonstrate that higher priority SCMs have been properly evaluated to move onto the lower priority SCM alternatives:
    A. Non-structural Retention Measures
    B. Structural Retention Measures,
    C. Structural Treatment Measures (treatment with no evapotranspiration or infiltration).
- **Non-structural retention measures:**
    - *Relative size of the proposed development to the project parcel:* It may be possible to adequately utilize non-structural measures once the performance curves for volume reduction and quality treatment are developed by Paradigm Environmental. Using currently available data, it does not appear there is adequate space for non-structural measures to meet the volume reduction and quality treatment necessary for the site.
- **Structural retention measures:**
    - *Is Gravel Wetland a Structural Retention Measure or Not?* High seasonal groundwater is the primary barrier to implementing structure retention measures. With seasonal groundwater at 2 feet below the surface, it's a challenge achieving the necessary separation distance. Implementing any underdrained systems also

poses a challenge due to the frost depth. Grassed swales are used to convey stormwater, allowing for incidental infiltration.

- **Structural treatment measures:**
    - Because the site is flat, having the proper head to facilitate drainage is a challenge. Thus, the site has been designed to utilize grassed swales to convey stormwater and a gravel wetland was proposed to provide the stormwater quality treatment.
    - Here, "retention" refers to all SCMs that can reduce stormwater volume through infiltration and/or evapotranspiration. Not to be confused with wet ponds, which are commonly called as "retention ponds".

G2 - Runoff Volume Reduction

- The project is in a Sensitive & Threatened region (i.e., Scarborough). Therefore, Table 2 in the long memo applies to the project.
- Limiting site constraints:
    - HSG for the site is A/D. The soil is very loose fine to coarse sand with a seasonal high water table at 2 feet below the surface. The site is also relatively flat, making it difficult to achieve the proper head for conveying stormwater runoff.
    - Because of the site constraints, this may be a situation where a waiver from strict adherence is needed. First we attempt to infiltrate the roof runoff. It must be noted that the new General Standards do not require rooftop runoff treatment for nitrogen or phosphorus removal. Thus, the separation to the seasonal high water table can be reduced to one foot. Potential alternatives for meeting the runoff volume reduction for the roof:
- Roof drip-edge filters
    - Approximate building perimeter = 600 feet. Rock porosity = 0.4. Depth = 1 ft (to maintain at least 1 feet separation from SHWT). Required width to achieve the 750 cubic feet storage (calculated below) = 3.2 ft wide system. This assumes no underdrain (frost depth issue). Overflow would spill over the filter edge.
- Impervious area disconnection with storage
- Infiltration gallery or similar system
- Rainwater capture & re-use
    - This would require a cistern or reservoir that's approximately 5,600 gallons + internal plumbing to facilitate re-use. If stored at the exterior of the building, additional winterization will be necessary.
- Subsurface storage basin from which stored stormwater will be pumped out to infiltrate.
- Last resort: slow release of stormwater that cannot be infiltrated.
- **Comments**
    - **Andy:** Integrating a methodology into the new regulation for artificially lowering groundwater tables in poor soil conditions, like Type D or Type C soils, could significantly expand site development options. Developers often install underdrains to address high groundwater, but this alters post-construction groundwater levels. Introducing solutions like curtain drains, which are permitted in other states around septic systems, could facilitate the use of features such as porous pavement by ensuring adequate separation from groundwater. For instance, placing a five-foot-deep curtain drain around a porous pavement system could enable proper drainage while allowing innovative stormwater management practices to function effectively. This approach could open up a range of possibilities for sustainable site designs.
    - **Doug:** Killing groundwater recharge. The natural storage in soils is what contributes to base flow in nearby streams, maintaining a critical hydrological balance. When systems like curtain drains are used, this natural subsurface hydrology is altered by redirecting the water into pipes, effectively converting it into stormwater flow. This approach changes the natural conditions and could be seen as bypassing the intent of maintaining base flow and preserving natural hydrological processes.

        - **Andy:** If foundation drains and underdrains are already being installed around buildings and parking lots due to poor soil conditions, it's important to recognize that these practices are inherently altering the subsurface hydrology. Instead of ignoring these changes, the system should allow for some flexibility to incorporate these elements into the stormwater system design. By acknowledging their presence, you could optimize their use to improve stormwater management outcomes, particularly in areas where soils necessitate such interventions. This approach provides practical adaptability while enhancing stormwater functionality.

G3 – Stressors of Concern

- Because the project is located in a sensitive & threatened region, the project needs to treat the stressors of concern. These have not yet been identified for this watershed, so we will examine both Phosphorous and Nitrogen as stressors.
- Currently, treatment for the site is provided by a gravel wetland sized to meet our current standards (1 inch of runoff from impervious areas and 0.4 inches of runoff from landscaped areas).
- For a design storage volume of 1 inch from impervious areas, 61% of the total phosphorous is removed and 68% of the total nitrogen is removed. Thus, the approved stormwater control measure meets the standard.
    - Note: if nitrogen was identified as the stressor in this watershed, the currently approved stormwater control measure would be oversized. According to the performance curve (and an interpolation calculation), the required design runoff depth would be 0.69 inches.

Discussion and Next Steps

Other

- **Angela:** In working with particularly challenging sites, such as one we struggled with locally for over a year, it's essential to have an honest conversation about whether the site is suitable for development. While the goal may be to maintain the ability to develop under both old and new rules, there are cases where attempting to force development on a poor site—essentially trying to fit a square peg into a round hole—is counterproductive. Developers need to recognize when a site simply may not be viable, even under the most flexible regulations. Clear guidance on these situations could help avoid prolonged struggles and ensure better outcomes for all stakeholders. This is not a good site and so that's where it goes back to. I was hoping that this new Chapter 500 might be able to address some of the shortcomings of, “Yep, you could develop it this way today, but it really shouldn't have been.”
- **Jeff:** This is an inappropriate development for this site, and I really hope we can reach a clear bottom line on this. It just shouldn’t be happening here—there are better locations for it. Scarborough is still a pretty big place, so let’s find a different site that makes more sense.
- **Andy:** I'm not sure that falls under stormwater law. I've always been a big proponent of zoning overlay districts, especially stream and wetland protection overlay districts. This approach allows towns to have local control over land use, which is important because this is all within Maine's local authority. By implementing zoning, towns can establish limits—like a maximum coverage of 25-30% in these sensitive areas. This way, towns have control, and everyone is on the same page. It prevents state overreach and ensures local concerns are addressed. To me, this seems like the simplest and most effective solution for managing these areas.
    - **Jeff:** I don’t think we should impose a blanket coverage limit, but on a site like this, where you can’t meet the standards because of factors like marine clay at just 2 feet and a flat site, there should be a point where we recognize this is not an appropriate location for development. We need to have the courage to say that, rather than pretending that every site can be developed to its fullest extent. Otherwise, we’re not really accomplishing anything.
    - **Andy:** What we've been discussing today—volumetric runoff reduction and storage—could be combined in a way where the onsite storage and release are so extensive that it takes up more of the

site coverage. By doing this, maybe there's a way to table those two standards and reconsider how we approach the site's development.
    - **Jeff:** If you can meet the standard, great. I'm just saying, if there's a way to meet it, then fine. But I also want us to have the ability to say no when necessary.
    - **Andy:** What I'm saying is, if you set those standards in stone and require them to be met, then either your BMP (Best Management Practice) becomes so large it takes up a huge portion of your site, or you'll just walk away because it's not feasible. Essentially, you're limiting development to a certain percentage of the site because there's no way to meet the standards otherwise.
- **Doug:** You can also consider the idea that no one's saying you can't develop the site—you just might not be able to do it the way you originally planned. You may need to scale back your project, which is totally fair. Just because you have a site doesn't mean you can build it out to its maximum potential without considering the surrounding resources or infrastructure, something we often see in Portland. Developers sometimes look at a five-acre parcel and ignore the realities of the site, focusing only on maximizing development without regard for the conditions. There needs to be a reality check in the community, as you said. It's important to have the right to say no. Just so everyone knows, Portland's LID standards actually passed last night, so in about a month, we'll be figuring out how to implement them.

Jeff's Chloride Discussion (Figure 7 in Appendix)

- The proposed point system initially required developers to earn 75 points for redevelopment and 100 for new development. Aubrey suggested considering fewer points to work with, so the system was simplified, and points are now easier to calculate. Key practices include stormwater management strategies, such as secured conveyances, strategically located storage, and reducing parking lot area through measures like covered or seasonal parking.
- A major focus is infiltrating runoff, particularly from roofs, with points assigned based on the area infiltrated relative to the site's impervious area. Scenarios were explored, such as covering 20% of parking or infiltrating roof runoff, which could help reach the point goals. For smaller sites or redevelopment projects, using techniques like seasonal parking isolation or roof infiltration can achieve the necessary points.
- While there's flexibility in the system, the challenge is aligning parking standards with development needs, especially for specific types of projects.
- A cheat sheet is available for developers to calculate points based on roof area and runoff depth. The system aims to be adaptable for various site conditions, and feedback is welcomed.

APPENDIX

Standard Code	Standards
	Wetland Protection (B1 thru B3)
B1	There can be no disturbance of NRPA Protected wetlands on the project site.
B2	Impervious areas must be located at least 15 feet away from an NRPA protected wetland.
B3	Wetland Crossings Exception: a. Maintain hydraulic connectivity. b. Minimum # of crossings and cumulative wetland impact.
	Natural Drainage Network Protection
B4	a. Natural Drainage Way (NDW) 1: 75-ft buffer. b. Natural Drainage Way (NDW) 2: 15-ft buffer.
B5	Exceptions: a. Stormwater outfall stabilization work allowed in B4 buffers. b. NDW crossing minimum opening size = 3 x NDW cross-sectional area or NDW crossing accommodates 25-year peak flow. c. The number of NDW-1 crossings must be minimized.
B6	The proposed development cannot increase the pre-development catchment area of a NDW at the parcel boundary by more than 10% or 10,000 sq. ft. whichever is greater.
B7	If NDW catchment's post-development impervious area exceeds 20,000 sq. ft. and is less than three acres, a drainage easement must be obtained from the downgradient parcel's owner. Exception: a. Site Law projects may be exempt from this requirement by complying with the flooding standard.
B8	a. Runoff from areas greater than 10,000 sq. ft. that in the pre-development condition did not leave the site in an NDW channel must leave the site in well distributed, unconcentrated flow unless a drainage easement is obtained from the downgradient parcel's owner. b. Level-lip spreader setback from the property boundary is minimum 15 ft unless its catchment area contains more than 20,000 sq. ft. impervious area, in which case the minimum setback is 50 ft. c. Where upgradient sheet flow is intercepted by a road ditch, crossing structures must be placed at a maximum interval of 250 ft.
B9	a. Open drainage systems must be designed using 50-year return period storm. b. Closed drainage systems must be designed using 10-year return period storm.

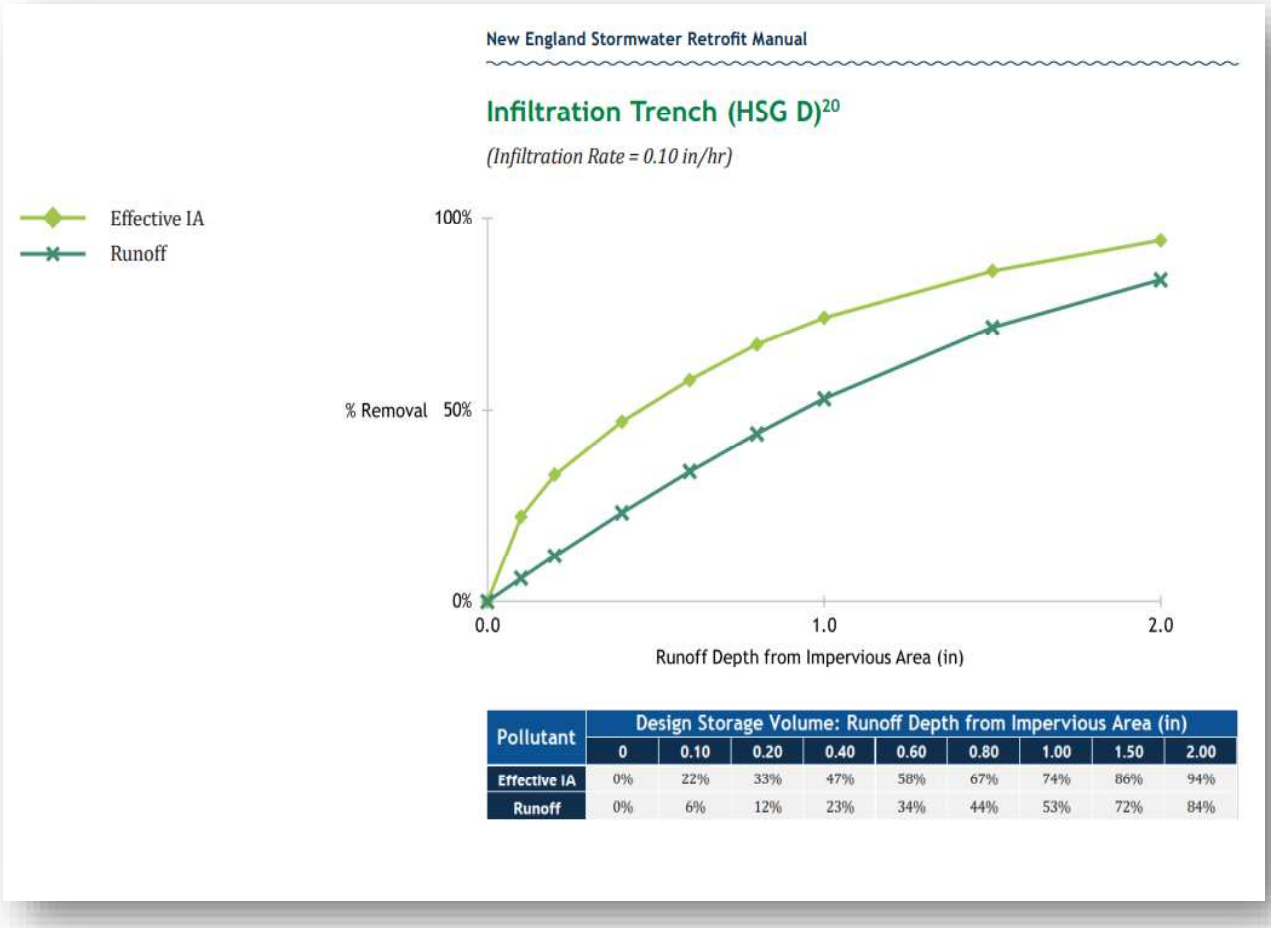
Figure 1. New Basic Standards

Standard Code	Standards
G1	Nature-based/Low Impact Development (LID) stormwater treatment
G2	Runoff Volume Reduction Standard
G3	Stressor Guided Stormwater Treatment Standard

Figure 2. New General Standards

Pre-development Meadow Replaced by Impervious Area (sq. ft.)	Pre-development Forest Replaced by Impervious Area (sq. ft.)	Project Site Hydrologic Soil Group (HSG)
32,156	21,438	A/D
Runoff Volume Reduction Requirement for Meadow (%)	Runoff Volume Reduction Requirement for Forest (%)	Area-weighted Runoff Volume Reduction Requirement (%)
31	42	35

Figure 3. Runoff volume reduction performance curve for infiltration trenches for the Example Project in Scarborough.

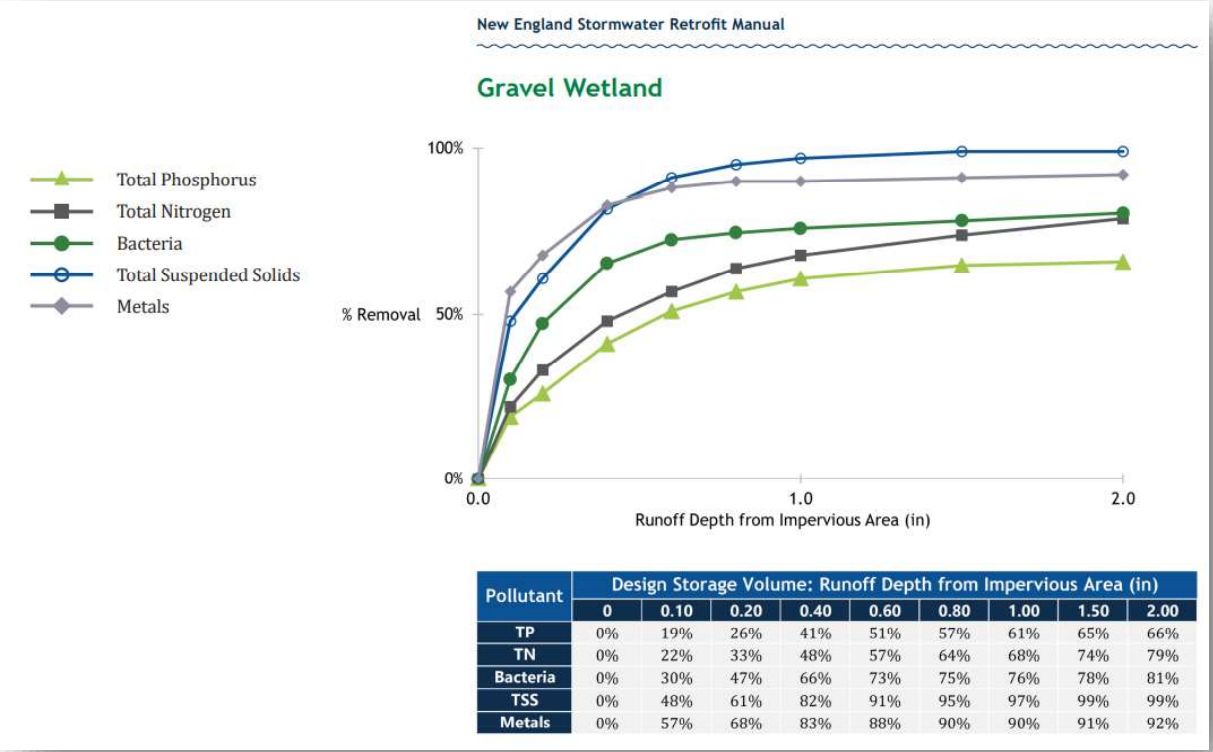


Pollutant	Design Storage Volume: Runoff Depth from Impervious Area (in)								
	0	0.10	0.20	0.40	0.60	0.80	1.00	1.50	2.00
Effective IA	0%	22%	33%	47%	58%	67%	74%	86%	94%
Runoff	0%	6%	12%	23%	34%	44%	53%	72%	84%

Figure 4.

Impervious Cover Type	Treated Impervious Area (sq. ft.)	Target Runoff Volume Reduction (%)	Runoff Depth from Impervious Area (Performance Curve) (inch)	Required Design Storage Volume (cubic ft)	Provided Design Storage Volume* (cubic ft)	Treatment Measure
Rooftop	15,000	35	0.60	750		Roof Drip Edge Filter
Pavement	38,594	35			7,002	Gravel Wetland
	*: Design storage volume provided to comply with current Chapter 500 standards. One-inch design storage volume required to treat impervious areas.					

Figure 5.



Pollutant	Design Storage Volume: Runoff Depth from Impervious Area (in)								
	0	0.10	0.20	0.40	0.60	0.80	1.00	1.50	2.00
TP	0%	19%	26%	41%	51%	57%	61%	65%	66%
TN	0%	22%	33%	48%	57%	64%	68%	74%	79%
Bacteria	0%	30%	47%	66%	73%	75%	76%	78%	81%
TSS	0%	48%	61%	82%	91%	95%	97%	99%	99%
Metals	0%	57%	68%	83%	88%	90%	90%	91%	92%

Figure 6. The pollutant removal performance curves for gravel wetlands.

Eligible Practices Total Points Required for New Development = 75, for Redevelopmenmt = 35	Points Earned	Scenarios	SC1 NEW	SC2 NEW	SC3 NEW	SC4 NEW	SC5 NEW	SC6 NEW	SC7 RE-D	SC8 R-D	SC9 RE-D
Practices that prevent infiltration of meltwater											
Provide lined stormwater SCMs and secure/lined stormwater conveyances for parking runoff	required										
Strategically locate snow storage on impervious surfaces that drain to secure conveyances	required										
*Seasonally bypass parking storm/meltwater around intentional and incidental infiltration SCMs	35										
**Provide a "Smart" that strategically stores and releases high chloride stormwater	50										
Practices that minimize the area requiring salt application - Minimum Pts 50 (Redevelopment 10)											
Covered or stacked parking											
Points assigned equivalent to % of total parking that is covered	0 to 100		20				40	75			
Heated pedestrian surfaces											
Sidewalks and entryways heated	25		25			25	25				
Designated pedestrian lanes in parking lot heated	15					15					
Seasonally reduced parking for commercial retail from January 1 to April 15											
Points assigned equivalent to % of total parking that is isolated and not plowed or salted	0 to 90			45							
Minimize # of parking spaces and/or area required per parking space											
Does not exceed maximum recommended # of spaces for given use ???	10				10	10					
Conservative sizing of individual parking spaces – 50% compact spaces	5		5	5		5	5			5	5
90 degree parking with rows parrallel to the longest dimension of the lot	5		5	5	5	5	5			5	5
Redevelopment only - Replace existing parking with infill buildings or otherwise reduce parking											
Points assigned equivalent to the % reduction in total parking area	0 to 50								35	25	15
Practices that limit the amount of salt applied											
Sweep and reuse granular salt applied to all pedestrian surfaces after every storm/melt event	15				15						
Practices that dilute chloride contamination in groundwater											
Dilute groundwater by infiltrating low chloride roof runoff – SCM designed to infiltrate:											
Points assigned equivalent to the ratio of the area of roof runoff infiltrated to project impervious area times the cumualtive percentage of annual runoff infiltrated (see table A)	0 to 50		21	20	46	19					10
		Total Points	76	75	76	79	75	75	35	35	35

Figure 7. Point System, as presented by Jeff Dennis.