Stormwater Manual Update

Workgroup Team Meeting #2

08/21/2025

Agenda

- **Recap**
  - Workgroup Meeting #1 (05/19/25)
- **Updates**
  - DEP's Ongoing Chapter 500 Work
  - Needs Assessment
  - Best Available Information (BAI) Research
  - Potential Design Tools
  - Potential Manual Outline
- **Discussion**
  - Feedback on the above updates
- **Next Steps**
  - Finalize scope for draft/ final Manual revisions

DEP's Ongoing Chapter 500 Work

– Rule Drafting & Technical Work

- Focus on the new stormwater standards
- Examples demonstrating how the new stormwater standards will apply
- Performance curves for the vegetated stormwater buffers (Contractor: Paradigm Environmental)
  - Draft technical memo under review
- Rulemaking timeline change
  - DEP needs more time to draft the rules
  - Draft rules will be sent to the stakeholders for feedback before official rulemaking process initiates

Needs Assessment Methods

- Created a **prioritized** list of Manual update topics based on:
  - Online survey (***19 responses**; May – June 2025*)
  - Feedback from Workgroup Meeting #1 (*May 19, 2025*)
  - Email feedback from DEP staff and stakeholders (*April – May 2025*)
  - DEP's Ch 500 Proposal "Long Memo" (*April 4, 2025*)
  - Feedback from Project Team Meeting #2 (*June 24, 2025*)

- Prioritization/scoring based on:
  - Online survey responses (High, Medium Low)
  - Topics identified via Workgroup Mtg #1, email feedback, and Long Memo
  - Results were grouped by topic – "General" vs. "SCMs"

BAI Research Methods

- Identified BAI needs through feedback (summarized on previous slide)
- Intent of research was to:
  - Identify recent developments in stormwater management, especially regarding Green Infrastructure/ Low Impact Development (LID), emerging contaminants, and maintenance of stormwater practices.
  - Evaluate regionally accepted design standards and guidance for stormwater control measures.
  - Support recommended updates to Manual content, structure, and design.
- Reviewed federal, state, and academic sources published in the last five years (±)
- Needs Assessment Memo provides full list of BAI sources- needs and outcomes are summarized over the next few slides

Summary of Results

Topic	Score	BAI Research Needed?
General		
Infiltration & Soils Testing Guidance	5.6	✅
Alternatives Analysis for SCM Design	5.2	✅
SCM O&M Guidance	5.1	✅
SCM Schematics & Specs	4.6	✅
SCM Selection & Design Hierarchy	4.3	✅
SCM Design Criteria	2.7	✅
SCM Example Calculations	2.5	✅
Ch 500 Detailed Compliance Guidance on Standards	2.4	
Design Tools to Assist in Calculations	2.3	✅
Adaptation & Resilience	2.1	
Stormwater Monitoring	2.0	
Ch 500 Stormwater Regulatory Framework / Rationale	1.9	
General Manual Formatting / Editorial Updates	1.8	
Stormwater Control Measures (SCMs)		
Source Control BMPs (e.g., for chloride)	3.5	✅
LID / Green Infrastructure Options	3.5	✅
Retention SCMs	3.4	✅
Smart SCMs	3.2	✅
Nature-Based Options	2.6	✅
Retrofit SCMs	2.4	✅
SCMs / BMPs for Emerging Contaminants	2.4	✅
Proprietary / Manufactured SCMs	2.0	✅
SCMs to Mitigate Temperature Impacts	2.0	✅
Rainwater Harvesting SCMs	1.7	✅

Detailed Results

Topic	Needs Notes	BAI Needs	BAI Outcomes
General			
Infiltration & Soils Testing Guidance	• Clear guidance to help meet infiltration/ volume reduction standard • For SCM design - what needs to be done under what circumstance (e.g., flow chart)– standardized protocols (e.g., test pits, infiltration testing, HSG determination, mounding, review setback requirements)	• State-of-the-practice infiltration recommendations (e.g., effective in-situ infiltration testing protocols)	• Model after MassDEP 2025 guidance • **Potential Manual Location**: Ch 5 (*Infiltration & Soils Testing*)
Alternatives Analysis for SCM Design	• Clear guidance on how to exhaust alternatives to meet the standards • Clear, consistent process to streamline reviews	• Research how other State manuals have handled this (e.g., feasibility analysis vs. alternatives analysis)	• Model after MassDEP 2025 guidance, tailored based on new Ch 500 requirements. • **Potential Manual Location**: Ch 5 (*Alternatives Analysis*); App B (*Design Tools*)
SCM O&M Guidance	• Need for SCM-specific inspection, maintenance, and reporting requirements	• SCM-specific maintenance recommendations • Existing SCM installations (e.g., common failure modes, potential maintenance indicators)	• Failure vs. maintenance indicators from UNHSC and Minnesota media deconstruction reports • Additional considerations from Villanova and WA research • Model SCM-specific maintenance recommendations after 2025 MA and NH SCM fact sheets • **Potential Manual Location**: Ch 6 (*Inspection & Maint.*); App A (*SCM Fact Sheets*)
SCM Schematics & Specs	• Updates to Schematics / Design Criteria / Specs to meet new Ch 500 requirements and state of the practice (e.g., filter media), flexibility to address site-specific goals • Consideration of construction phase in design of SCMs (e.g., expand on guidance for the use of permanent SCMs for controlling construction runoff, protection of HSG A/B soils if subject to volume reduction standard)	• Optimization of SCM designs and site preparation techniques to achieve significant volume reduction and pollutant removal/ groundwater protection (e.g. Filter media specifications, porous pavement specifications).	• Model after newer media specifications from UNHSC, SNEP Retrofit Manual, WA DEP • **Potential Manual Location**: App A (*SCM Fact Sheets*)
SCM Selection & Design Hierarchy	• Clear process for SCM selection (e.g., LID --> Retention --> Structural) • Promote LID	• Research how other State manuals have handled design hierarchy (e.g., 2025 New Hampshire Stormwater Manual) • Options for non-structural retention SCMs to meet the proposed standards (e.g., parking lots with multiple vegetated SCMs with small drainage areas, conservation subdivisions and innovative housing development such as cottage courts)	• Model after 2025 MA and NH SCM hierarchies • Model after MassDEP 2025 ESSD guidance • **Potential Manual Location**: Ch 4 (*SCM Hierarchy*); App A (*SCM Fact Sheets*)

Detailed Results-II

Topic	Needs Notes	BAI Needs	BAI Outcomes
General			
SCM Design Criteria	• Need for clear criteria and alignment with new Ch 500 (e.g., Volume Reduction vs. Treatment) • Planting guidance • O&M design considerations (e.g., auxiliary features for easy inspection and access, valves for emptying permanent pools of wetlands)	• Optimization of SCM design for stormwater volume reduction/ treatment and vegetation survival	• Model after MA and NH planting guidance • Additional considerations from Minnesota and Villanova research • **Potential Manual Location**: Ch 5 (*Standard Requirements*); App A (*SCM Fact Sheets*)
SCM Example Calculations	• Example calcs for new standards (e.g., Volume Reduction vs. Treatment) • New vs. Redevelopment calcs • Guidance on use of SCM Performance Removal Curves (PRCs)	• Maine DEP has a separate ongoing contract to develop PRCs for stormwater buffer LID measures	• To include new ME DEP buffer guidance & PRC • **Potential Manual Location**: Ch 5 (*Design Criteria*); App B (*Tools*)
Ch 500 Detailed Compliance Guidance on Standards	• Wetland and Natural Drainage Network Protection Standard (e.g., clarity on definitions and mapping, identification of NDW-2s) • Stressor-Guided Stormwater Treatment Standard • Section on "self-treating" impervious surfaces (e.g., Central Maine Power substation yards, railroad ballast, artificial turfs)	---	• BAI = N/A • **Potential Manual Location**: Ch 3 (*Ch 500 Overview*)
Design Tools to Assist in Calculations	• Modeling infiltrating SCMs • Spreadsheets or other tools to aid complex calculations, alternatives analysis template	• Possible use/ modification of existing design tools (e.g., how to use treatment trains with the EPA curves) • Potential for Continuous Simulation guidance	• See **Memorandum** for explanation of proposed tools. • Potentially reference/ incorporate additional tools as listed in Minnesota Manual • **Potential Manual Location**: App B (*Tools*)
Adaptation & Resilience	• Incorporation of climate change considerations (e.g., impact of more frequent storms- small and large, NOAA 15?)	---	• BAI = N/A • **Potential Manual Location**: Ch 2 (*Adaptation and Resilience*)
Stormwater Monitoring	• Guidance on monitoring requirements and methods	---	• BAI = N/A • **Potential Manual Location**: Ch 6 (*Monitoring*)
Ch 500 Stormwater Regulatory Framework	• General vs. Basic vs. Other Standards (Flow Charts) & Rational • Clear definitions for new/ revised terms	---	• BAI = N/A • **Potential Manual Location**: Ch 3 (*Ch 500 Overview*)
General Formatting	• Improve overall readability and organization. Make sure readers understand the "why" before the "how"	---	---

Detailed Results-III

Topic	Needs Notes	BAI Needs	BAI Outcomes
Stormwater Control Measures (SCMs)			

Source Control BMPs (e.g., for chloride)	• High need for effective chloride control measures	• Identify or develop new or improved chloride control measures, particularly concerning mitigation of baseflow toxicity (e.g., cover parking spaces with a canopy)
		• Evaluate the effectiveness, costs, and O&M implications of source control BMPs
			• Model chloride source control based on NH Green SnowPro guidance/ Salt BMPs, MA salt storage and disposal guidance, MN Smart Salting guidance/ model ordinances and policies
			• Incorporate new ME chloride standards (Ch 500)
			• Potentially include:
			  ○ Minnesota Smart Salting Assessment Tool
			  ○ Innovative chloride source control SCMs (e.g., cover parking spaces with a canopy, MN hydronic snowmelt tubing under paved surfaces)
			  ○ Additional source control BMPs from 2024 Western Washington Stormwater Manual
			• **Potential Manual Location**: Ch 4 (*Site Planning*); App A (*SCM Fact Sheets*)

LID / Green Infrastructure Options	• Promote/ prioritize use of LID measures, make sure definitions are clear (e.g., LID vs. green infrastructure vs. environmentally sensitive site design) • Updated guidance with a broader array of options • Examples to show how LID can be integrated into site design to meet requirements	• State-of-the-practice LID measures • Adaptations for Maine specific conditions (e.g., difficult soils, cold climate)	• Model after 2025 NH and MA guidance/ LID options, cross check with EPA fact sheets • Potentially include options/ considerations from additional resources (e.g., Villanova Center for Resilient Water Systems research) • Include MN cold climate considerations • **Potential Manual Location**: Ch 4 (*Site Planning*); App A (*SCM Fact Sheets*)
Retention SCMs	• Interest in SCMs suitable for challenging site conditions (i.e., shallow profile SCMs) • Clearly distinguish between “retention” and “non-retention” SCMs	• State-of-the-practice recommendations for SCM design that can effectively achieve infiltration and volume reduction in more challenging soil types (e.g., HSG D) and sites with high season water tables	• Include MN recommendations for BMP use in settings with shallow soils/ depth to bedrock • Include UNHSC Bioretention with ISR • **Potential Manual Location**: App A (*SCM Fact Sheets*)
Smart SCMs	• Interest in innovative/ “smart” SCMs	• Evaluate the feasibility, effectiveness, cost-benefit, and O&M requirements of Smart SCMs (e.g., Continuous Monitoring and Adaptive Control for Chloride, small pumps, recycling stormwater through system multiple times)	• Model guidance based on available tools and existing case studies • **Potential Manual Location**: Ch 2 (*Innovative Solutions)*

Detailed Results-IV

Topic	Needs Notes	BAI Needs	BAI Outcomes
Stormwater Control Measures (SCMs)			
Nature-Based Options	• Promote/ prioritize nature-based solutions	• Guidance on vegetation, soil decompaction and amendment, buffers • To discuss with Dave Rocque, who has ideas on the buffer amendment.	• Model after Minnesota and Washington soil amendment guidance, additional considerations from Dave Rocque • **Potential Manual Location**: Ch 4 (*Site Planning*); Ch 5 (*Soils Testing*)
Retrofit SCMs	• Options for retrofitting existing development with SCMs	• Recent retrofit guidance (e.g., SNEP Retrofit Manual)	• Model after SNEP retrofit guidance • **Potential Manual Location**: Ch 4 (*Retrofits*)
SCMs/ BMPs for Emerging Contaminants	• Need to address emerging contaminants, such as PFAS, microplastics, or 6PPD-q in artificial turf.	• Evaluate the effectiveness of current SCMs in addressing emerging contaminants • Identify potential new SCMs or modifications to existing designs that can effectively target these pollutants	• Model guidance based on UNHSC and Minnesota research and 2024 Western Washington Stormwater Manual • Additional considerations from other publications • **Potential Manual Location**: Ch 2 (*Emerging Contam.*); Ch 4 (*Site Planning*); App A (*SCM Fact Sheets*)
Proprietary / Manufactured SCMs	• Guidance on acceptance and performance of proprietary systems	• Independent, reliable performance data for proprietary SCMs • Viability, replacement triggers, and disposal of proprietary filter media	• Model after WA DEP TAPE guidance • See SCM O&M Guidance • **Potential Manual Location**: Ch 5 (*Design Criteria*); App A (*SCM Fact Sheets*); Ch 6 (*O&M*)
SCMs to Mitigate Temperature Impacts	• Need for guidance on SCMs to mitigate thermal impacts for protecting cold-water fisheries and aquatic habitat	• SCM designs or modifications that optimize stormwater temperature reduction	• Model after MassDEP 2025 guidance • Potentially include SCM modifications from other publications • **Potential Manual Location**: Ch 4 (*Site Planning*)
Rainwater Harvesting SCMs	• Additional information on rainwater harvesting (e.g., sizing when taking irrigation into account). May also include irrigation with other SCMs (e.g., wet ponds)	• Use of rainwater harvesting SCMs to reduce the volume needing infiltration	• Model based on MA and NH guidance • Additional considerations from Minnesota Stormwater Manual and NC State University Stormwater Engineering Group research • **Potential Manual Location**: App A (*SCM Fact Sheets*)

Potential Design Tools

1. **Performance Removal Curves**: Compile an Appendix of the most current Performance Removal Curves (PRCs) (e.g., *UNHSC PRC guidance; updated SNEP Stormwater Retrofit Manual expected Summer 2025, new ME buffer PRC, 2025 Draft MA MS4 Permit*).

2. **SCM Sizing Tool(s)**: Develop an excel spreadsheet style tool that can be used to size SCMs to meet certain requirements (e.g., pollutant removal, retention, etc.). Model the tool after existing tools such as the MassDEP 2025 tool for SCM treatment trains, UNHSC Continuous Simulation calculator, and the EPA BMP-BATT tool.

3. **SCM Selection Tool or Alternative Analysis Template**: Create a fillable alternative analysis (or "feasibility analysis") template for SCM selection based on the SCM design hierarchy. Model the template based on MassDEP 2025 guidance, tailored based on new Ch 500 requirements.

4. **Applicability of Standards**: Create an excel and ArcGIS Online tool to determine project site requirements based on site location and characteristics. Model after MassDOT WQ Data Form. Tool may include flow charts/ lookup tables/ maps as applicable for how standards may apply to projects. For example, for soil testing such as Chapter 12 of the NJDEP BMP Manual. Tool may be integrated into (1) through (4), above.

Note: Tool ideas are preliminary and won't be finalized until the proposed regulations have been written in more detail.

Proposed Manual Outline

Note: Content from current Vol III moved to new Vol I; minor updates to current Vol II (Phosphorus Control)

PROPOSED (2025)			PROPOSED (2025) UPDATE NOTES
VOL I	STORMWATER MANAGEMENT AND TECHNICAL DESIGN		
Chap.	Title	Subheadings	To Include…
1	Introduction	Regulatory Overview	---
		Objective of This Manual	• To present state-of-the-science design recommendations and how to meet regulatory requirements
2	Stormwater Hydrology and Impacts	---	• Combine Vol I Ch 2 Stormwater Impacts + Vol III Ch 2 Stormwater Hydrology
		Water Quantity	• Controlling Peak Discharges and Runoff Volumes • Factors Affecting Runoff Quantity
		Adaptation and Resilience	• Adaptation and resilience (climate change considerations, updated precipitation data)
		Water Quality	• Factors Affecting Runoff Quality
		Emerging Water Quality Challenges and Innovative Solutions	• Emerging contaminants (e.g., PFAs, microplastics) and Smart SCMs
3	DEP Stormwater Management Objectives	Overview of ME State Stormwater Regulations	• Section 2.1 of long memo
		Overview of Chapter 500 Standards	• Overview of updated Chapter 500 Framework and Terminology - Basic Standards, General Standards, Phosphorus Standard, Flooding Standard • Info from long memo, flow charts and visuals on how to determine which standards apply to projects- reference to new tool in Appendix B
4	Site Planning and Implementation of Control Measures	Overview of the Site Planning Process	• Permit and documentation requirements, design goals, site design techniques, etc. • Intro to SCMs (overview of all SCMs types, distinguish between retention and non-retention • Updated LID and Environmentally Sensitive Site Design Info (Clear Definitions)
		ESSD and LID Techniques	• Updated LID information • New Environmentally Sensitive Site Design (ESSD) information • Clear definitions and distinction between terms and how they relate to Ch 500
		SCM Selection	• Design Hierarchy / treatment trains • Updated BMP Selection Matrix from Vol III Ch 1- promote LID (LID > Retention > Structural) • Ability of SCMs to meet objectives (e.g., chloride, phosphorus, nitrogen, emerging contaminants, temperature; volume reduction; recharge) • Selection Criteria (e.g., land uses, physical feasibility, ME-specific such as cold climate etc.) • Setbacks
		Redevelopment/ Retrofits	• Redevelopment guidance (re-iterate redevelopment requirements from Ch 3) • Retrofit guidance

Proposed Manual Outline

PROPOSED (2025)			PROPOSED (2025) UPDATE NOTES
VOL I	STORMWATER MANAGEMENT AND TECHNICAL DESIGN		
Chap.	Title	Subheadings	To Include…
5	Design Criteria and Documenting Compliance	Requirements of Stormwater Standards	• Documentation/ requirements for Basic, General, Phosphorus (refer to Vol II), and Flooding Standard • Section on "self-treating" impervious surfaces (e.g., Central Maine Power substation yards, railroad ballast, artificial turfs) • Overview of Design Criteria and Sizing Guidance (e.g., peak rate, retention, pollutant removal, etc.)
		Alternative Analysis	• NEW Overview of Alternative Analysis for SCM Design
		Manufactured SCMs	• Acceptance of manufactured (i.e., proprietary) SCMs
		Infiltration and Soils Testing	• NEW Infiltration and soils testing guidance
		Example Calculations	• SCM example calculations for simple example sites (new vs. redevelopment) • Up to five examples per Chapter • [separate section or to be included in each applicable section- TBD]
6	Inspection, Maintenance, and Good Housekeeping	Inspection and Maintenance	• Overview of O&M (SCM-specific requirements to be included in App A fact sheets)
		Stormwater Monitoring	• Stormwater monitoring requirements and methods
Appx.	A. Stormwater Control Measure Fact Sheets	---	• Note on "fact sheets": Format similar to 2025 NH Stormwater Manual fact sheets • Fact sheet for LID/ESSD techniques; New techniques; Include nature-based options; Vol I App A landscape info • Updated SCM schematics (up to 10 new figures, including diagrams and illustrations in above Chapters), specs, design criteria • In addition to existing Vol III chapters, add notes on new: Source control SCMs, Retention SCMs, Smart SCMs, Manufactured SCMs, Rainwater harvesting SCMs per BAI research results
	B. Design Resources and Tools	---	• Design tools to be in callout boxes where applicable, then all listed in an Appendix • Dedicated webpage for tools so they can be updated without having to update the entire manual
		Up to 5 tools	• See **memo** for overview of proposed tools

Discussion Topics

- Needs Assessment and BAI Research
  - Do you agree with the top-ranked “needs” topics?
  - Are any “needs” topics missing or ranked too low?
  - Any additional BAI resources to look into?
- Design Tools
  - Do the potential tools feel practical and usable?
  - What would make them more effective (e.g., more checklists)?
  - Are there any other tools or types of tools that you expected to see?
- Manual Outline
  - Does the overall outline feel complete and logical?
  - Where could subheadings or more detail help?
  - What would make the manual easier to navigate and use in practice?

Other questions or input?

Next Steps

- Incorporate feedback from today's discussion, finalize findings.
- Finalize "Scope" for Manual Updates.
- Commence work on Draft 1 of the Manual.