April 28, 2023

Technical Guidance Coordinator
Pennsylvania Department of Environmental Protection
Policy Office
Rachel Carson State Office Building
P.O. Box 2063
Harrisburg, PA 17105-2063

Re: ***DEP ID*: 386-0300-001.** *Title*: Pennsylvania Post-Construction Stormwater Management (PCSM) Manual [53 Pa.B. 674]. Submitted via electronic mail at: https://www.ahs.dep.pa.gov/eComment/

The Marcellus Shale Coalition (MSC), a regional trade association with a national membership, appreciates the opportunity to submit comments regarding the above-referenced proposed PCSM Manual. The MSC was formed in 2008 and is currently comprised of approximately 140 producing, midstream, transmission and supply chain members who are fully committed to working with local, county, state and federal government officials and regulators to facilitate the development of the natural gas resources in the Marcellus, Utica and related geological formations. Our members represent many of the largest and most active companies in natural gas production, gathering, processing, transmission and utilization, in the country, as well as the supply chain companies, contractors and professional service firms who work with the industry.

The MSC appreciates the opportunity to offer the following comments on the above-referenced proposed PCSM Manual. The member companies of the MSC are proud of their cumulative efforts to date to strengthen domestic energy production, meet the needs of America's citizens and businesses, enhance our nation's national security, all the while doing so in a manner that protects and enhances our shared environment. The MSC offers the Pennsylvania Department of Environmental Protection (PA DEP or Department) the following comments.

General Comments

The MSC acknowledges that the purpose of the proposed PCSM Manual is a guidance document that establishes standards for the management of stormwater through the implementation of stormwater control measures (SCMs) and other measures to comply with the regulatory requirements under 25 Pa. Code Chapter 102. The standards established in the proposed PCSM Manual should be used by the Department and permit reviewers as guidance and allow for flexibility during the design, engineering, and permit process.

It has been the experience of the MSC and its members that the prior version of the PCSM Manual was utilized by permit reviewers as de facto requirements. Several members have experience throughout the permit review process that if SCMs were not designed exactly as the manual prescribed, then the engineered SCM control was denied during the permit application process. While the SCMs proposed in the PCSM Manual have the underpinning of regulation, it

is important to stress that, like other technical guidance documents of the Department, the PCSM Manual should not be regarded as regulation. The MSC strongly encourages the Department to recognize the legal limitation of guidance documents and emphasize this point in the internal training that the Department intends for its staff. Any final PCSM Manual should provide flexibility for state licensed engineers, geologists and other licensed professionals to propose SCMs that are best tailored for the project and site being developed – while still adhering to the current regulations.

The Erosion and Sediment Control General Permit (ESCGP) for oil and gas earth disturbance activities is a complex and lengthy process, utilizing multiple guidance manuals and adhering to numerous statutes and regulations. With this in mind, when the PCSM Manual is published as final, we would respectfully request that all ESCGP permits in the Department's review process that reference the version of the PCSM in existence at the time the permit was submitted, be reviewed accordingly. It is important to underscore that applicants incur thousands, and in many cases tens of thousands, of dollars in preparation for designing, writing and submitting permit applications. Applicants need to be able to definitively rely upon those guidance and policy documents in effect at the time a permit was submitted.

Conclusion

The MSC and its member companies take great pride in their efforts to conduct operations safely, efficiently, and in a manner that protects our shared environment and local communities, while at the same time meeting the critical energy needs of our citizens. We welcome the opportunity to discuss in greater detail any questions or need for clarification that you may have regarding our comments.

Sincerely,

David E. Callahan
President

Specific Comments

Chapter 1 – Introduction

1. The proposed PCSM Manual focuses on traditional land development activities requiring stormwater management BMPs that are not always practical or appropriate for the earth disturbance associated with oil and gas activities. The MSC recommends that the Department address these oil and gas activities and summarize how the PCSM Manual requirements should be applied.

Chapter 2 – PCSM Requirements

1. Section 2.1, Regulatory Interpretations of PA Code 102, Page 2-20 – The MSC recommends that the Department clarify if a site restoration or reclamation plan can satisfy the requirement for a PCSM Plan if it meets the regulatory requirements contained in regulations and Department guidance for other land development activities such as oil and gas and mining. The MSC's belief is that it should be adequate, presuming it adheres to the regulatory requirements, but an explicit acknowledgement of such would be beneficial to both permit applicants and for permit review staff to ensure any ambiguity is avoided.

2. Section 2.1, Regulatory Interpretations of PA Code 102, Page 2-25 - Is 102.8(f) regarding PCSM Plan Module 2, a requirement for the Oil and Gas ESCGP permit?

3. Section 2.1, Regulatory Interpretations of PA Code 102, Page 2-28 – The MSC requests specific examples of more stringent requirements for SCMs in HQ and EV watersheds. This should also be addressed in the context of the Oil and Gas draft policy for prioritized ESCGP reviews for project designs that incorporate the proposed policy-enhanced BMPs.

4. Section 2.1, Regulatory Interpretations of PA Code 102, Page 2-33 – The MSC requests that the Department clarify what additional information would be required by the Department for oil, gas, and mining activities in areas of special concern.

5. Section 2.1, Regulatory Interpretations of PA Code 102, Page 2-40 – The MSC is concerned that field staff from Conservation Districts and the Department are not adequately trained to request, review, and approve the PCSM controls. The MSC recommends that PA DEP undertake a training program with field staff on these controls due to their complexity, and how they should function when properly constructed. The MSC and/or our member companies would welcome the opportunity to provide technical support for this training program as many of our members are experts in the design and installation of PCSM controls.

6. Section 2.4 – Stormwater Analysis Scope, Page 2-55 - Many processes depend on the disturbance percentage of drainage area of the receiving stream. "Discharges" and "streams" are not clearly defined and could result in subjective application by the Department. The MSC recommends the Department provide definitions of these terms.

7. Section 2.4.4 – Point of Analysis (POAs), Page 2-58 - A Stream Stability Analysis could be required in some circumstances, despite the rate, volume, and water quality standards having been met. This analysis can be a significant cost and should only be a recommendation only and after careful consideration/justification. The MSC recommends specifically noting this in this section.

8. Section 2.4.6 – Stream Stability Analysis, Page 2-65 – The MSC is unclear why this assessment is "necessary", because under current regulations all discharge points from sites are already designed to avoid erosion potential downstream (i.e., pipe outfall protection, level spreaders, etc.). At a minimum, Section 2.4.6 seeks more clarification when a stream stability analysis would be required. For example, is it only recommended where there is non-sheet flow off of a project site when the project site area is 10% or more of the streams watershed area or is it recommended in all situations (even sheet flow and/or concentrated outfalls with outlet protection) when the project site area is 10% or more of the streams watershed area where from the project site enters the stream? The MSC suggests that these should only be recommendations and not requirements of the applicant.

   Generally, in headwaters, streams are limited in width, and are often ephemeral pending the characteristics of the watershed. Defined stream data for small headwater streams (bed, bank, slope) will be limited in publicly available PA LiDAR data, which is generally the industry standard for most topography on engineering site plans outside of the project limits of disturbance or study area. Publicly available PA LiDAR from 2019 and 2020 has a horizontal resolution of 2.5 feet, which is much larger than would be required to produce a stream analysis with a water surface difference tolerance of three inches for a small stream. This will require extensive field survey efforts to define stream characteristics and the surrounding topography. Stream channel sections are unlikely to tie in well with the surrounding topography and a geotechnical analysis will be required to support any sediment transport analysis.

   The Department should also consider that the ability to survey downstream of a project site may be limited due to property ownership and/or landowner permission. The accuracy of data sources commonly used by the industry, without extensive field survey, would not meet the accuracy tolerance needed for a 3-inch surface elevation threshold change. It would be unreasonable to predict water surface elevation within the defined threshold of three inches at headwater stream cross sections with reliable confidence in the results.

   Computer programs, such as HEC-RAS, will require an extensive number of cross sections above and below the area of study interest to avoid the influence of model boundary conditions at the upper end and lower end of the model in the results. This new study area recommendation by the Department in the draft PCSM Manual is in addition to the criteria of 100 feet upstream of any discharge location to 500 feet downstream of any discharge location as noted in Section 2.4.6. Additionally, this will require many surveyed points along the cross section to accurately resolve the true stream channel and

overbank areas. Pending the topography, cross sections may be required every several feet to accurately model that stream and overbanks in addition to the geotechnical analysis to define the streambed and overbank sediment parameters. Moreover, headwaters are often characterized by steeper slopes. HEC-RAS has a limitation to accurately compute water surface elevations for slopes greater than 0.1 based on the derivation of the energy equation used in the model, which may limit the application of the model and the accuracy of the results.

The Department should consider that this new recommendation being made in the draft PCSM Manual is likely to cause undue hardship and burden to owners, developers, and operators to prove non-erosion potential due to the limitations of available data and computer programs. It is recommended that the Department acknowledge certain limitations requested in this section (data, landowners, and other model considerations) that may limit the ability for a qualitative assessment to be performed at the three-inch water surface elevation difference threshold at any cross section. The Department should include an option for a qualitative assessment if a quantitative assessment can reasonably be demonstrated as unable to be performed.

9. Section 2.4.7 – Lakes and Ponds, Page 2-66 - Similar to Section 2.4.6, it is unclear why this assessment in Section 2.4.7 is recommended. According to current regulations, sites are designed to manage the net change in peak rates for the 2-, 10-, 50 and 100-year/24 hours storm events in a manner not to exceed pre-construction rates from a project site and manage the net change in runoff volume for storms up to and including the 2-year/24 hours storm event when compared to pre-construction conditions. At a minimum clarification is required to what extent downstream of a project site this assessment would need to be considered. For example, would a pond/lake 2000 ft downstream of a project site qualify as needing this quantitative assessment? If a project site area is 10% or more of the pond's or lake's watershed, to what extent downstream would a stream stability analysis be recommended?

   The Department should also consider that the ability to survey downstream of a project site may be limited due to property ownership and/or landowner permission to evaluate said requirement. Pending the downstream pond/lake size, the accuracy of the input data sources to conduct the analysis may not be reasonably attainable and may not meet the accuracy needed to reasonably compute the ponded depth difference noted in Section 2.4.7. Additionally, unlike regulated reservoirs defined by a published water control plan, the water level in a privately owned pond or lake may not have a defined published "normal pool" elevation. It may freely fluctuate with no defined threshold from year to year, or may fluctuate based on the time of year, inflows, and landowner withdraws. It may not be reasonable to define a pool to evaluate the six inches of ponding depth criteria. Moreover, the cited guidance "Pennsylvania Lacustrine Condition Level 2 Rapid Assessment Protocol" in Section 2.4.7 was designed for use to assess resource conditions in all natural or artificial lakes, reservoirs, ponds and large streams and rivers with drainage areas greater than 2,000 square miles and may not be applicable to many site development situations, particularly if the project site area is 10% or more than the size of the pond or lakes watershed.

The MSC recommends that the Department acknowledge certain limitations requested in this section (data, landowners, and other considerations) that may limit the ability for a qualitative assessment to be performed at the 6-inch ponded water difference threshold. The Department should provide the option for a qualitative assessment if a quantitative assessment can reasonably be demonstrated as unable to be performed.

10. Section 2.4.8 – Wetlands, Page 2-66 - It is unclear if this section is intended to apply to wetland within the project site, and/or if a wetland is downstream of a project site or both. If downstream of a project site, clarification is required as to what extent downstream of a project site this assessment needs to be considered. For example, would a wetland 2,000 feet downstream of a project site qualify as needing this quantitative assessment? Also, "existing ponding depth" as referenced in Table 2-3 is not defined. Unlike regulated bodies of water defined by a published water control plan, the water level in a wetland may not have a defined or published "existing ponding depth." It may freely fluctuate with no defined threshold from year to year, or may fluctuate based on the time of year, inflows, and beaver dams, etc. It may not be reasonable to define a "normal pond depth" to evaluate.

    The Department should also consider that the ability to survey downstream of a project site may be limited due to property ownership and/or landowner permission to evaluate said requirement. Pending the wetland location, the accuracy of the data sources to conduct the analysis may not be reasonably attainable and may not meet the accuracy tolerance needed for this analysis.

    The MSC recommends that the Department acknowledge certain limitations requested in this section (data, landowners, and other considerations) that may limit the ability for a qualitative assessment to be performed for the ponding water difference criteria in Table 2-3. The Department should provide the option for a qualitative assessment if a quantitative assessment can reasonably be demonstrated as unable to be performed.

Chapter 3 – SCM Technical Guidance

1. Section 3.2.4 – Preliminary Site Evaluation for Infiltration Capabilities, Step 2 Preliminary Testing, Page 3-13 – The PCSM Manual states, "Adequate and appropriate soils and geologic testing and evaluation must be performed to demonstrate the infiltration capacity of the project site. At a minimum, one infiltration test for every 40,000 square feet (SF) within the project site boundary should be performed with a minimum of four tests, equally distributed across a site."

    The MSC requests clarification on if the recommendation is one infiltration test or four infiltration tests in 40,000 square feet.

2. Section 3.2.5 – Site Evaluations for Potentially Contaminated Sites, Page 3-15 - This section is vague in terms of defining Acid Producing Rock (APR) or Potential Pollutant thresholds and are open to multiple interpretations across the PA DEP regional offices

and between reviewers. Protocols already exist to further define what APR is or is not, and what requires special handling or does not require special handling. The MSC requests additional detail be provided to define those thresholds for needed consistency and clarification purposes or at least provide references to appropriate regulatory documents.

The MSC recommends that the Department provide additional clarifying language that is consistent with and reference the PA DEP's existing publication entitled *'How to handle acid producing rock formations encountered during well site development'*. While the ideal goal is to avoid disturbing potential pollutants such as coal/APR, it is generally not practical given the multiple unnamed rider seams that crop out across a site, or which can simply disappear and reappear. Typically, this shallow 'coal' or potential APR is weathered out and with sulfur testing/results that come back <0.5%, they do not require any special handling or permitting. This threshold should be noted or at least referenced back to the *'How to handle acid producing rock formations encountered during well site development'* publication.

In the rare instance that sulfur testing of relatively shallow depths, that is typically common for most developments, comes back >0.5%, a defined plan for Acid Based Accounting that outlines the factor for Net NP = total tons net NP / (total tons overburden/1000), example 6 would be consistent w/ existing protocols as adequate for NNP should be noted and as such no special handling or permitting required.

3. Section 3.2.5 – Site Evaluations for Potentially Contaminated Sites, Page 3-15 - Environmental issues related to contaminated soils/groundwater not associated with the project owner(s) and not identified through due diligence (i.e., Phase I ESA) should be directed to the appropriate PA DEP regional office for investigation to identify a Responsible Party. Linear projects will have easement agreements and should not assign unknown liability to the project owner(s) for unknown environmental conditions. The Department provides no direction in the PCSM Manual of how to report environmental conditions not caused by the project owner(s) but identified during project execution. MSC recommends that PA DEP provide additional clarification in the PCSM Manual.

4. Section 3.4.5 – Retentive Grading, Table 3-24, Page 3-88 - SCM Recommendations by SCM Component states that infiltration testing is not needed when the SCM will be located within an existing woodland or meadow area that falls within HSG A, B, and C when confirmed through soil characterization testing. This contradicts other sections of the PCSM Manual. The SCM Analysis Methods of this section references Section 3.5.1 Bio infiltration for guidance on volume, water quality, and peak rate management credit which requires infiltration testing. Section B.2.2 Hydrologic Soil Group of Appendix B states that knowing only the HSG is not adequate for the infiltration rate design of an infiltration SCM.

   The MSC requests additional language and direction on what qualify this SCM to be excluded from infiltration testing should be added to the SCM Recommendations. Currently when this SCM has been proposed without a volume management component

testing has often been omitted. Clarifying the language would aid in reducing the amount of pre-construction activity and help to preserve the soil properties of areas suitable for this type of SCM.

5. Section 3.4.5 – Retentive Grading, Table 3-24, Page 3-88 - Underlying Soils – See Appendix B for infiltration testing *"requirements"*. If this SCM is proposed within an existing woodland or meadow with soil that falls into HSGs A, B, or C according to USDA soil maps and confirmed through soil characterization testing, then infiltration testing is not needed.

   The MSC recommends that the Department update this section and Appendix B to be a recommendation only, not a requirement as it is not in regulation. Further, if retentive grading is proposed in HSG D soils, infiltration testing with a minimum of 5 double ring tests could be required for each berm. This is excessive for smaller SCMs like infiltration berms, which are typically designed at regular intervals along proposed access roads. Additionally, the draft manual does not appear to specify what infiltration rate should be used for design/modeling if infiltration testing is not completed in HSG A, B, or C soils. Would the designer be responsible for selecting a representative rate that was determined during soil characterization testing?

6. Section 3.4.5 – Retentive Grading, Table 3-24, Page 3-88 – The MSC recommends an addition under the SCM-Specific Component of:

   "Preference should be given to construction of the berms by utilizing topsoil sourced from topsoil stockpile(s), if available, at the project site rather than excavation balancing within the berm infiltration area. Ber m material should be placed with small, tracked equipment to minimize compaction of soils and destruction of vegetation surrounding the berm, particularly the infiltration area upslope of the berm."

7. Section 3.4.5 – Retentive Grading, Table 3-24, Page 3-89 – The MSC recommends an addition under Vegetation Component of:

   "When berms are located within existing forested areas or existing meadow, preference should be given to retaining the existing vegetation, intact, upslope and downslope of the berm by utilizing small, tracked equipment to place topsoil stockpile derived berm material."

8. Section 3.4.5 – Retentive Grading, Table 3-25, Page 3-90 – The MSC recommends an addition under Filter Sock with Growing Media Component of:

   "At the time of installation, desired seeding should be mixed directly with the growing media prior to it being placed within the filter sock to facilitate rapid vegetative growth."

   "Socks should be staked using hardwood stakes to prevent movement. Stakes should remain in place for the lifetime of the stake to allow vegetation to produce roots throughout the growing media and into the soil under the sock."

The MSC recommends the addition of the below photo to illustrate use of a Filter Sock with Growing Media.

9. Section 3.5.1 – Bioinfiltration, Table 3-31, Page 3-105 – General – If the SCM is utilized as a temporary sediment basin during construction, excavation should be limited to no more than one (1) foot above the intended infiltration surface elevation in accordance with DEP's E&S Manual. Removal of sediments and native soils that are visibly saturated is required (often 1.5 feet to two feet) at the end of construction prior to conversion to a surface infiltration basin. Infiltration rates of infiltration surface must be confirmed by infiltration testing (see Appendix B).

   This implies that testing after the sediment basin is converted to bioinfiltration is necessary and requires inspection as a critical stage of construction. If the permit is approved, will PA DEP water quality inspectors be responsible for the confirmation of this additional testing, or will it become an NOT requirement? How will this be proven or reported?

10. Section 3.5.1 – Bioinfiltration, Table 3-31, Page 3-106 - Storage/Ponding Area – Maximum ponding depth of two feet for the 2 year/24-hour storm event should not be exceeded.

    In the prior PCSM Manual, surface ponding depth for rain gardens was limited to 6-12 inches maximum. Will the selected plant species for this SCM survive with the additional ponded water?

11. Section 3.5.2 – Surface Infiltration Basin, Page 3-113 - Surface infiltration basins are graded surface depressions that are located in areas with high infiltration potential and typically include vegetation (such as grasses that have a minimum height after mowing of six inches).

    Sand or gravel bottoms are considered an SCM Variation where the Department has used the draft PSCM Manual to require pretreatment for TSS. In the PA DEP PCSM Spreadsheet, would the 6 inches of grass, sand or gravel depth count as soil media depth in the volume tab to calculate appropriate water quality values? The MSC recommends that the Department change the word require to recommends since the PCSM Manual is guidance and not a regulation.

12. Section 3.5.2 – Surface Infiltration Basin, Table 3-34, Page 3-116 - General – The PCSM Plan preparer should consider other SCMs on sites with low design hydraulic conductivity rates (See Appendix B).

    Will justification be required to satisfy this recommendation? Figure B-2, PCSM Objective B and C Infiltration Decision Tree, specifically uses HSG D soils group in a decision example of having poor infiltration potential. Does that imply that if a site is all HSG D that deciding to use Objective B is still considerable? The MSC recommends that the Department specifically state that this is a recommendation only and not a requirement since the PCSM Manual is guidance and not a regulation.

13. Section 3.7 – MRC Design Standards, Page 3-237 - The MRC Design Standards sections lists a general maximum MRC drainage area size of 3 acres with no more than 1.5 acres from impervious. This differs from what was provided in the 2020 MRC guidance which utilized the above acreages as a guide for when County Conservation Districts should submit a PAG-02 to the DEP for further technical review. The stated maximum acreage listed also contradicts the guidance provided in Table 3-90 of Section 3.9, which recommends a contributing watershed size of 5 acres or less for MRC SCMs.

    The MSC recommends that the Department revise this section to clarify the recommended allowable drainage area size for MRC SCMs. Since its release the managed release concept has been retrofitted to several wet basin designs which typically have drainage areas of 5 to 10 acres.

14. Section 3.7.3 – MRC Karst, Pre-Construction Site Plan, Page 3-274 - GPR is not the most reliable geophysical technique to identify subsurface features in karst areas as the clay and possibly water content would be sufficient to mask any features. Other methods such as microgravity and seismic would be more efficient. MSC recommends including these in the PCSM Manual.

Appendix A – Precipitation

1. A.1 – Rainfall Patterns, Page A-1 – The PCSM Manual places significant confidence in models and trying to design for future conditions based on assumptions and small subsets

of data at specific locations. The MSC recommends that the Department be open to traditionally accepted stormwater modeling for the design of controls as this is based on accepted assumptions and more historic data sets.

2. A.1 – Rainfall Patterns, Page A-1 – The PCSM Manual states, “Daily potential ET, although a different order of magnitude than precipitation, tends to be highest in magnitude during the same seasons that precipitation is highest and most frequent.”

   The questions why PA DEP focuses on Daily potential ET when it is a different order of magnitude than actual precipitation for the purposes of modeling.

3. A.1 – Rainfall Patterns, Page A-1 – The PCSM Manual states, “Typically, high-intensity, short-duration local thunderstorms produce the largest runoff volume for small urban watersheds."

   While this may be the case, development throughout the Commonwealth is not centered solely on Urban watersheds, and as such, it is not relevant, unless other indications or recommendations are to be made about leniency for development in non-urban or rural watersheds.

4. A.1 – Rainfall Patterns, Page A-3 – The PCSM Manual states, “For example, to estimate a 100-year flood one should have at least 50 years of data.”

   This statement is not accurate. Stormwater is measured by rainfall events and not “floods”. The terminology does not follow traditional stormwater measurement methods, such as the SCS or TR-55 methods of design. MSC recommends deleting this statement and referring to acceptable stormwater methodology.

5. A.2 – Climate Change, Page A-3 – The impacts of climate change generally are gauged by knowledgeable experts over extended periods of time. Numerous studies have documented the inaccuracy of prior climate change impacts previously predicted under previous models. The MSC is concerned that the Department seems to rely on short-term models for climate change for the purposes of stormwater modeling. For the PCSM Manual PA DEP should recognize that the specific models predicting impacts of climate change often fluctuate even within the short-term and are often influenced by factors other than climate change as well. The Department should avoid affixing itself to any particular short-term model that past practice has demonstrated may become outdated or inaccurate in a relatively short period of time.

   Climate change should be looked at holistically, with due consideration for all factors that may impact the behavior of stormwater. All factors must be considered including the evapotranspiration effect. The broad concept of the hotter it is, the more evapotranspiration will take place is acknowledged but appears to be left out of the equation later. The softening of the raw actual rainfall values vs expected values from a model that the Department admitted did not simulate extreme precipitation well, should

dictate that actual data to be used rather than model data, because model data can easily be manipulated by modifiers and assumptions rather than facts.

6. A.2.1 – Background of Including Climate Change in Stormwater Analysis, Page A-4 – The Department is recommending the EPA Storm Water Management Model Climate Adjuster Tool, (SWMM-CAT) even though PA DEP states that "at this time global climate change models do not simulate extreme precipitation well."

   The MSC questions why the Department would recommend a stormwater modeling tool which they admit does not simulate precipitation well. The MSC recommends that traditional stormwater models should be acceptable as well. Moreover, given that the PCSM Manual is not a binding regulatory document, even if the Department retains the SWMM-CAT, it should explicitly recognize that other, traditional, stormwater models are appropriate tools to be utilized. The MSC is concerned that field personnel will decree that the SWMM-CAT must be utilized, which would effectively suggest the PCSM Manual is a binding regulatory document – which is not at all what a Manual is and even the Department has acknowledged is inappropriate.

7. A.2.1 – Background of Including Climate Change in Stormwater Analysis, Page A-4 – The PCSM Manual states, "SWMM-CAT projections result in a rainfall increase of about 6% between 2020 and 2050 for the 24-hour design storm depths, an increase that is comparable to the increase between NOAA's average 2-year/24-hour storm and the upper 90% confidence interval. An understanding of local climate change with respect to global climate change models is still at the infancy of current research. At the time of this writing, there has been one long-term data set developed for Philadelphia using best-known methods at the time established by PWD for planning purposes."

   The MSC again questions the thought process, if there is only one data set available for Philadelphia and presumably no data sets for the rest of the Commonwealth, then what is gained by attempting to utilize this method, particularly when it's stated that the design storm depths are similar to NOAA's 90% confidence interval? Even if there was confidence in the data set for Philadelphia – and the science regarding local climate change impacts is speculative at best – using Philadelphia as representative of the Commonwealth at large seems highly inappropriate. The MSC recommends this be deleted from the manual.

8. A.2.1 – Background of Including Climate Change in Stormwater Analysis, Page A-4 - When renewing a permit, will the values that were utilized during design/construction still be applicable, specifically for the Continuous Simulation method? What is the expectation if NOAA (or other) data is released during project design, prior to permit submittal?

9. A.2.1 – Background of Including Climate Change in Stormwater Analysis, Page A-4 - This section discusses Hurricane Agnes (which occurred in 1972) in the context of climate change. Hurricanes are a naturally-occurring weather phenomenon and have occurred long before the industrial revolution and mass urbanization and development.

The correlation to climate change is inappropriate. Additionally, while a hurricane is a common natural disaster, designing for such storm events is well beyond the confines of this Manual and 25 PA Code Chapter 102. It is therefore not practical to design SCMs for storm events of this magnitude. This makes the example irrelevant to the subject matter at hand and the MSC recommends removal of this paragraph.

10. A.2.1 – Background of Including Climate Change in Stormwater Analysis, Page A-5 – The PCSM Manual recommends, "that PCSM design continue to use the mean value of the 24-hour storm event depths from NOAA...for peak rate management." But then on Pages A-9 and A-10 the PCSM Manual states that the 2-yr/24-hour 90% interval should be used for rate as well. The MSC requests that the Department explain and resolve this contradiction and express the value recommended to be used (if any is to be retained in the final version).

11. A.3 – Precipitation in Pennsylvania, Page A-6 - The PCSM Manual in general and the data referenced therein is heavily focused on the Eastern region of Pennsylvania. Large cities, such as Pittsburgh, are mentioned for the first time in 400 pages in this section. The MSC recommends that the PA DEP consider making the manual more inclusive of the entire geography of the Commonwealth.

12. A.3 – Precipitation in Pennsylvania, Page A-7 – The PCSM Manual states, "Studies have also shown that an average of about a week of time is available between any storm events that are greater than 0.01 inch..."

    If this is the case, why do PA DEP reviewers require engineers to analyze back-to-back 100-yr/24-hr storms? The MSC recommends clarification and consistency. Applicants should not have to design for storm events that both experience and commonsense show have an extremely low degree of actual likelihood – even under the most aggressive models of climate change.

13. A.4 – Precipitation Data for Stormwater Methodologies, Page A-8 – In Table A-1: It appears that the "Design Storm" is the only method that is accepted for all analyses. The MSC requests clarification whether there will be an expectation to use other methodologies for specific SCMs moving forward. The MSC again points out that the information in the draft PCSM Manual are recommendations only and not requirements backed by regulation.

14. A.4 – Precipitation Data for Stormwater Methodologies, Page A-8 - How/When/Will the PCSM Spreadsheet be updated to account for analysis methods that are not the Design Storm? Currently the PA DEP Water Quality spreadsheet is required to be submitted as part of any permit, and the spreadsheet relies on the Volume tab, which is calculated via the Design Storm method.

15. A.5 – Design Storm Method, Page A-9 – The PCSM Manual states, "For modeling of storm events greater than the 2-year/24-hour storm event...the mean estimate as determined by partial duration statistics should be used."

The MSC requests clarification on if this means engineers are to use the 90% level for the 1 and 2-year events for both volume and rate and then the mean depth for any greater storm event?

16. A.5 – Design Storm Method, Page A-10 – There is an indication that differing precipitation data should be used when modeling peak rate versus volume, whereas the use of upper range for volume calculations should be completed, but the mean rate should be used for peak rate calculations. As rate and volume are interrelated, the same precipitation value should be used. Furthermore, there is already a significant factor of safety built into SCMs, through multiple means, including infiltration rates as an example. Adding additional volume mitigation, through the subjective increase to precipitation values is unnecessary and will be costly to development within Pennsylvania.

17. A.5.1 – How to Obtain Design Storm Precipitation Data, Page A-10 - The example listed in the center of this page references the 2-yr/24-hour 90% confidence interval values from Table A-3 then lists a 50-yr/24-hr storm that is not listed anywhere else on the page(s). This is confusing and does not aid the applicant in understanding the recommendation.

18. A.5.1 – How to Obtain Design Storm Precipitation Data, Page A-10 - Table A-3 and the paragraph immediately preceding the table above should include more information/clarity. As it is shown, it is not clear as to where the 50-year/24-hour storm event of 4.39 inches is coming from.

19. A.5.2 - NRCS Distributions Based on NOAA Atlas 14 Data and Precipitation Totals, Page A-11 – The PCSM Manual states, “Use of other legacy rainfall distribution (e.g., Type II) with the updated NOAA Atlas 14 data could introduce errors..."

    The MSC points out that this language is not clear as to what is being recommended. Will the Department refuse to accept Type II distributions when the PCSM Manual is finalized? Will the Department require that all applicants recreate Appendices A-1 through A-5 and import them into their own analyses? Additional clarification is needed. The MSC again points out the PCSM Manual is a guidance document and not regulation.

20. A.5.2 - NRCS Distributions Based on NOAA Atlas 14 Data and Precipitation Totals, Page A-12 - Figures A-6 and A-7 aren't clear. The MSC recommends that County labels on Figure A-6 be added. Further, MSC suggests that the Department develop interactive maps.

21. A.6.1 – How to Obtain Continuous Precipitation Data, Page A-14 - The domain linked to get to NOAA's website does not work. The 15-minute continuous precipitation data can be found correctly through an extensive search of NOAA's website, but it is not at the same link. The actual data is at https://www.ncei.noaa.gov/access

22. A.6.1 – How to Obtain Continuous Precipitation Data, Page A-14 – The PCSM Manual states, “The most recent rainfall record of 15 years from the closest NOAA station or other station that provides complete, reliable data should be used.”

    What constitutes complete, reliable data? The MSC presumes that all NOAA data is reliable. If not, who is making this interpretation? Are there any distance limitations for station selection?

23. A.7 – Precipitation Intensity for Inflow Design, Page A-7 – The PCSM Manual states, “SCM inflow components and conveyance systems, with the purpose of transporting flow to an SCM, should be analyzed and designed for all frequency storms."

    What do all storm events mean? Please define the events that are recommended to be analyzed as this language is vague and open to interpretation.

24. A.7 – Precipitation Intensity for Inflow Design, Page A-7 – The PCSM Manual states, “...studies illustrate that the designer can use longer periods of infiltration and ET without negatively impacting performance."

    Why are dewatering times as listed in Chapter 3 still capped (typically) at 72 hours? If, per comment above, an average of a week is typical between (most) storm events, why can a proposed SCM not dewater within 168 hours (7 days)? The MSC again states that the PCSM Manual is guidance only and the recommendations are not requirements.

25. A.7 – Precipitation Intensity for Inflow Design, Page A-7 – The PCSM Manual discusses the occurrence of back-to-back storm events. Within the Pennsylvania Code, Chapter 102.8 lists the requirements of modeling. This section of the PCSM Manual should not recommend modeling of back-to-back storm events.

26. A.7.1 – Intensity-Duration-Frequency (IDF) Curve Approach, Page A-2 – The PCSM Manual states, “With the exception of storm drains over 30 inches in diameter or other similarly large appurtenances, or areas with long overland flow paths, the duration used for design of inlets to SCMs should be five minutes.”

    The MSC questions why the actual Tc is not being recommended to size conveyance pipes? This will result in significant increases in pipe sizes and consequently costs for development. We request that the Department provide the chapter and section of the Pennsylvania code which allows for specific regulation of pipe sizing for stormwater conveyance. This is typically regulated at the local level through municipal ordinances. Furthermore, the proposed methodology is inconsistent with TR-55 and TR-20 which recommend a minimum Tc of 6 minutes – a nationally accepted methodology for stormwater design.

27. A-1: NOAA Atlas NRCS Rainfall Tables, Page A-4 – The PCSM Manual states, “When the NOAA-14 data server is updated, this appendix will require revision.”

The MSC requests that when updates occur that the Department provide a grace period for permits that are currently in for review and under development.

Appendix B – Soil Physics, Characterization, and Infiltration Testing

1. B.1.2 – Process, Page B-4 – The PCSM Manual states, "Soil characterization and infiltration testing for final SCM designs should be conducted by, or under the direct supervision of, either 1) a Soil Science Society of America (SSSA, formerly ARCPACS) Certified Professional Soil Scientist (CPSS); 2) a professional member of the Pennsylvania Association of Professional Soil Scientists (PAPSS); 3) a licensed Professional Geologist (PG) with professional experience and education in soil science; or 4) a licensed Professional Engineer (PE) with experience in soils and infiltration in Pennsylvania."

   The MSC points out that other design professionals may be qualified to conduct this work besides the four listed. We recommend stating a licensed professional with experience in soils and infiltration in Pennsylvania. (Registered Landscape Architects & Professional Land Surveyors are examples).

2. B.1.3 – Limited and Marginal Soils, Page B-8 - The PCSM Manual states, "If the average saturated hydraulic conductivity rate of underlying soils exceeds 10 inches/hour, soil media should be placed on the underlying soils to limit this rate. Saturated hydraulic conductivity of media placed in the field should be between 0.5 and 10 inches/hour and typically should not be more limiting than the underlying soil unless designed to reduce infiltration rates to the underlying soil (see Appendix J.10.1, Soil Materials and Engineered Media for more information)."

   These two sentences appear to be redundant. How is a saturated conductivity rate exceeding 10-inches/hour a problem in non-karst areas?

3. B.2 Soil Physics and Soil Properties, Figure B-3, Page B-9 - Example Comparison of infiltration testing and soil characterization testing for Preliminary Site Evaluation and SCM-Specific Design

   Two distinct phases are described in this figure and elsewhere in the manual when determining site infiltration: 1) Preliminary Site Evaluation requiring 1 test per 40,000 SF, with a minimum of 4 total tests, and 2) SCM Soil Characterization and Infiltration Testing requiring additional testing within the footprint or very proximal to the proposed infiltration SCM.

   These recommendations appear to have been updated to be consistent with guidance presented in the PA DEP's Managed Release Concept technical guidance document from 2018 (and most-recently updated in August 2020). Completing a Preliminary Site Evaluation with preliminary testing for infiltration would be un-useful and economically impractical for sites that are located in hilly or mountainous areas (the majority of central and western Pennsylvania's geographic territory). In these areas, designers primarily

select locations for infiltration SCMs based on topography, with SCMs typically placed at the lowest possible on-site elevations, where they will be able to capture the maximum amount of runoff. As such, the vast majority of a proposed industry well sites are located in hilly or mountainous terrain can be eliminated from consideration of infiltration SCMs based on topography alone, and without the unnecessary time/costs of the preliminary testing described in Section 3.2.4.

4. B.4 – Infiltration Testing, Page B-17 – The PCSM Manual states, "Acceptable infiltration testing methods include: Double Ring Infiltrometer tests and Single Ring Infiltrometer tests, such as Modified Phillip-Dunne (MPD) and Dual-Head Infiltrometer tests…Other methods may be accepted if accuracy can be documented by a licensed professional to have reasonable results when compared against methods included in this appendix...Percolation tests are not acceptable procedures for measuring saturated hydraulic conductivity."

   Infiltrometer testing is often not feasible in rocky soils where the rings cannot be properly seated and sealed. In addition, infiltrometer rings require significantly more water for testing, which can limit the number of tests that can be completed in a day on remote sites where a water source is not available (i.e. many proposed industry well sites in undeveloped, forested areas). In these situations, perc testing has historically been relied upon as an acceptable alternative. The MSC recommends provisions be added to this section to at least allow perc testing as an acceptable substitute for when double-ring or single-ring tests have been attempted but have been unsuccessful due to rocky soil conditions preventing the rings from being seated and sealed.

5. B.4 – Infiltration Testing, Table B-4, Page B-18 - Number of infiltration tests necessary per infiltration SCM. The PCSM Manual States, "For the final design of each infiltration SCMs, the minimum number of infiltration tests specified in Table B-4 should be performed within 100 feet of the infiltration SCM. At least one test must be within 25 feet of the final location of each infiltration SCM and within one vertical foot of each proposed infiltration interface (SCM bottom elevation)."

   Based on the table, the minimum number of tests for each SCM is 5 (double ring infiltrometer) or 8 (single ring infiltrometer). The recommended minimum number of tests is excessive, particularly for smaller-scale SCMs. For example, to fill five 12-inch diameter rings to a depth of 6 inches would take 15 gallons of water. With two presoaks and up to eight re-fillings to obtain readings, a total of 150 gallons of water would need to be on hand by the tester for each SCM. With testing often occurring in undeveloped, forested areas without vehicular access, transporting this much water for each proposed SCM can be impractical. The MSC recommends leaving the number of tests up to the discretion of the professional.

   Additionally, while testing within 1 foot of the proposed SCM bottom elevation is good practice, this should be revised to allow for testing within the same soil horizon as the proposed SCM bottom elevation. This is a reasonable approach that will allow more flexibility to adjust SCM bottom elevations during design.

6. B.6, Table B.9, Page B-28 – Applicability of Construction Confirmation Testing for Infiltration Capacity, Page B-28 - Infiltration SCMs* where the contractor does not meet the experience criteria (constructed at least three successful infiltration SCMs in the past two years).

   The MSC requests clarification on what the Department considers successful. For example, no less than 80% of the design value?

   In addition, the MSC requests clarification on what is an acceptable means to document success. Some examples may include:
   A letter from the contractor.
   A DEP/CCD approved Notice of Termination (NOT).
   SCM Construction report.

7. B.6 – Construction Confirmation Testing for Infiltration Capacity, Page B-28 – The PCSM Manual states, "The testing should be performed after major earthwork is complete and, preferably, prior to placing soil media or stone in an SCM, especially where an infiltration SCM has been used as a temporary E&S BMP during construction."

   The MSC agrees that conducting the infiltration verification test at this stage may be a prudent interim step during the construction process of the infiltration SCM prior placement of soil media or gravel. However, a test at this stage may not be reflective of the final post-construction performance of the basin in the permanently stabilized condition.

8. B.6 – Construction Confirmation Testing for Infiltration Capacity, Page B-28 – The PCSM Manual states, "Simulated runoff testing is a highly recommended method to verify infiltration capacity following construction as is discussed further below."

   The MSC Recommends removing the "highly recommended" portion of this statement. The statement should simply indicate it is a method but may not be suitable for all circumstances. For instance, simulated runoff testing may be a good method for the confirmation of a relatively small infiltration area, the use of this method for a larger basin would not be appropriate due to the sheer volume of water that would be required to achieve the six inches of ponding in the SCM to conduct the test. The selection of the appropriate verification method should be at the direction of the licensed professional/PCSM Plan Preparer.

9. B.6 – Construction Confirmation Testing for Infiltration Capacity, Page B-28 – The PCSM Manual states, "Infiltration capacity can also be observed and estimated during and after any storm that produces six inches of ponding in the SCM."

   The MSC requests clarification whether six inches is the minimum required depth. Basins' bottoms can be sloped – does the entire basin bottom need to be submerged? 2y-24hr max depth is 2 ft ponding?

10. B.6 – Construction Confirmation Testing for Infiltration Capacity, Page B-29 – The PCSM Manual states, "Construction infiltration testing should confirm that the SCM can function as intended, which is interpreted as no less than 80% of the design value."

    The MSC requests justification of the establishment of "no less than 80% of the design value" as the threshold if the SCM is functioning as intended.

    The MSC observes that this section establishes low-end limits as no-less-than 80% of the design value to be considered properly functioning, but provides no guidance for conditions when saturated hydraulic conductivity exceeds 10 inches/hr. (i.e., can you be 20% higher than the design value?) The guidance provides that soils with saturated hydraulic conductivity rates in excess of 10 inches/hr are recommended to have soil amendments or tamping. Upon achieving final subgrade elevations, a two-foot-thick layer of amended soil with a saturated hydraulic conductivity rate less than of 10 inches per hour should be placed across the entire cross-section of the infiltrating SCM, below the SCM bottom elevation. Is infiltration verification test then suggested again after placement of this material?

11. B.8 – Separation Distance and Mounding Analysis, Page B-31 – The PCSM Manual states, "Groundwater mounding, the process by which a mound of water forms on the water table as a result of recharge at the surface, can limit the effectiveness of an infiltration facility if it is not identified. As the SCM increases in size, it is necessary for the respective separation distance to also increase. A mounding analysis is generally warranted for Surface Infiltration Basin and Underground Infiltration Basin SCMs (see Section 3.5.2, Surface Infiltration Basin and Section 3.5.5, Underground Infiltration Basin) due to their large footprints. DEP/CCD may request that a mounding analysis be completed for any project."

    The MSC recommends that guidance of a mounding analysis should be added to this section.

Appendix C – Karst Terrain

1. C.2.1 – PCSM in Karst Terrain, Page C-3 - How is the risk assessment to be completed - is there guidance from PA DEP on completing this? Section 3.7.3 is the MRC Section with SCM Analysis Methods. There is one bullet point in Appendix C.3.1 on risk analysis that could be more detailed to be more helpful and remove any question on what PA DEP is seeking. There appears to be no guidance in Chapter 3, either. The MSC recommends the Department provide additional guidance on how the risk assessment is to be completed.

2. C.2.1 – PCSM in Karst Terrain, Page C-3 - The definition of active karst is unclear and there is no definition of epikarst. MSC recommends that active karst be defined; more specifically, what is happening between the surface and 33 feet below grade. A top-down definition, rather than bottom-up definition of active karst, would be more informative.

3. C.2.1 – PCSM in Karst Terrain, Page C-4 - Competency of the bedrock and degree of fractures in the rock are needed only if the infiltration directly onto bedrock is proposed. In most cases it is not since bedrock is a limiting zone.

4. C.2.6 – Water Quality Protection. Page C-9 – MSC recommends that Improved Sinkholes be defined and how they can be used as an SCM.

5. C.3.1 – Identification and Characterization of Karst Site Conditions, Page C-10 – The MSC recommends that Karst features should be defined or listed in the narrative rather than in the definitions section. Examples include:

   Sinkholes;
   Closed depressions;
   Lineaments in carbonate areas;
   Fracture traces;
   Caverns;
   Intermittent lakes;
   Ephemeral disappearing streams;
   Bedrock pinnacles (surface or subsurface).

Appendix D – Evapotranspiration

1. D.3.6 – How DEP's PCSM Spreadsheet Accounts for ET, Page D-9 - Will the Department offer training to designers and engineers to detail how the new Evapotranspiration (ET) design storm approach is modeled and calculated in the new PA DEP PCSM Spreadsheet?

2. D.3.6 – How DEP's PCSM Spreadsheet Accounts for ET, Table D-6, Page D-9 - Will the PA DEP consider overrides to the "simplified version" or how ET or evaporation is accounted for in various soil types? The ET and Infiltration void space recovery listed in Table D-6 specifies only sandy loam soil.

3. D.3.7 – Vegetated Infiltration SCMs with Periodic Ponding, Page D-10 - Will the Department offer additional guidance or publish a list, or matrix, for designers to utilize in order to appropriately select which ET Volume calculation or equation to utilize based on commonly deployed SCMs? Some SCMs, such as Infiltration Berms designed to utilize both amended soils for infiltration and an underdrain system outfitted with a butterfly valve, can be operated or considered to be both an infiltration SCM and an MRC.

4. D.3.7 – Vegetated Infiltration SCMs with Periodic Ponding, Table D-7, Page D-11 - The "Media Depth" as listed in Table D-7 is expected to represent the rooting depth of the vegetation as proposed or designed in the Vegetated Infiltration SCM. However, soil depth can be used as a design substitute or proxy as mentioned in Equations D-1, D-2,

and D-3. Will the Department consider providing an additional Vegetation Rooting Depth Appendix for designers to utilize?

Appendix E – Hydrologic Budget and Water Balance

1. E.3 – Water Balance Management Strategies, Page E-6 - The water management strategies as detailed in this section appear to only be acceptable in urban development areas. Will the Department consider providing additional guidance or examples that can be utilized in a more rural setting. For example, where the use of a green roof is not feasible, such as proposed site development that does not include buildings or structures.

Appendix F – Volume Management Analysis Methods

1. F.1.1 Design Storm Analysis Method to Demonstrate Volume Management, Page F-2 - The Department is applying a 25% reduction to the infiltration credit for SCMs utilizing an underdrain. The MSC recommends that the PA DEP consider removing this reduction if the proposed underdrain is capped and only to be implemented for maintenance of the SCM.

2. F.4.1 Bioinfiltration with Various Underlying Infiltration Rate – Continuous Simulation Example, Figure F-11, Page F-5 - The bioinfiltration SCM footprint to meet the ponding requirement of 72 hours for HSG, C3, and D in the example shown on Figure F-11 are 5,800 and 34,000 SF, respectively. Sites with unfavorable soils are commonplace in Northeast PA, and large SCM footprints such as the ones listed above in order to meet the ponding requirement are rarely feasible. The 72-hour ponding requirement is likely to be the determining design factor on a large majority of sites, resulting in an increase of MRC SCMs to manage stormwater.

   The MSC is concerned about how Department staff will inspect and authorize successful closure of ESCGP Permits during the NOT process. Moreover, what field observation will need to be conducted in order to determine if the MRC SCM is functioning properly and as designed. In some cases, Department staff have denied NOTs when standing water is observed within the MRC SCS. The MSC recommends providing additional guidance to Department staff in order to determine when standing water is acceptable and a function of the MRC SCM.

1. K.3 – Routine Inspections, Page K-7 – The PCSM manual states, “At minimum, inspections should occur annually and following the end of storm events exceeding 2.5 inches.” There are additional inspection guidelines for karst areas. If an inspection is suggested, the manual should state that they are being suggested. The MSC again points out that the PCSM Manual is a guidance document and the information contained are recommendations only and not regulation.

2. Table K.4, Page K-6 - The Department does not distinguish between naturally occurring foam and oily sheen versus chemical contamination. This guidance could lead to unnecessary water disposal. The MSC recommends the PA DEP provide clarification.

3. K.7 – Record Keeping, Page K-18 - The department does not provide any record retention timeline. This expectation may be specified in applicable permits, and the MSC recommends the PCSM Manual refer to the applicable permits.