



Connecticut Fund
for the Environment

Save the Sound®

**COMMENTS ON PROPOSED DEEP GENERAL PERMIT FOR
THE DISCHARGE OF STORMWATER AND DEWATERING
WASTEWATERS FROM CONSTRUCTION ACTIVITIES**

FEBRUARY 12, 2020

Connecticut Fund for the Environment/Save the Sound is a nonprofit organization representing over 4,200 member households and 10,000 activists statewide. Our mission is to protect and improve the land, air, and water of Connecticut and the entire Long Island Sound region. We use legal and scientific expertise and bring citizens together to achieve results that benefit our environment for current and future generations.

We are pleased to submit the following comments on the Connecticut Department of Energy and Environmental Protection's ("DEEP") Draft General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, Permit No. DEEP-WPED-GP 151 ("Stormwater Permit"). This permit will authorize construction activities and associated stormwater and dewatering wastewater discharges ("construction discharges") as regulated under relevant federal and state regulations.

We ask that DEEP strengthen the general permit in the following ways:

- (1) The general permit should call attention to, and require compliance with, specific provisions in the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control and the 2004 Connecticut Stormwater Quality Manual (e.g. swale design, stormwater management basin design, stream channel protections, and peak runoff attenuation).
- (2) Two rows of erosion control barriers, such as silt fences, should be required during construction activities on sites with sensitive conditions.
- (3) The hydrologic soil group reduction required under Appendix I should apply to all construction activities under the general permit (not just solar activities).
- (4) Hydrologic soil groups should be reduced by two steps where sites are regraded by more than two feet.

We ask that DEEP strengthen Appendix I in the following ways:

- (1) Impervious cover designations should be used for all calculations, not just water quality volume calculations.
- (2) The permit should require that designs ensure sheet flow runs downgradient towards stormwater management features and that compliance is inspected and enforceable.
- (3) Instead of referencing Figure 1, vegetation requirements should be put into writing that ensures establishment of sheet flow conditions and sufficient ground coverage.

- (4) The permit should require native vegetation, encourage pollinator-friendly vegetation, and allow agricultural vegetation.
- (5) The use of chemical fertilization, herbicides, and pesticides should be prohibited except as necessary to establish vegetation.
- (6) The permit should require that post-construction stormwater control measures be designed and constructed to provide permanent stabilization and non-erosive conveyance of runoff on the site, to the property line of the site, or downgradient from the site so as to protect on and off-site water resources.

CFE/Save the Sound members use, enjoy, live adjacent to or near, and otherwise benefit from Long Island Sound and other waters of Connecticut. As a result, our members are directly and adversely impacted by construction discharges regulated by the Stormwater Permit. CFE/Save the Sound members participate in numerous water quality-related activities in, on, or near these waters. These activities include, but are not limited to, fishing, sailing, rowing, canoeing, kayaking, pleasure boating, sightseeing, hiking, wildlife watching, other forms of recreation, education, conservation work, various scientific endeavors, and aesthetic enjoyment. CFE/Save the Sound members would increase their use of these waters if they were not so concerned about pollution from construction discharges that are the subject of the Stormwater Permit.

Construction discharges cause or contribute to pollution levels in Long Island Sound and other waters of Connecticut used by CFE/Save the Sound members that are injurious to human health, wildlife, and the aesthetic qualities of those waters. These discharges threaten the health and welfare of CFE/Save the Sound members, impair and threaten members' use and enjoyment of the above-mentioned waters, deny them the level of water quality to which they are legally entitled under Conn. Gen. Stat. §§ 22a-430, 22a-430b, 22a-19 and the federal Water Pollution Control Act, 33 U.S.C. § 1251 et seq., and deprive them of procedural rights and protections provided under such statutes. Adopting the prudent and feasible alternatives set forth herein would redress the above-described injuries.

At the same time, CFE/Save the Sound members are facing, and will increasingly face, the impacts of climate change. Sea level rise, air pollution, species loss, and heat waves are among the many negative consequences of climate change that threaten the members of CFE/Save the Sound and the state at large. Connecticut is currently committed to reducing greenhouse gas emissions by 45% below 2001 levels by 2030.¹ To meet this goal, the state requires—and CFE/Save the Sound supports—robust and swift procurement of solar power. Granted, the construction of solar arrays, like all construction activities, can lead to environmental consequences. The state therefore must carefully regulate stormwater discharges so as to balance the need for renewable energy with the assurance that construction activities in general do not cause or contribute to the impairment of our waters. Along these lines, thoughtful solar siting is critical. Core forests and other green spaces should be avoided, while industrial sites, brownfields, and rooftops should be encouraged whenever possible.

Stormwater runoff is one of the most serious problems facing water quality in Connecticut today. Construction activities remove vegetation and compact soils. Constructed infrastructure collects

¹ Conn. Gen. Stat. § 22a-200a(2).

pollutants and alters the flow of stormwater. As a result, every time it rains, water runs off impervious surfaces, flows over the landscape, and causes flooding, erosion, and sedimentation. This polluted stormwater runs towards streams, lakes, and Long Island Sound, degrading water quality. Stormwater has been identified by DEEP as a potential source of pollution for waterbodies throughout the state that are failing to meet minimum water quality standards to support uses such as aquatic and wildlife support and recreation. Stormwater pollution leads to waterbodies that cannot adequately sustain fish and other marine life, closed beaches and shellfish beds, and an unhealthy Long Island Sound. Implementing a strong Stormwater Permit is a critical step to protecting these waters.

The current Stormwater Permit is missing significant elements required for the protection of Connecticut's natural resources. In order to improve the Stormwater Permit, we offer the following comments.

I. Changes to the General Permit

a. The general permit should call attention to, and require compliance with, specific provisions in the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control and the 2004 Connecticut Stormwater Quality Manual.

The general permit broadly requires compliance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control ("Guidelines") and the 2004 Connecticut Stormwater Quality Manual ("Manual"). However, as indicated in comments submitted by Steven Trinkaus, PE, this broad obligation is insufficient. Engineers commonly supplant, rather than supplement, these guidance documents with their own judgment, leading to decisions that do not comply with accepted best practices.

DEEP can address this problem by calling attention to specific requirements from the Guidelines and Manual and expressly mandating compliance with these requirements. For example, the permit could require that all swales and stormwater management basins be designed in compliance with the Manual. The permit could also mandate compliance with the Manual's stream channel protection and peak runoff attenuation requirements. These provisions should be part of the Stormwater Pollution Control Plan ("SWPCP") under Section 5(b)(1)(A) or (B) of the general permit.

Bringing obligations of the Guidelines and the Manual to the forefront will ensure the SWPCP minimizes soil erosion and stormwater pollution in accordance with established protective standards.

b. Two rows of erosion control barriers, such as silt fences, should be required during construction activities on sites with sensitive conditions.

Erosion control barriers such as silt fences are critical for intercepting sediment from disturbed sites during construction. In Connecticut, the Guidelines generally require that one erosion control barrier be implemented to achieve this protective purpose. However, these barriers often

fail due to inadequate installation or maintenance.² As a result, it is generally more effective to implement multiple barriers that provide several lines of defense against erosion and sedimentation.³ The general permit should require two rows of erosion control barriers during construction activities on sites with sensitive conditions, such as proximity to waterbodies and steep slopes.

Several other states require or strongly encourage the use of two erosion control barriers. For example, Georgia requires two rows of barriers along sensitive areas, including all state waters.⁴ Maine similarly recommends two rows of sediment barriers near natural resources and on steep slopes.⁵ New Jersey also suggests two rows of silt fences along sensitive areas such as stream buffers.⁶ Additionally, Iowa recommends installing two rows of silt fences at all sites.⁷ This list provides a mere sampling of state standards across the country. Connecticut should follow this precedent and require two rows of erosion control barriers on sites with sensitive conditions.

- c. The hydrologic soil group reduction required under Appendix I should apply to all construction activities under the general permit (not just solar activities). Additionally, hydrologic soil groups should be reduced by two steps where sites are regraded by more than two feet.**

Construction compacts soils, significantly reducing infiltration and consequently increasing the volume of runoff.⁸ Pre-development soil classifications can accordingly skew stormwater calculations by overrepresenting the final infiltration capacity of a site.⁹ In general, designs based on pre-development soil classifications are unlikely to ensure sheet flow conditions.¹⁰ DEEP's proposed stormwater permit acknowledges this challenge in Appendix I, under Section 3(c) of the "design requirements for post-construction stormwater management measures." In this Section, the permit requires that hydrologic analyses reduce the hydrologic soil group of the site by one step to account for compaction.

This soil compaction, however, is not limited to the construction of solar arrays—all construction causes soil compaction. Therefore, this provision would be more appropriately placed within the

² S.J. Cooke, J.M. Chapman, & J.C. Vermaire, *On the Apparent Failure of Silt Fences to Protect Freshwater Ecosystems from Sedimentation: A Call for Improvements in Science, Technology, Training, and Compliance Monitoring*, 126 J. ENVTL. MGMT. 67, 69 (2015); Jon Harbor, *Engineering Geomorphology at the Cutting Edge of Land Disturbance: Erosion and Sediment Control on Construction Sites*, 31 GEOMORPHOLOGY 247, 257–58 (1999).

³ Cooke, Chapman, & Vermaire, *supra* note 2, at 71.

⁴ GA. SOIL & WATER CONSERVATION COMM'N, FIELD MANUAL FOR EROSION & SEDIMENT CONTROL IN GEORGIA 106 (2016), <https://gaswcc.georgia.gov/document/document/field-manual-erosion-and-sediment-control-georgia-2016-edition-pdf/download>.

⁵ ME. DEP'T OF ENVTL. PROT., MAINE EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES (BMPs) 21 (2016), https://www.maine.gov/dep/land/erosion/escbmps/esc_bmp_engineers.pdf.

⁶ N.J. DEP'T OF TRANSP., SOIL EROSION AND SEDIMENT CONTROL STANDARDS 103 (2008), <https://www.state.nj.us/transportation/eng/documents/SESC/pdf/SESCStandards2008.pdf>.

⁷ IOWA DEP'T OF TRANSP., EROSION AND SEDIMENT CONTROL FIELD GUIDE 80 (2017), https://iowadot.gov/construction_materials/earthwork_erosion/Erosion_Sediment_Control_Field_Guide.pdf.

⁸ J.H. Gregory, et al., *Effect of Urban Soil compaction on Infiltration Rate*, 61 J. SOIL & WATER CONSERVATION 117, 117 (2006).

⁹ *See id.* at 122.

¹⁰ *See id.*

requirements of the general permit. Soil group reductions should apply to stormwater modeling and calculations for *all* covered construction projects.

Furthermore, this one-step reduction is insufficient in some cases. As Mr. Trinkaus explains in his comments, a two-step reduction would be more appropriate where sites are regraded by more than two feet. This reduction is recommended for both cutting and filling activities because both significantly reduce soil quality. Cutting removes soil organic matter, decreasing stability and infiltration capacity, thereby increasing erosion potential.¹¹ Fill material also typically has a lower infiltration capacity because it is more compact. Accordingly, where cutting and filling is significant, a two-step reduction in soil quality is fitting.

II. Changes to Appendix I: Stormwater Management at Solar Array Construction Projects

a. Impervious cover designations should be used for all calculations, not just water quality volume calculations.

Under the “design and construction requirements” for solar projects, Section 1 explains when roadways, gravel surfaces, transformer pads, and solar panels (“solar infrastructure”) will be considered impervious cover. This Section states that on post-construction slopes above 15%, or on slopes under 15% that fail to meet certain conditions, solar infrastructure is considered impervious only for the purposes of calculating the water quality volume. The triggers for this designation are acceptable, but the designation’s function should be broadened. The amount of impervious cover at a site is typically used for other calculations in addition to the water quality volume, including for example groundwater recharge volume. This designation should therefore be expanded to cover all stormwater calculations.

Without this change, calculations can be significantly underestimated. Solar infrastructure consists of impervious surfaces that collect and direct stormwater at locations different from where it would naturally fall. Solar infrastructure also increases the amount of water occurring at a given location, thereby increasing erosion. These problems are exacerbated when construction causes soil compaction and reduces infiltration rates. These unnatural changes must be accounted for in all stormwater management calculations to properly mitigate negative consequences to the environment. Therefore, solar infrastructure should be considered impervious for all stormwater calculations when slope is greater than 15% or other conditions are not met.

b. The permit should require that designs ensure sheet flow runs downgradient towards stormwater management features and that compliance is inspected and enforceable.

Under the solar “design and construction requirements,” Section 1(b) should require that designs ensure sheet flow runs downgradient towards stormwater management features. Without this design requirement, stormwater can run off solar panels into contours incidentally created during

¹¹ K. R. Brye, et al., *Short-Term Effects of Land Leveling on Soil Chemical Properties and Their Relationships with Microbial Biomass*, 68 SOIL SCI. SOC’Y AM. J. 924, 927 (2004).

construction. This can result in concentrated flow that creates channels parallel to the rows of solar arrays—instead of running downgradient or towards engineered management features. As Mr. Trinkaus explains in his comments, this flaw contributed to recent problems in East Lyme, Connecticut. Therefore, the permit should include a provision ensuring sheet flow actually runs perpendicular to the solar panels as it is intended to run. Moreover, compliance with this provision must be inspected with sufficient regularity from design to construction and beyond. DEEP also must be able to enforce compliance with this provision, and enforceability should be made explicit in this Section.

- c. Instead of referencing Figure 1, vegetation requirements should be put into writing that ensures establishment of sheet flow conditions and sufficient ground coverage.**

Under the solar “design and construction requirements,” Section 1(c), bullet point 1 states, “appropriate vegetation shall be established as indicated in Figure 1.” This language should be removed and replaced. Figure 1 depicts short, homogeneous, grassy vegetation. Stating that vegetation must match this illustration is limiting—it implies that only grasses may be established. However, other vegetation may provide greater runoff absorption or co-benefits for the ecosystem. Indeed, the Manual suggests a wide variety of herbaceous plants that can withstand cycles of inundation and drought while providing benefits such as slope stabilization.

The reference to Figure 1 should be replaced with general language that makes clear appropriate vegetation is not limited to grasses. This replacement language should also require vegetation that will ensure sheet flow conditions and that will provide sufficient ground coverage. By way of example, Minnesota¹² and Pennsylvania¹³ require at least 90% vegetation coverage at solar sites.

- d. The permit should require native vegetation, encourage pollinator-friendly vegetation, and allow agricultural vegetation.**

Under the solar “design and construction requirements,” Section 1(d), additional language about vegetation should be added to encourage supplemental sustainable practices. First, this Section should state that vegetation must be native. As DEEP itself has acknowledged, “Plant species that are native to the region are well adapted to the climate. They are accustomed to the type of soil and the amount of rainfall that we have here in New England. Once the plants are established, they will require little or no maintenance.”¹⁴

¹² MINN. POLLUTION CONTROL AGENCY, MINNESOTA STORMWATER MANUAL: STORMWATER MANAGEMENT FOR SOLAR PROJECTS AND DETERMINING COMPLIANCE WITH THE NPDES CONSTRUCTION STORMWATER PERMIT (2019), https://stormwater.pca.state.mn.us/index.php/Stormwater_management_for_solar_projects_and_determining_compliance_with_the_NPDES_construction_stormwater_permit.

¹³ PA. DEP’T OF ENVTL. PROT., CHAPTER 102 PERMITTING FOR SOLAR PANEL FARMS: FREQUENTLY ASKED QUESTIONS 2 (2019), http://files.dep.state.pa.us/Water/BNPNSM/StormwaterManagement/ConstructionStormwater/Solar_Panel_Farms_FAQ.pdf.

¹⁴ CONN. DEP’T OF ENERGY & ENVTL. PROT., *DEEP’s Native Plant Garden at 79 Elm Street* (last updated Apr. 2019), https://www.ct.gov/deep/cwp/view.asp?a=2702&q=322452&deepNav_GID=1641.

Second, this Section should state that pollinator-friendly vegetation is encouraged. At least one state, North Carolina, already does this.¹⁵ Pollinator species are rapidly declining. Connecticut alone lost 39.6% of its bee colonies last year.¹⁶ Resolute protective action is necessary wherever possible. Pollinator-friendly plants are consistent with the sustainable mission of solar power and provide one simple step developers can take—without jeopardizing stormwater infiltration potential. Therefore, the Stormwater Permit should encourage pollinator-friendly vegetation.

Third, this Section should state that agrivoltaics (agriculture co-located with solar arrays) is allowable, provided that it complies with the letter and the spirit of the Stormwater Permit. Agrivoltaics can reduce competition between land uses, enabling both farming and solar power to exist in harmony.¹⁷ In fact, crops such as tomatoes may even grow better in the shade of solar arrays.¹⁸ Lettuce similarly grows well with solar due to its high shade tolerance.¹⁹ At least one state, Pennsylvania, has expressly stated it will allow agrivoltaics under its stormwater permitting for construction activities associated with solar arrays.²⁰ Connecticut's Stormwater Permit should likewise include a provision that allows agrivoltaics where such practices are consistent with set standards for stormwater management.

e. The use of chemical fertilization, herbicides, and pesticides should be prohibited except as necessary to establish vegetation.

Under the solar “design and construction requirements,” Section 1(d) should prohibit the use of chemical fertilization, herbicides, or pesticides except as necessary to establish vegetation. These chemicals are inconsistent with the sustainable mission of solar arrays. They cause harm to human health and the environment, creating problems ranging from eutrophication to cancer. Several other states, including Minnesota,²¹ Pennsylvania,²² and North Carolina²³ have prohibitive provisions in their stormwater permits and manuals. Connecticut should similarly prohibit chemical fertilizers, herbicides, and pesticides at solar sites under the Stormwater Permit.

¹⁵ N.C. DEP'T OF ENVTL. QUALITY, *Solar Farms*, in STORMWATER DESIGN MANUAL 3 (2017), <https://files.nc.gov/ncdeq/Energy%20Mineral%20and%20Land%20Resources/Stormwater/BMP%20Manual/E-6%20%20Solar%20Farms.pdf>.

¹⁶ BEE INFORMED PARTNERSHIP, 2018/19 TOTAL ANNUAL ALL COLONY LOSS, <https://research.beeinformed.org/loss-map/>.

¹⁷ Hélène Marrou, *Co-Locating Food and Energy*, 2 NATURE SUSTAINABILITY 793, 793 (2019); Harshavardhan Dinesh & Joshua M. Pearce, *The Potential of Agrivoltaic Systems*, 54 RENEWABLE & SUSTAINABLE ENERGY REVIEWS 299, 300 (2016).

¹⁸ Marrou, *supra* note 17, at 793.

¹⁹ Dinesh & Pearce, *supra* note 17, at 300.

²⁰ PA. DEP'T OF ENVTL. PROT., *supra* note 13, at 5–6.

²¹ MINN. POLLUTION CONTROL AGENCY, *supra* note 12.

²² PA. DEP'T OF ENVTL. PROT., *supra* note 13, at 3.

²³ N.C. DEP'T OF ENVTL. QUALITY, *supra* note 15, at 2–3.

- f. The permit should require that post-construction stormwater control measures be designed and constructed to provide permanent stabilization and non-erosive conveyance of runoff on the site, to the property line of the site, or downgradient from the site so as to protect on and off-site water resources.**

Under the solar “design and construction requirements,” Section 1 should be reworded to state, “Post-construction stormwater control measures shall be designed and constructed to provide permanent stabilization and non-erosive conveyance of runoff *on the site*, to the property line of the site, or downgradient from the site *so as to protect on and off-site water resources*” (added language italicized). As written, the provision fails to account for on-site conveyances and water resources. The supplementary language suggested here provides clarity and added protection, and it should therefore be included in the Stormwater Permit.

Thank you for the opportunity to comment on these important matters.

Sincerely,



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