Water Infrastructure
FINANCING PROGRAMS

Clean Water State Revolving Fund (CWSRF)

Policy:	**Gray and Green Stormwater Infrastructure and Projects Definition**	**Effective Date:**	**3/29/2019**
Applicable To:	**Department of Environmental Conservation, Facilities Engineering Division**	**Revision Date:**	**3/29/2019**
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Policy Objective

The purpose of this policy statement is to define gray and green stormwater infrastructure projects for purposes of funding within Vermont's Clean Water State Revolving Fund. Both gray and green stormwater infrastructure and project types may qualify for CWSRF loans. This policy defines Green Stormwater Infrastructure projects. There are several definitions and policies to be considered.

Impacted Departments or Divisions

The Facilities Engineering Division (FED) within the Department of Environmental Conservation (DEC).

Governing Documents

1. 1972 Federal Clean Water Act, Section 212 & 319
2. 2014 Water Resources Reform & Development Act
3. 2012 Clean Water State Revolving Fund 10% Green Project Reserve: Guidance for Determining Project Eligibility
4. 2016 Overview of Clean Water State Revolving Fund Eligibilities
5. Vermont Statutes 10 V.S.A., Chapter 55; 24 V.S.A., Chapter 120
6. 2017 Environmental Protection Rule Chapter 2: Municipal Pollution Control Priority System
7. Vermont Stormwater Rules and Stormwater Manual (Latest Version)

Background

With the passage of the Water Resources Reform and Development Act (WRRDA) in June 2014, Congress expanded the eligibility of projects for funding from the Clean Water State Revolving Loan Fund to include a broad array of green stormwater infrastructure types. On June 17, 2016 EPA issued the Lake Champlain TMDL for phosphorus and in May of 2017 Vermont issued the Lake Memphremagog TMDL for phosphorus. Compliance with both TMDLs is projected to require a variety of water quality improvement projects including green stormwater infrastructure projects. CWSRF and the State of Vermont already have several definitions of

green and gray infrastructure. There is also a CWSRF framework for defining a green project. This paper will help to determine how and when to use the existing definitions and how to distinguish green from gray.

EPA's website provides the following contrasting definitions for gray and green stormwater infrastructure. ***Traditional "gray" stormwater*** *is designed to move urban stormwater away from the built environment and includes curbs, gutters, drains, piping, and collection systems. Generally, traditional gray infrastructure collects and conveys stormwater from impervious surfaces, such as roadways, parking lots and rooftops, into a series of piping that ultimately discharges untreated stormwater into a local water body. Whereas,* ***"green" stormwater infrastructure*** *is designed to mimic nature and capture rainwater where it falls. Green infrastructure reduces and treats stormwater at its source while also providing multiple community benefits.* [1]

Currently, for projects to be funded through Vermont's CWSRF, they need to meet the state definition for Clean Water Project.

1. "**Clean water project**" means "water pollution abatement and control facilities" as defined in 10 V.S.A. SS 1571, and such equipment, conveyances, structural or nonstructural facilities, and natural resource projects that are needed for and appurtenant to the prevention, management, treatment, storage, or disposal of stormwater, sewage, or waste, or that provide water quality benefits, including a wastewater treatment facility, combined sewer separation facilities, and indirect discharge system, a wastewater system, flood resiliency work related to a structural facility, or a groundwater protection project.
2. ***"Water pollution abatement and control facility"*** *means; such equipment, conveyances, and structural or nonstructural facilities owned or operated by a municipality that are needed for and appurtenant to the prevention, management, treatment, storage, or disposal of stormwater, sewage, or waste, including a wastewater treatment facility, combined sewer separation facilities, an indirect discharge system, a wastewater system, flood resiliency work related to a structural facility, or a groundwater protection project*.
3. "***Natural resource project***" which means; *a project to protect, conserve, or restore natural resources, including the acquisition of easements and land, for the purpose of providing water quality benefits*.

Federal law currently requires a certain portion of the annual Federal CWSRF Grant be allocated to Green Project Reserve (GPR) projects. To qualify for GPR, projects need to meet numerous criteria and the following definition: ***Green stormwater infrastructure*** *includes a wide array of practices at multiple scales that manage wet weather and that maintain and restore natural hydrology by infiltrating, evapotranspiring and harvesting and using stormwater. On a regional scale, green infrastructure is the preservation and restoration of natural landscape features, such as forests, floodplains and wetlands, coupled with policies such as infill and redevelopment that reduce overall imperviousness in a watershed. On the local scale green infrastructure consists of site- and neighborhood-specific practices, such as bioretention, trees, green roofs, permeable pavements and cisterns.*

EPA published the 2012 *Clean Water State Revolving Fund 10% Green Project Reserve: Guidance for Determining Project Eligibility*. Green stormwater infrastructure projects may meet the definition of the Green Project Reserve. Note that green projects may or may not be wholly comprised of green infrastructure.

1. *Eligible nonpoint source projects implement a nonpoint source management program under an approved section 319 plan or the nine element watershed plans required by the 319 program.*

[1] https://www.epa.gov/G3/why-you-should-consider-green-stormwater-infrastructure-your-community

2. *Projects prevent or remediate nonpoint source pollution.*
3. *Projects can be either publicly or privately owned[2] and can serve either public or private purposes. For instance, it is acceptable to fund land conservation activities that preserve the water quality of a drinking water source, which represents a public purpose project. It is also acceptable to fund agricultural BMPs that reduce nonpoint source pollution, but also improve the profitability of the agricultural operation. Profitability is an example of a private purpose.*
4. *Eligible costs are limited to planning, design and building of capital water quality projects. The CWSRF considers planting trees and shrubs, purchasing equipment, environmental cleanups and the development and initial delivery of education programs as capital water quality projects. Daily maintenance and operations, such as expenses and salaries are not considered capital costs.*
5. *Projects must have a direct water quality benefit. Implementation of a water quality project should protect or improve water quality. States should be able to estimate the quantitative and/or qualitative water quality benefit of a nonpoint source project.*
6. *Only the portions of a project that remediate, mitigate the impacts of, or prevent water pollution or aquatic or riparian habitat degradation should be funded. Where water quantity projects improve water quality (e.g. reduction of flows from impervious surfaces that adversely affect stream health, or the modification of irrigation systems to reduce runoff and leachate from irrigated lands), they would be considered to have a water quality benefit. In many cases, water quality protection is combined with other elements of an overall project. For instance, brownfield revitalization projects include not only water quality assessment and cleanup elements, but often a redevelopment element as well. Where the water quality portion of a project is clearly distinct from other portions of the project, only the water quality portion can be funded by the CWSRF.*
7. *Point source solutions to nonpoint source problems are eligible as CWSRF nonpoint source projects. Section 319 Nonpoint Source Management Plans identify sources of nonpoint source pollution. In some cases, the most environmentally and financially desirable solution has point source characteristics and requires an NPDES discharge permit. For instance, a septage treatment facility may be crucial to the proper maintenance and subsequent functioning of decentralized wastewater systems. Without the septage treatment facility, decentralized systems are less likely to be pumped, resulting in malfunctioning septic tanks.*

The following Green Stormwater Infrastructure projects are considered categorically eligible under EPA's Green Project Reserve.

1. *Implementation of green streets (combinations of green infrastructure practices in transportation rights-of-ways), for either new development, redevelopment or retrofits including: permeable pavement, bioretention, trees, green roofs, and other practices such as constructed wetlands that can be designed to mimic natural hydrology and reduce effective imperviousness at one or more scales. Vactor trucks and other capital equipment necessary to maintain green infrastructure projects.*
2. *Wet weather management systems for parking areas including: permeable pavement, bioretention, trees, green roofs, and other practices such as constructed wetlands that can be designed to mimic natural hydrology and reduce effective imperviousness at one or more scales. Vactor trucks and other capital equipment necessary to maintain green infrastructure projects.*
3. *Implementation of comprehensive street tree or urban forestry programs, including expansion of tree boxes to manage additional stormwater and enhance tree health.*

[2] Vermont Statute currently does not allow loans to private entities.

4. *Stormwater harvesting and reuse projects, such as cisterns and the systems that allow for utilization of harvested stormwater, including pipes to distribute stormwater for reuse.*
5. *Downspout disconnection to remove stormwater from sanitary, combined sewers and separate storm sewers and manage runoff onsite.*
6. *Comprehensive retrofit programs designed to keep wet weather discharges out of all types of sewer systems using green infrastructure technologies and approaches such as green roofs, green walls, trees and urban reforestation, permeable The total capital cost of permeable pavement is eligible, not just the incremental additional cost when compared to impervious pavement, pavements and bioretention cells, and turf removal and replacement with native vegetation or trees that improve permeability.*
7. *Establishment or restoration of permanent riparian buffers, floodplains, wetlands and other natural features, including vegetated buffers or soft bioengineered stream banks. This includes stream day lighting that removes natural streams from artificial pipes and restores a natural stream morphology that is capable of accommodating a range of hydrologic conditions while also providing biological integrity. In highly urbanized watersheds this may not be the original hydrology.*
8. *Projects that involve the management of wetlands to improve water quality and/or support green infrastructure efforts (e.g., flood attenuation).*
    a. *Includes constructed wetlands.*
    b. *May include natural or restored wetlands if the wetland and its multiple functions are not degraded and all permit requirements are met.*
9. *The water quality portion of projects that employ development and redevelopment practices that preserve or restore site hydrologic processes through sustainable landscaping and site design.*
10. *Fee simple purchase of land or easements on land that has a direct benefit to water quality, such as riparian and wetland protection or restoration.*

Similarly, EPA has categorically excluded the following projects types *That Do Not Meet the Definition of Green Infrastructure*.

1. *Stormwater controls that have impervious or semi-impervious liners and provide no compensatory evapotranspirative or harvesting function for stormwater retention.*
2. *Stormwater ponds that serve an extended detention function and/or extended filtration. This includes dirt lined detention basins.*
3. *In-line and end-of-pipe treatment systems that only filter or detain stormwater.*
4. *Underground stormwater control and treatment devices such as swirl concentrators, hydrodynamic separators, baffle systems for grit, trash removal/floatables, oil and grease, inflatable booms and dams for in-line underground storage and diversion of flows.*
5. *Stormwater conveyance systems that are not soil/vegetation based (swales) such as pipes and concrete channels. Green infrastructure projects that include pipes to collect stormwater may be justified as innovative environmental projects pursuant to Section [on Environmental Innovation] of this guidance.*
6. *Hardening, channelizing or straightening streams and/or stream banks.*
7. *Street sweepers, sewer cleaners, and vactor trucks unless they support green infrastructure projects.*

Additionally, the GPR framework allows a state to set forth a business case to categorize certain Green Stormwater Infrastructure Projects that do not directly fit the definition, as Environmentally Innovative Projects. They define Environmentally Innovative Projects as follows: ***Environmentally innovative projects*** *include those that demonstrate new and/or innovative approaches to delivering services or managing water resources in a more sustainable way.*

The following (abridged) project types are categorically eligible for GPR as environmentally innovative:

1. *Total/integrated water resources management planning likely to result in a capital project.*
2. *Utility Sustainability Plan consistent with EPA SRF‟s sustainability policy.*
3. *Greenhouse gas (GHG) inventory or mitigation plan and submission of a GHG inventory to a registry (such as Climate Leaders or Climate Registry) Note: GHG Inventory and mitigation plan is eligible for CWSRF funding. EPA Climate Leaders: http://www.epa.gov/climateleaders/basic/index.html Climate Registry: http://www.theclimateregistry.org/*
4. *Planning activities by a Publicly Owned Treatment Works (POTW) to prepare for adaptation to the long-term effects of climate change and/or extreme weather.*
   a. *Office of Water – Climate Change and Water website: http://www.epa.gov/water/climatechange/*

Projects That Do Not Meet the Definition of Environmentally Innovative

1. *Air scrubbers to prevent nonpoint source deposition.* [Nitrogen TMDLs]
2. *Surface discharging decentralized wastewater systems where there are cost effective soil-based alternatives.*
3. *Higher sea walls to protect POTW from sea level rise.*
4. *Reflective roofs at POTW to combat heat island effect.*

EPA gives the following Decision Criteria for Business Cases:

1. Green Stormwater Infrastructure Business Cases
   a. *Green infrastructure projects are designed to mimic the natural hydrologic conditions of the site or watershed.*
   b. *Projects that capture, treat, infiltrate, or evapotranspire water on the parcels where it falls and does not result in interbasin transfers of water.*
   c. *GPR project is in lieu of or to supplement municipal hard/gray infrastructure.*
   d. *Projects considering both landscape and site scale will be most successful at protecting water quality.*
   e. *Design criteria are available at: http://cfpub.epa.gov/npdes/greeninfrastructure/munichandbook.cfm and http://cfpub.epa.gov/npdes/greeninfrastructure/technology.cfm*

2. Environmentally Innovative Decision Criteria for Business Cases:
   a. *State programs are allowed flexibility in determining what projects qualify as innovative in their state based on unique geographical or climatological conditions.*
      i. *Technology or approach whose performance is expected to address water quality but the actual performance has not been demonstrated in the state;*
      ii. *Technology or approach that is not widely used in the State, but does perform as well or better than conventional technology/approaches at lower cost; or*
      iii. *Conventional technology or approaches that are used in a new application in the State.*
   b. *Examples of Projects Requiring a Business Case*
   c. *Constructed wetlands projects used for municipal wastewater treatment, polishing, and/or effluent disposal.*
      i. *Natural wetlands, as well as the restoration/enhancement of degraded wetlands, may not be used for wastewater treatment purposes and must comply with all regulatory/permitting requirements.*
      ii. *Projects may not (further) degrade natural wetlands.*

   d. *Projects or components of projects that result from total/integrated water resource management planning consistent with the decision criteria for environmentally innovative projects and that are Clean Water SRF eligible.*
2. *Projects that facilitate adaptation of POTWs to climate change identified by a carbon footprint assessment or climate adaptation study.*
3. *POTW upgrades or retrofits that remove phosphorus for beneficial use, such as biofuel production with algae.*
4. *Application of innovative treatment technologies or systems that improve environmental conditions and are consistent with the Decision Criteria for environmentally innovative projects such as:*
   a. *Projects that significantly reduce or eliminate the use of chemicals in wastewater treatment;*
   b. *Treatment technologies or approaches that significantly reduce the volume of residuals, minimize the generation of residuals, or lower the amount of chemicals in the residuals. (National Biosolids Partnership, 2010; Advances in Solids Reduction Processes at Wastewater Treatment Facilities Webinar; http://www.e-wef.org/timssnet/meetings/tnt_meetings.cfm?primary_id=10CAP2&Action=LONG&subsystem=ORD%3cbr).*
      i. *Includes composting, class A and other sustainable biosolids management approaches.*
5. *Educational activities and demonstration projects for water or energy efficiency.*
6. *Projects that achieve the goals/objectives of utility asset management plans (http://www.epa.gov/safewater/smallsystems/pdfs/guide_smallsystems_assetmanagement_bestpractices.pdf; http://www.epa.gov/owm/assetmanage/index.htm).*

General Business Case for Expansion of GPR Green Stormwater Infrastructure Projects in Vermont

The following are reasons why Vermont can build a general business case for expansion of GPR Stormwater Infrastructure Projects:

1. Vermont is experiencing increased rainfall and increased frequency of high intensity storms as a result of climate change, impacting Vermont's stormwater needs and management practices.
2. Vermont has a wide range of soil types, including many C and D hydrologic group soils, limiting the potential for infiltration practices.
3. Vermont has a wide range of topographic conditions that require flexibility to convey stormwater to areas where they can be safely controlled or cost effectively treated.
4. Vermont has several wide spread water quality issues and TMDLs to address water quality issues.
5. Vermont has transitioned to watershed level planning including tactical basin plans identifying high priority projects to effectively target water quality projects.
6. Vermont values its historic villages as cultural and historic resources.
7. Many existing properties with high amounts of impervious surfaces will be required to find retrofit solutions.
8. When hazardous materials are in the ground or groundwater, infiltrative practices may have negative impacts on water quality or groundwater.
9. Vermont CWSRF requires Preliminary Engineering Reports (PER) that evaluate project alternatives, costs, and effectiveness.

As such, the following green stormwater infrastructure project types that are considered ineligible according to the GPR document are to be considered conditionally categorically eligible in Vermont. Components of a green infrastructure project that are essential but considered gray infrastructure (e.g. a pipe to convey water to a green practice) may be eligible.

Table 1

Stormwater Infrastructure Project Type	Conditions, if any
Stormwater controls that have impervious or semi-impervious liners and provide no compensatory evapotranspirative or harvesting function for stormwater retention.	Liners, when used where there is soil contamination, shall be considered green.
In-line and end-of-pipe treatment systems that only filter or detain stormwater.	Green treatment systems (e.g. bioretention) can be placed at the end of pipe if they have a stable overflow.
Underground stormwater control and treatment devices such as swirl concentrators, hydrodynamic separators, baffle systems for grit, trash removal/floatables, oil and grease, inflatable booms and dams for in-line underground storage and diversion of flows.	These practices are considered green if they support a green stormwater infrastructure project. Underground infiltration chambers are a Tier 1 stormwater practice and considered green.
Stormwater conveyance systems that are not soil/vegetation based (swales) such as pipes and concrete channels.	Gray stormwater conveyances are considered green if they are necessary to convey water to a green stormwater practice.

Definition of Green and Gray Stormwater Infrastructure and Project

Based on existing definitions in Vermont Statute and EPR Chapter 2, of **"Green stormwater infrastructure"**, definition to be used for CWSRF is as follows:

Green Stormwater Infrastructure involves a *wide range of multi-functional, natural and semi-natural landscape elements that are located within, around, and between developed areas, that are applicable at all spatial scales, and that are designed to control, collect, or treat stormwater runoff.* Components of a green infrastructure project that are essential but considered gray infrastructure (e.g. a pipe to convey water to a green practice, or elements of a standard detail in the stormwater rule for the practice) may be included in sponsored green stormwater infrastructure project. Additionally, Green Stormwater Infrastructure Projects:

1. Have a direct and quantifiable water quality benefit that includes a reduction in sediment or nutrient pollution as accepted by the Department of Environmental Conservation; and
    a. Comply with the technical standards of the most current version of the Vermont Stormwater Management Manual, including projects that manage less than the requisite volume identified in the Vermont Stormwater Management Manual; and
        i. Involve Tier 1 or Tier 2 stormwater treatment practices; or
        ii. Are considered eligible under EPA's Green Project Reserve or are conditionally considered green according to Table 1 above;

    or,

    b. Are considered green stormwater infrastructure as determined by the Secretary.

Gray Stormwater Infrastructure means a wide range of engineered and non-engineered structural elements and practices designed to convey and control stormwater in developed and undeveloped areas. Elements of gray stormwater infrastructure include: culverts, headwalls, pipe, catch basins, drain inlets, manholes, swirl separators, curbs, storage tanks, and impoundments.

Gray Stormwater Infrastructure Projects are projects that involve predominantly gray stormwater infrastructure.