

RIDOT SCP Approach

This document summarizes the approach and procedures used during the development and implementation of Stormwater Control Plans (SCPs). Tasks or activities outlined in this document have a common approach used for all SCPs. Research, results, or information gained from following this general approach that is associated with a specific SCP is discussed in the individual SCP Report.

Site Description

RIDOT Discharging Area Description

Subwatershed Boundary Delineation

The RIDEM-provided watershed boundary is reviewed as a result of the desktop analysis and site visits. If changes to the subwatershed boundary are identified, a subwatershed boundary modification memo is sent to RIDEM for approval and RIDEM incorporates any approved updates into their dataset. The SCP Report documents any updates.

Other RIDOT Roadways

RIDOT is developing a formal inventory of the roads owned and/or maintained by RIDOT. As part of each SCP, RIDOT assesses whether their current inventory of roads in each subwatershed is comprehensive. RIDOT uses available drainage system mapping and drainage, ROW, and plat plans to determine if additional roads are owned or operated by RIDOT. The SCP Report discusses any findings or discrepancies.

Outfall Catchment Delineation

RIDOT catchment areas are delineated for each discharge location within the subwatershed. RIDOT uses the following data to evaluate drainage patterns and determine catchment areas and discharge locations to the impaired water body segment:

- RIDOT geospatial drainage mapping;
- drainage, ROW, and plat plans from RIDOT;
- 2011 U.S. Geological Survey Topographic LiDAR: LiDAR for the North East;¹ and
- impervious cover data from RIGIS 2011 impervious surfaces data layer.²

This data is used to help delineate RIDOT maintained/owned property, determine direction of flow, drainage patterns, and map additional RIDOT maintained structures, pipes, and outfalls. RIDOT performs a desktop analysis with the combined data above and field visits to investigate areas in question. The SCP report documents any relevant findings and actions taken.

Interconnections

¹ Available at: <https://data.noaa.gov/dataset/2011-u-s-geological-survey-topographic-lidar-lidar-for-the-north-east>

² RIGIS Impervious Surfaces datalayer taken from 2011 orthoimagery. Available at: <http://www.edc.uri.edu/rigis/data/download/impervious/>

MS4: RIDOT identifies incoming and outgoing MS4 interconnections based on desktop review of available drainage data, drainage system mapping, field visits, and/or a review of local topography and surface drainage patterns. The assumed owner/operator of each of the systems is the municipality the connection lies within. If changes to the current discharge locations are identified during future SCP implementation, RIDOT will update individual SCP reports with MS4 interconnections. The SCP report lists the number of incoming and outgoing interconnections.

Private: Desktop review, drainage system mapping, and field visits are used to identify potential private interconnections. RIDOT reviews its Physical Alterations Permit Application (PAPA) database. This database lists permits requested by adjacent properties to tie into the RIDOT storm drainage system and includes an analysis of the applicant's contribution to the RIDOT storm drainage system. RIDOT will review future PAPA permit requests for compliance with its TAC 0071 – PAPA Guidance – Public and Private Tie-Ins to the State's Drainage System and its RIPDES permit and to ensure that only stormwater flows are being introduced to their system. The SCP report describes the results of the PAPA database review and the proper RIDOT course of action.

Non-Discharge Areas

RIDOT studies the subwatershed to determine whether any areas do not discharge to the water body (also called non-discharge areas). In accordance with the Consent Decree's definitions of "RIDOT MS4 direct discharge" and "RIDOT MS4 indirect discharge", these non-discharge areas meet the Consent Decree definition of having "flows that fully infiltrate into the ground before reaching the waterbody (including its banks) or wetlands adjacent to the waterbody." SCP requirements do not apply to these areas and they may be removed from the subwatershed area requiring treatment. The areas are identified on case-by-case basis based on field observations and site-specific data including topography, distance and type of land cover. The SCP report describes any relevant findings.

Sewered/Combined Sewer Areas

RIDOT studies the subwatershed to determine whether any areas discharge to a sewered area or combined sewer system. These areas are identified based on mapping by the sewer or CSO owner. Areas discharging to a combined sewer system do not discharge untreated stormwater, therefore stormwater runoff from these areas is not included in the RIPDES MS4 regulated area. SCP requirements do not apply to these areas and the catchment areas to combined sewer systems may be removed from the subwatershed area requiring treatment. The SCP report describes any relevant findings.

Flow and Water Quality Monitoring Data

As part of each SCP, RIDOT reviews the following sources for existing flow and water quality monitoring data:

- TMDLs <<http://www.dem.ri.gov/programs/benviron/water/quality/rest/reports.htm>>
- Narragansett Bay Commission Annual Data Report <<http://www.narrabay.com/ProgramsAndProjects/Environmental%20Monitoring%20and%20Data%20Analysis%20Program.aspx>>
- EPA Water Quality Assessment and TMDL Information http://ofmpub.epa.gov/tmdl_waters10/attains_state.control?p_state=RI
- USGS / National Water Quality Monitoring Council water quality data <<https://www.waterqualitydata.us/portal/>>

- USGS Rhode Island Water Data <http://waterdata.usgs.gov/ri/nwis/>
- University of Rhode Island (URI) Watershed Watch < <http://web.uri.edu/watershedwatch/uri-watershed-watch-monitoring-data/> >
- Municipal Data

The SCP report describes any additional data sources that were reviewed and relevant findings.

Reduction Target Development

RIDOT identifies the waterbody's impairments according to the RIDEM's CWA Integrated List of Waterbodies - Appendix A 2016 Index of Waterbodies and Category Listing. RIDOT's contribution of pollutants not addressed by a final TMDL and/or bacteria are assessed using the Impervious Cover (IC) Standard, as described in Appendix 2 of the Consent Decree. RIDOT's contribution of pollutants addressed by a final TMDL are assessed using the TMDL methodology, as described in Appendix 3 of the Consent Decree, which applies to non-bacteria impairments. For watersheds requiring both the IC Standard and TMDL methodology, RIDOT uses the more stringent reduction target by equating the TMDL pollutant reduction target to the impervious area expected to produce that same amount of pollutant. This impervious area can be compared to the IC reduction target calculated using the IC Standard to determine which methodology equates to the more stringent reduction target.

RIDOT impervious cover (IC) and pollutant reduction targets are based on an approximate delineation of RIDOT owned property discharging to the waterbody, which does not include non-discharge areas and areas discharging to combined sewer systems. The delineation of RIDOT owned property, which include roadways potentially owned by RIDOT, is based on the best available information at the time of this study and is not based on formal survey. The SCP report list impairments and which methodology was used to address them.

TMDL Method

The TMDL method involves comparing the estimated RIDOT pollutant load to the waste load allocation (WLA) identified in the TMDL. Per Appendix 3 of the Consent Decree, the required RIDOT pollutant reduction target is calculated as the pollutant load reduction percentage from the TMDL multiplied by the pollutant loading rate (mass per area per year) multiplied by the area of RIDOT IC discharging to the impaired water body. RIDOT uses the impervious cover data layer obtained from RIGIS to estimate RIDOT's impervious cover discharging to the waterbody. The SCP report includes RIDOT pollutant reduction targets calculated using the TMDL Method.

According to the Consent Decree, RIDOT shall use the zinc annual loading and reductions due to stormwater controls for any metals that are the pollutant of concern.

Per the Consent Decree, RIDOT evaluates the feasibility of distributing infiltration or other stormwater controls throughout the catchment area of RIDOT TMDL priority outfalls.

Impervious Cover Method

Under the Consent Decree, consistent with the findings of Environmental Protection Agency (EPA) and others, it is assumed that when a watershed has less than 10% IC, stormwater is not the likely cause of the impairment. The IC Standard uses 10% watershed IC as a goal and applies IC treatment credits based on a combination of pollutant removal, runoff reduction, and peak rate attenuation.

RIDOT calculates the watershed IC reduction target based on the estimated percent reduction necessary to achieve an IC that is less than 10% of the total subwatershed. If the total IC area for an impaired subwatershed is less than 10%, the watershed IC reduction target is zero and RIDOT is not required to implement treatment. The total watershed IC calculation is calculated in GIS using the subwatershed boundary and the impervious cover data layer obtained from RIGIS (which does not include a calculation for effective IC (taking into account direct vs. indirect connection and treatment) versus overall IC). The SCP Report includes RIDOT IC reduction targets calculated using the IC Method.

Non-Stormwater Related Impairments

In accordance with methodology outlined in the Consent Decree, the non-roadway stormwater-related impairments are not specifically addressed as part of each SCP. RIDOT assumes the following impairments are not stormwater related:³

- Ambient bioassays
- Sediment bioassays
- Dioxin
- Dioxin in fish tissue
- Mercury
- Mercury in fish tissue
- PCB
- PCB in fish tissue
- Total organic carbon
- Whole effluent toxicity
- Temperature, water
- Other flow regime alterations
- Erosion water milfoil, myriophyllum spicatum
- Chronic aquatic toxicity

Existing Stormwater Controls

Stormwater Controls Descriptions

RIDOT identifies existing stormwater controls using RIDOT's asset database. The function, condition, and dimensions of existing controls are verified during field visits. These STUs are visually inspected by RIDOT staff for proper function and issues including sediment accumulation, erosion and damaged drainage features are noted in the RIDOT asset database and communicated to RIDOT maintenance staff for follow up action. The SCP Report describes any existing STUs.

Stormwater Controls Calculations

For pollutant assessments using the TMDL Method, RIDOT uses calculation methods outlined in the Consent Decree (Appendix 3) to estimate annual pollutant loads from its property and treatment through existing STUs and enhanced non-structural measures. STU treatment depths are calculated as STU physical storage capacity (storage volume) divided by the impervious area treated (contributing area to the STU). The detailed calculation methodology is described further in RIDOT's

³ RIDOT. May 2018. Water Quality Accounting and Crediting for RIDOT RIPDES Compliance.

Water Quality Accounting and Crediting for RIDOT RIPDES Compliance report and documented in the SCP Calculator.

For the impervious cover standard analysis, RIDOT follows the analysis procedures outlined in the Consent Decree (Appendix 2) to estimate the effective IC of the RIDOT discharging areas accounting for treatment by existing STUs. STU treatment depths are calculated as STU physical storage capacity (storage volume) divided by the impervious area treated (contributing area to the STU). The detailed calculation methodology is described further in RIDOT's Water Quality Accounting and Crediting for RIDOT RIPDES Compliance report and documented in the SCP Calculator.

Potential Enhanced Non-Structural Stormwater Controls

Stormwater Controls Descriptions

RIDOT reviews the subwatershed for potential source controls and enhanced non-structural control measures including:

- Source reductions and run-on reduction
- Good housekeeping
- Area disconnection
- Pavement reductions
- Enhanced street sweeping
- Catch basin cleaning
- Leaf litter removal
- Animal waste or manure pile removal
- Dredging
- Erosion and gully repair
- Floodplain reconnection

The SCP report describes any potential non-structural controls selected.

Stormwater Controls Calculations

For the pollutant assessment using the TMDL Method, RIDOT estimates annual pollutant loads from its property and treatment through enhanced non-structural measures. The detailed calculation methodology is described further in RIDOT's Water Quality Accounting and Crediting for RIDOT RIPDES Compliance report and documented in the SCP Calculator.

For the impervious cover standard analysis, RIDOT estimates the effective IC of the RIDOT discharging areas accounting for treatment by enhanced non-structural measures. The detailed calculation methodology is described further in RIDOT's Water Quality Accounting and Crediting for RIDOT RIPDES Compliance report and documented in the SCP Calculator.

Potential Structural Stormwater Controls

RIDOT identifies potential STU locations within the subwatershed and evaluates them by reviewing aerial imagery, topography, land use and soils data, resource area boundaries, and field observation. In general, RIDOT reviews areas and measures for potential in the following priority:

- Qualifying pervious areas (QPAs)
- Upgrading existing STUs or drainage features
- Retrofit STUs on the following areas (by priority)
 - RIDOT ROW (exclude non-point, CSO and TIP areas)
 - State properties
 - Partnerships with municipalities and watershed groups

The potential to install both surface and subsurface STUs is evaluated against constraints related to construction and STU function. RIDOT prioritizes the potential to install infiltration STUs according to the ability to treat the pollutants of concern, followed by filtration and detention STUs. Areas with established tree stands are not considered for structural STUs.

Stormwater Controls Description

RIDOT evaluates site-specific constraints for each potential STU location. The presence of environmental and cultural resource areas, existing utilities, bedrock, and high groundwater all pose challenges that may alter the type or size of the STU or eliminate its feasibility all together during the design phase. Preliminary engineering would include utility survey, soil evaluation, detailed topographic and drainage survey, and coordination with adjacent property owners. Although preliminarily assessed during the development of each SCP, confirming that a worthwhile amount of runoff can be directed to the STU is also an important preliminary design step. The SCP Report describes all potential STUs and their locations.

Limited ROW STUs

RIDOT roadways with limited ROW, particularly in highly urban portions of the subwatershed, have limited opportunities for retrofit STUs due to the numerous constraints associated with implementation of structural STUs in these settings. Surface STUs are often not feasible on RIDOT property in these limited ROW areas therefore potential STUs that may be considered include permeable pavement, tree boxes or sand filters, small bioretention areas, leaching basin system and infiltration trenches with the appropriate pretreatment. Potential constraints such as underground utilities, soil suitability, micro-topography within urban settings, and constructability and safety need to be investigated on a case by case basis to evaluate the potential suitability for STU implementation. Survey and geotechnical investigations are recommended to be performed in these areas prior to STU design.

Limited ROW areas are identified on a roadway by roadway basis through desktop review and site visits. STUs in limited ROWs will only be considered if the RIDOT IC or pollutant reduction target cannot be met by STUs already proposed in other areas of the subwatershed or as part of a full reconstruction project.

In limited ROW areas, RIDOT evaluates site conditions on a roadway by roadway basis to estimate the potential for implementation of STUs for entire roadway corridors. Due to the need for additional investigation to be conducted in these areas, RIDOT uses a modified approach for recommending STUs in locations with limited ROW. RIDOT estimates STU treatment potential by assuming a percent for the impervious catchment area treated and by assuming a treatment depth. The SCP report describes Limited ROW areas and assumptions used to estimate treatment potential.

Infeasible Stormwater Controls

RIDOT catchments may be determined to be infeasible for stormwater controls. All RIDOT catchments are evaluated individually for site-specific constraints including the following:

- Environmental Constraints (proximity to)
 - FEMA floodplain
 - Inundation surfaces
 - Outstanding resource waters
 - Surface water protection areas
 - Freshwater wetlands
 - OWTS Critical Resource area
 - Coastal features
 - Endangered species
 - Environmental justice areas
 - Open space/conservation land
 - Cultural/historic resources
 - Underground storage tanks
 - Leaking underground storage tanks
 - Comprehensive Environmental Response Compensation Liability Information System/National Priority List
 - Environmental Land Use Restriction
 - Contamination
 - Land Uses with Higher Potential Pollutant Loads (LUHPPLs)
 - Other resource areas
- Physical Constraints
 - Non-RIDOT property/limited ROW
 - Limited drainage
 - Limited access
 - Inadquate setbacks
 - Tight soils
 - Fill
 - Groundwater Resources
 - Ledge (bedrock)
 - High Water Table
 - Tree clearing
 - Steep slopes
 - Elevated topography
 - Utilities
- Access Constraints
 - Safety
 - Constructability Issue
 - Permitting
 - Residential Impacts

Stormwater Controls Calculations

For the pollutant assessment using the TMDL Method and IC standard analysis, RIDOT uses calculation methods outlined in the Consent Decree and refined in RIDOT's Water Quality Accounting and Crediting for RIDOT RIPDES Compliance report to estimate annual pollutant loads from its property and treatment through potential STUs. STU treatment depths are calculated as STU physical

storage capacity (storage volume) divided by the impervious area treated (contributing area to the STU). The STU storage volume is estimated based on field observation and engineering judgment for the potential STU location and configuration. The detailed calculation methodology is described further in RIDOT's Water Quality Accounting and Crediting for RIDOT RIPDES Compliance report and documented in the SCP Calculator.

RIDOT requests approval as necessary to allow the maximum amount of pollutant or IC treatment credit outside RIDOT's area of responsibility to exceed 25% of RIDOT's IC or pollutant reduction target for the water body segment, except as provided in the Framework to be utilized by U.S. EPA and RIDEM for Determining Credit for Stormwater Treatment Outside a MS4 Operator's Area of Responsibility.⁴ The SCP report summarizes the NonRIDOT treatment credit as a percent of RIDOT's IC or pollutant reduction target.

Implementation

RIDOT will implement each SCP through:

1. Non-Constructed Measures
2. RIDOT New Construction and Re-Construction Projects
3. Retrofit Projects

RIDOT New Construction and Re-Construction

Per the Consent Decree, RIDOT is required to consider the implementation of structural STUs for all new construction, reconstruction, and pavement management projects. RIDOT has enacted a directive that requires that all infrastructure projects follow the Rhode Island Linear Stormwater Manual requirements and, at a minimum, treat 50% of existing impervious and 100% of new impervious stormwater. Per the Consent Decree, infrastructure development program projects include, but are not limited to, any and all new construction, reconstruction, preservation, mill and overlay, level and overlay, thin overlay, in-place recycle, reclamation, and other similar RIDOT infrastructure projects. Projects who's scope and limits have been defined at the time of SCP development are included within each SCP with an assumed 50% treatment level.

The Office of Stormwater reviews and provides water quality improvement recommendations beginning at the scoping phase of the project. RIDOT will work to identify opportunities to limit impervious cover, minimize pollutant sources including run-on and incorporate structural measures into projects.

The TIP is a dynamic program that may change over time, therefore RIDOT will revisit the TIP against SCP recommendations annually, or more frequently if priorities are re-assessed by RIDOT. As specific enhanced non-structural and structural controls are implemented as part of these projects, they will be added to RIDOT tracking database with their associated treatment areas and credits.

⁴ Framework to be utilized by U.S. EPA and RIDEM for Determining Credit for Stormwater Treatment Outside a MS4 Operator's Area of Responsibility. January 31, 2018.

Retrofits

If STUs cannot be incorporated into TIP projects, then they may be may be designed and constructed as stand-alone projects to retrofit current drainage patterns.

RIDOT estimates costs for potential structural controls and enhanced non-structural measures based on the preliminary design information developed as part of each SCP. Design, and construction and annual operation and maintenance cost estimates for potential structural STUs are developed from data published in a memorandum from EPA Region-1 titled "Methodology for developing cost estimates for Opti-Tool",⁵ and adjusted as necessary based on site-specific conditions. As described in this memorandum, EPA developed STU cost information for the New England Stormwater Management Optimization Tool (Opti-Tool) using the latest available information to reflect capital costs for STUs installed within the New England region. The costs account for capital construction, and also include a factor to account for design engineering and contingencies which is consistent with industry standards. The STU costs used for RIDOT's analysis include a recommended adjustment factor of 2.0, which reflects construction conditions in developed areas, and this adjustment factor is consistent with that used by the Charles River Watershed Association in urban settings within eastern Massachusetts. The SCP Report includes an estimated cost for each potential STU.

The Consent Decree allows for prioritization of SCP projects. RIDOT uses the treatment estimates and the cost estimates along with an evaluation of maximum extent practicable and constructability to prioritize the retrofit STUs. In general, STUs with a high level of treatment for their cost and relatively easy constructability are prioritized over more complicated and less cost effective STUs. Potential STU retrofit priorities are included in the SCP Report.

Once a RIDOT IC or pollutant reduction target is reached, retrofits will not be constructed as stand-alone projects; but may be included as part of Construction/Reconstruction projects. As such, they will remain in the RIDOT database as Potential STUs.

Municipal and Private Partnerships

RIDOT will continue to evaluate additional opportunities for municipal and private partnerships that may allow for construction of stormwater controls outside RIDOT's area of responsibility. RIDOT may receive treatment credit for stormwater controls unrelated to development projects or associated with new development or redevelopment on private property that discharge to its MS4 systems regardless of whether RIDOT has funded the project.⁶ Potential implementation of controls on non-RIDOT property require additional coordination and legal agreements. RIDOT will contact these landowners to discuss the possibility of easements or other mechanisms to use these locations for stormwater treatment. RIDOT will continue coordination with stakeholders within the subwatershed to identify opportunities to find cost-effective ways to provide source control and treatment. The SCP Report describes any existing partnerships and RIDOT course of action for potential STUs as necessary.

⁵ EPA Region-1, February 20, 2016. Memorandum: Methodology for developing cost estimates for Opti-Tool.

⁶ Framework to be utilized by U.S. EPA and RIDEM for Determining Credit for Stormwater Treatment Outside a MS4 Operator's Area of Responsibility. January 31, 2018.

IDDE

RIDOT reviews initial IDDE screenings completed during RIDOT asset inventory and inspection, which may satisfy the requirements for dry weather inspections. RIDOT completes dry weather sampling within 6 months of SCP submission and wet weather sampling within 1 year of SCP submission. RIDOT follows the standard operating procedures outlined in their IDDE Plan.⁷ IDDE data is documented in the SCP database and IDDE reports are submitted twice a year. The SCP Report describes recent IDDE activities in the subwatershed.

Public Outreach

Once approved by the EPA, after opportunity to review and comment by DEM, each SCP will be made public online on RIDOT's Stormwater Management webpage: <http://www.dot.ri.gov/about/stormwater.php>. RIDOT has developed SCPs as a template that may be used by other Rhode Island cities and towns at no cost.

The SCP Report describes public outreach meetings with municipalities that occurred during the SCP.

STU Operations and Maintenance Plan

Existing and newly constructed STUs will be inspected, operated and maintained to ensure functionality and longevity of the STUs. The inspection, operation and maintenance procedures for STUs are consistent with those outlined in RIDEM's Stormwater Design and Installation Standards Manual, amended in March 2015,⁸ and include inspections and maintenance that is customized to the functioning components of the STU.

RIDOT has generalized O&M Plan templates for each STU type that outline the inspection and maintenance schedules, maintenance descriptions and guidance, inspection checklists, owner/operator information, and communication and enforcement procedures. During the design phase of the individual STU, a customized O&M Plan will be created as each STU O&M and inspection is unique to site conditions.

Operations, maintenance, and inspections are documented in RIDOT's Asset Management System (VueWorks) which contains a spatial inventory of constructed STUs and alerts maintenance staff of inspection and regular maintenance needs. This system allows for work orders to be created and designated to the appropriate staff when issues are identified by RIDOT staff and their consultants during SCP development, IDDE investigations, good housekeeping activities, or other field work.

⁷ RIDOT. May 2017. RIDOT Illicit Discharge Detection and Elimination Plan. EPA Approved: August 12, 2016.

⁸ Rhode Island Stormwater Design and Installation Standards Manual, Rhode Island Department of Environmental Management and Coastal Resources Management Council, Amended March 2015. Accessed: <http://www.dem.ri.gov/pubs/regs/regs/water/swmanual15.pdf>.