

STP Selection Matrix

Version 5/8/2017

Project Name:	PR&R Development
Discharge Point:	1

Step 1: Is the Water Quality Treatment Standard entirely managed with one or more of the following Tier 1 practices?

Infiltration Basins/ Trenches/ Chambers	Simple Disconnection	<input checked="" type="radio"/> Yes <input type="radio"/> No Stop. No further justification needed.
Drywells	Disconnection to Filter Strips and Vegetated Buffers	
Bioretention (designed to infiltrate)	Dry Swales (designed to infiltrate)	
Filters (designed to infiltrate)	Permeable Pavement ¹	
Reforestation ¹		

1. These practices do not require specific justification due to feasibility limitation:

Step 2: Assess the feasibility of using Tier 1 Practices
 Complete the matrix below in its entirety for each drainage area.

Tier 1 Practices are available to meet the Water Quality Treatment Standard. If using one of these practices, stop here. If additional site constraints exist other than those listed here, proceed to Step 3.		Infiltration Basin/ Trench/ Chamber	Drywell	Bioretention (infiltrating)	Simple Disconnection	Disconnection to Filter Strips or Vegetated Buffer	Dry Swales (infiltrating)	Filters (infiltrating)
		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Practice Availability for Water Quality Treatment?		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Feasibility Restriction	Response	Practice Availability Based on Restrictions						
Do underlying soils have an infiltration rate of less than 0.2 inches per hour, as confirmed by field geotechnical tests or are classified as Hydrologic Soil Group D according to the NRCS Soil survey?	<input type="radio"/> Yes <input checked="" type="radio"/> No	Available	Available	Available	n/a	n/a	Available	Available
Will runoff to the practice include discharge from a hotspot landuse or activity?	<input type="radio"/> Yes <input checked="" type="radio"/> No	Available	Available	Available	Available	Available	Available	Available
Is the site a brownfield or contaminated site where infiltration is restricted or where infiltration would increase the threat of pollution migration, as confirmed in writing by the Department's Waste Management and Prevention Division?	<input type="radio"/> Yes <input checked="" type="radio"/> No	Available	Available	Available	Available	Available	Available	Available
Is the slope of the vegetated buffer greater than 15%	<input type="radio"/> Yes <input checked="" type="radio"/> No	n/a	n/a	n/a	Available	Available	n/a	n/a
Is the slope of the filter strip greater than 15%	<input type="radio"/> Yes <input checked="" type="radio"/> No	n/a	n/a	n/a	Available	n/a	n/a	n/a
Is the slope of the vegetated buffer greater than 8%	<input type="radio"/> Yes <input checked="" type="radio"/> No	n/a	n/a	n/a	n/a	Available	n/a	n/a
Are natural slopes where an infiltration trench or basin could be sited greater than 15%	<input type="radio"/> Yes <input checked="" type="radio"/> No	Available	n/a	Available	n/a	n/a	Available	Available
Bottom of practice would be below seasonal high water table	<input type="radio"/> Yes <input checked="" type="radio"/> No	Available	Available	Available	n/a	n/a	Available	Available
Seasonal high water table or bedrock would be less than 1 foot from the bottom of the practice.	<input type="radio"/> Yes <input checked="" type="radio"/> No	Available	Available	n/a	n/a	n/a	n/a	n/a
Seasonal high water table or bedrock would be less than 3 feet from the bottom of the practice.	<input type="radio"/> Yes <input checked="" type="radio"/> No	Available	n/a	n/a	n/a	n/a	n/a	n/a

Will the practice be located within 75 feet down-gradient of a wastewater disposal area system, within 35 feet up-gradient or 75 feet down-gradient of a wastewater disposal system?	<input type="radio"/> Yes <input checked="" type="radio"/> No	Available	Available	Available	n/a	n/a	Available	Available
Will the practice be located within 150 feet of a drinking water source located in an unconfined aquifer?	<input type="radio"/> Yes <input checked="" type="radio"/> No	Available	Available	Available	n/a	n/a	Available	Available
Will the practice be located within 100 feet of a drinking water source located in bedrock or a confined unconsolidated aquifer?	<input type="radio"/> Yes <input checked="" type="radio"/> No	Available	Available	Available	n/a	n/a	Available	Available
Will the practice be located within Zone 1 or Zone 2 of a public community groundwater source protection area?	<input type="radio"/> Yes <input checked="" type="radio"/> No	Available	Available	Available	n/a	n/a	Available	Available
Will the practice be located within 200 feet of non-transient non-community groundwater source?	<input type="radio"/> Yes <input checked="" type="radio"/> No	Available	Available	Available	n/a	n/a	Available	Available
Will the practice violate any restrictions of the Vermont Wastewater and Potable Water Supply Rules, or their replacement?	<input type="radio"/> Yes <input checked="" type="radio"/> No	Available	Available	Available	Available	Available	Available	Available

Step 3: Other feasibility constraints for remaining Tier 1 and Tier 2 practices

If, following completion of Step 2 of the STP Selection Tool there are no Tier 1 Practices available for use on the project site, designers shall consider the use of Tier 2 practices for treatment of the Water Quality Treatment Standard.

Is the Water Quality Treatment Standard entirely managed with Tier 2 Practices?

Yes No

Provide written site specific justification below. Tier 3 Practices may be used to meet the Water Quality Treatment Standard.

If the the use of a Tier 1 or Tier 2 Practice is infeasible for reasons beyond those listed in Step 2 of the STP Selection Matrix, a designer may submit site specific detailed feasibility justification that such practices are not feasible following the guidance in Section 2.2.4.1 of the 2017 VSMM. Only after completion of the STP Selection Matrix and determination that Tier and Tier 2 Practices are infeasible shall a designer consider Tier 3 Practices or existing stormwater infrastructure for meeting the Water Quality Treatment Standard (WQTS) on the project site.

Provide written feasibility justification below or list attachments

Vermont Operational Stormwater Permit - Standards Compliance Workbook

Project Name PR&R PUD

The name above will appear on all the discharge point tabs

Site Summary

Do not fill this tab out, apart from the project name and notes. It will auto-populated based on the values on the discharge point tabs. Discharge points (SN) will only show on the summary if an area has been entered on that tab. Areas listed below are those seeking permit coverage.

		Total	SN1
Impervious	New	0.98	0.98
	Redeveloped	0.00	0.00
	Existing	0.00	0.00
	Previously Authorized	0.00	0.00
	Total	0.98	0.98
Site Area		19.12	19.12
Latitude		44.32555	
Longitude		-73.07435	
Receiving Water		Unnamed Tributary of LaPlatte River	

Recharge

	Total	SN1
Required	0.0255	0.0255
Provided	0.4940	0.4940
Standard met?	Yes	Yes

Notes:

Water Quality

	Total	SN1
Required	0.1532	0.1532
Provided	0.4940	0.4940
Standard met?	Yes	Yes

A minimum WQ_v of 0.2" ($P \cdot R_v$) is required for sites with low impervious (<16.67%). This calculation has not been incorporated into this workbook. Designers should check that the minimum WQ_v has been met for their site.

Notes:

Channel Protection

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	Total	SN1
Standard Applies?		Yes
Waiver		n/a
Method		Hydrologic Condition Method
HC _v	0.1569	0.1569
T _v Provided	0.4940	0.4940

Notes:

Overbank Flood Protection

	SN1
Standard Applies?	Yes
Pre-Dev Q (cfs)	18.69
Routed, Post-Dev Q (cfs)	12.13
Waiver	n/a

Notes:

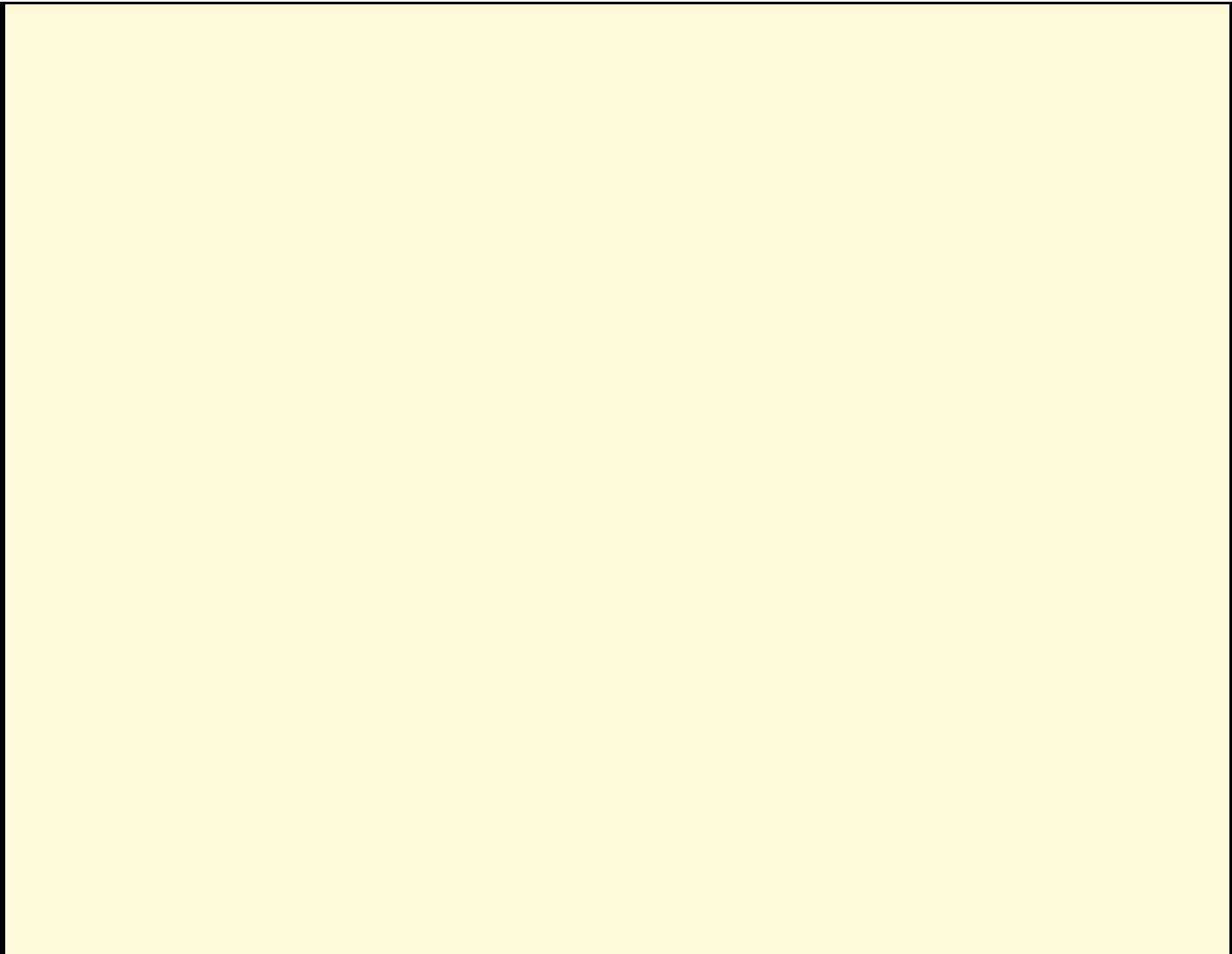
Extreme Flood Protection

	SN1
Standard Applies?	No
Pre-Dev Q (cfs)	0
Routed, Post-Dev Q (cfs)	0
Waiver	< 10 ac impervious

Notes:

General Notes

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Vermont Operational Stormwater Permit - Standards Compliance Workbook

General Discharge Point Information

Project name	PR&R PUD
Discharge point serial number (e.g. S/N 001)	S/N 001
Name of receiving water	Unnamed Tributary of LaPlatte River
Latitude (decimal degrees to five decimal places)	44.32555
Longitude (decimal degrees to five decimal places)	-73.07435

Precipitation Data

* Precipitation values shall be obtained from [NOAA Atlas 14](#)

Storm	WQ Storm	1 yr, 24 hr	10 yr, 24 hr	100 yr, 24 hr
Precipitation (inches)	1.00	2.05	3.51	5.25

Drainage Area Information

Pre Development Land Use (acres)

Landuse	A	B	C	D	Total
Grass	0.000	0.000	0.000	0.000	0.000
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	6.820	0.000	0.000	12.300	19.120
Existing Impervious	0.000	0.000	0.000	0.000	0.000
Impervious previously authorized under 2002 VSMM (not included in calculations)					0.000
Total Pre Site Area					19.120

Post Development Land Use (acres)

Landuse	A	B	C	D	Total	%
Grass	3.450	0.000	0.000	2.700	6.150	
Meadow	0.000	0.000	0.000	0.000	0.000	
Woods	2.860	0.000	0.000	9.130	11.990	
New Impervious	0.510	0.000	0.000	0.470	0.980	5.1%
Existing for Permit Coverage (Treated to New Standards)	0.000	0.000	0.000	0.000	0.000	0.0%
Existing Impervious Not for Permit Coverage					0.000	0.0%
Redeveloped Impervious					0.000	0.0%
Impervious previously authorized under 2002 VSMM					0.000	
Total Site Area					19.120	
Total Impervious for Permit Coverage					0.980	
Net Reduced Impervious					0.000	0.0%
Reduced Existing Impervious (for redevelopment)					0.000	0.0%

Information for Calculating T_c by the Watershed Lag Method

	Average Catchment Slope, Y (%)	Hydraulic Length, l (ft)
Pre Development	11	505.00
Post Development	11	170.00

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Runoff Calculations	1 yr, 24-hr	10 yr, 24-hr	100 yr, 24-hr
Predevelopment runoff volume (ac-ft)	0.4872	1.4739	2.9124
Pre-routed, post development runoff volume (ac-ft)	0.6440	1.7342	3.3417

Tier 1/Runoff Reduction Practices

List all Tier 1 practices below with the associated treatment volume (T_v). The T_v will be applied to all treatment standards, except for Green Roofs, which do not receive recharge or water quality credit. Please include the appropriate STP worksheet(s) with the application.

Practice	T _v (ac-ft)	Practice	T _v (ac-ft)
Infiltration Basin	0.192		
Infiltration Basin	0.302		

Runoff Reduction Calculations

Standard	Re	WQ	CP	Q _{P10}	Q _{P100}
T _v Required (ac-ft)	0.0255	0.1532	0.1569	0.2603	0.4293
T _v Provided (ac-ft)	0.4940	0.4940	0.4940	0.4940	0.4940
T _v Remaining (ac-ft)	0.0000	0.0000	0.0000	0.0000	0.0000
Standard met with HCM?	Yes	Yes	Yes	Yes	Yes
Post-Development CN	n/a	81	75	71	68
CN _{adj}	n/a	n/a	n/a	n/a	n/a
Pre-Development CN	n/a	n/a	72	68	65

Groundwater Recharge Standard (Re)

Standard Applicable?	<input checked="" type="radio"/> Yes <input type="radio"/> No
Re _v	0.0255
Standard met with Tier 1 Practices?	Yes
Recharge Notes:	

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Water Quality Treatment Standard (WQ)

	(ac-ft)		Apply Reduction?
WQ _v - New & Existing	0.1532	% Net Reduction	0.0% <input checked="" type="radio"/> No <input type="radio"/> Yes
WQ _v - Redevelopment	0.0000	% Removed Existing Impervious (Redevelopment)	0.0% <input checked="" type="radio"/> No <input type="radio"/> Yes
Total WQ _v	0.1532		
WQ _v met with Tier 1 practices	0.1532	Is all impervious treated by disconnection?	<input checked="" type="radio"/> No <input type="radio"/> Yes (WQ _v met)
WQ _v to be met with Tier 2 and/or Tier 3 practices	0.0000		

Tier 2 & 3 Water Quality Practice	WQ _v Provided (ac-ft)	Tier
Total WQ _v Provided (ac-ft)	0.0000	ac-ft
Is the WQ _v Standard met?	Yes	

Water Quality Notes:

Channel Protection Standard (CP)

Standard Applicable?	<input checked="" type="radio"/> Yes <input type="radio"/> No	
Standard Met with HCM?	Yes	<i>The channel protection standard has been fully met with hydrologic condition method. Additional treatment of the 1 year storm is not required.</i>
Provide Extended Detention for:	n/a	ac-ft
Warm or Cold Water Fishery?	<input checked="" type="radio"/> Cold <input type="radio"/> Warm	→ Provide: <div style="border: 1px solid black; padding: 5px; display: inline-block;">12 hours of extended detention</div>
		OR <input type="checkbox"/> The Alternative Extended Detention Method (§2.2.5.4) is being used.
Extended Detention STP:		

Modeling Info: When demonstrating CP compliance with extended detention in a hydrologic model, use the CN and T_c below if the practice being modelled is not a Tier 1 practice. The CN_{Adj} takes into account the reduction in runoff volume achieved through Tier 1 practices. The T_c is calculated by the watershed lag method using CN_{Adj} as CN'.

CN _{Adj}	n/a	Post Development T _c (min)	1.3	(Watershed Lag Method)
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Channel Protection Notes:

Vermont Operational Stormwater Permit - Standards Compliance Workbook

Overbank Flood Protection (Q_{P10})

Standard Applicable? Yes No

Standard Met with HCM? **Yes** *The Q_{P10} standard has been fully met. No additional STPs are required.*

STP used: Infiltration Basins 1 & 2

Pre-development peak discharge rate (cfs)	18.69
Pre-routed, post-development peak discharge rate (cfs)	25.68
Routed, post-development peak discharge rate (cfs)	14.53

Modeling Info: When demonstrating Q_{P10} compliance in a hydrologic model, use the following CN and T_c below, if the practice used to meet Q_{P10} is not itself a Tier 1 practice. The CN_{Adj} takes into account the reduction in runoff volume achieved through Tier 1 practices. The T_c is calculated by the watershed lag method using CN_{Adj} as CN'.

Pre-Development CN (Flow-weighted composite)	68	Pre Development T_c (min)	7.7	(Watershed Lag Method)
CN_{Adj}	n/a	Post Development T_c (min)	1.3	

Overbank Flood Notes:

Extreme Flood Protection (Q_{P100})

Standard Applicable? Yes No

Waiver (if No is selected): <10 acres impervious

Standard Met with HCM? **Yes** *The extreme flood standard has been fully met. No additional STPs are required.*

STP used:

Pre-development peak discharge rate (cfs)	
Pre-routed, post-development peak discharge rate (cfs)	
Routed, post-development peak discharge rate (cfs)	

Modeling Info: When demonstrating Q_{P100} compliance in a hydrologic model, use the following CN and T_c below, if the practice used to meet Q_{P100} is not a Tier 1 practice. The CN_{Adj} takes into account the reduction in runoff volume achieved through runoff reduction practices. The T_c is calculated by the watershed lag method using CN_{Adj} as CN'.

Pre-Development CN (Flow-weighted composite)	65	Pre Development T_c (min)	8.4	(Watershed Lag Method)
CN_{Adj}	n/a	Post Development T_c (min)	1.3	

Extreme Flood Notes: