STP Selection Matrix

Version 5/8/2017

Project Name:	Faith's Toyota Ford
Discharge Point:	Connecticutt River

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

Infiltration Basins/ Trenches/ Chambers
Drywells
Bioretention (designed to infiltrate)
Filters (designed to infiltrate)
Reforestation[1]
Simple Disconnection
Disconnection to Filter Strips and Vegetated Buffers
Dry Swales (designed to infiltrate)
Permeable Pavement[1]

◉ Yes ○ No

Stop. No further justification needed.

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

Step 2: Assess the feasibility of using Tier 1 Practices

Complete the matrix below in its entirety for each drainage area.

No Tier 1 practices are available for use. Proceed to Step 3 to evaluate Tier 2 Practices.		**Infiltration Basin/ Trench/ Chamber**	**Drywell**	**Bioretention (infiltrating)**	**Simple Disconnection**	**Disconnection to Filter Strips or Vegetated Buffer**	**Dry Swales (infiltrating)**	**Filters (infiltrating)**
Practice Availability for Water Quality Treatment?		Not Feasible	Not Feasible	Not Feasible	Not Feasible	Not Feasible	Not Feasible	Not Feasible
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?	○ Yes ○ No	Not Feasible	Not Feasible	Not Feasible	n/a	n/a	Not Feasible	Not Feasible
Will runoff to the practice include discharge from a hotspot landuse or activity?	○ Yes ○ No	Not Feasible	Not Feasible	Not Feasible	Not Feasible	Not Feasible	Not Feasible	Not Feasible
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?	○ Yes ○ No	Not Feasible	Not Feasible	Not Feasible	Not Feasible	Not Feasible	Not Feasible	Not Feasible
Is the slope of the vegetated buffer greater than 15%	○ Yes ○ No	n/a	n/a	n/a	Not Feasible	Not Feasible	n/a	n/a
Is the slope of the filter strip greater than 15%	○ Yes ○ No	n/a	n/a	n/a	Not Feasible	n/a	n/a	n/a
Is the slope of the vegetated buffer greater than 8%	○ Yes ○ No	n/a	n/a	n/a	n/a	Not Feasible	n/a	n/a
Are natural slopes where an infiltration trench or basin could be sited greater than 15%	○ Yes ○ No	Not Feasible	n/a	Not Feasible	n/a	n/a	Not Feasible	Not Feasible
Bottom of practice would be below seasonal high water table	○ Yes ○ No	Not Feasible	Not Feasible	Not Feasible	n/a	n/a	Not Feasible	Not Feasible
Seasonal high water table or bedrock would be less than 1 foot from the bottom of the practice.	○ Yes ○ No	Not Feasible	Not Feasible	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.	○ Yes ○ No	Not Feasible	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?	◯ Yes ◯ No	Not Feasible	Not Feasible	Not Feasible	n/a	n/a	Not Feasible	Not Feasible
Will the practice be located within 150 feet of a drinking water source located in an unconfined aquifer?	◯ Yes ◯ No	Not Feasible	Not Feasible	Not Feasible	n/a	n/a	Not Feasible	Not Feasible
Will the practice be located within 100 feet of a drinking water source located in bedrock or a confined unconsolidated aquifer?	◯ Yes ◯ No	Not Feasible	Not Feasible	Not Feasible	n/a	n/a	Not Feasible	Not Feasible
Will the practice be located within Zone 1 or Zone 2 of a public community groundwater source protection area?	◯ Yes ◯ No	Not Feasible	Not Feasible	Not Feasible	n/a	n/a	Not Feasible	Not Feasible
Will the practice be located within 200 feet of non-transient non-community groundwater source?	◯ Yes ◯ No	Not Feasible	Not Feasible	Not Feasible	n/a	n/a	Not Feasible	Not Feasible
Will the practice violate any restrictions of the Vermont Wastewater and Potable Water Supply Rules, or their replacement?	◯ Yes ◯ No	Not Feasible	Not Feasible	Not Feasible	Not Feasible	Not Feasible	Not Feasible	Not Feasible

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 feasibilty justification below or list attachments

Vermont Operational Stormwater Permit - Standards Compliance Workbook

Project Name Faith's Toyota Ford

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	1.59	1.59
	Redeveloped	2.38	2.38
	Existing	0.41	0.41
	Previously Authorized	0.00	0.00
	Total	4.38	4.38
	Site Area	9.64	9.64
	Latitude		43.10688
	Longitude		-72.44156
	Receiving Water		Connecticut River

Recharge

	Total	SN1
Required	0.0583	0.0583
Provided	1.0580	1.0580
Standard met?	Yes	Yes

Notes:

Water Quality

	Total	SN1
Required	0.2994	0.2994
Provided	1.0580	1.0580
Standard met?	Yes	Yes

A minimum WQ_V of 0.2" ($P*R_V$) 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: Site balancing was used to meet standards. 2.24 acres of redeveloped impervious surface located in S/N 001 will be treated to 100% water quality in the proposed infiltration basin to compensate for 0.412 acres of untreated new and 0.140 acres of untreated redeveloped surface within S/N 001 as identified on sheet SW.02.

Channel Protection

	Total	SN1
Standard Applies?		Yes
Waiver		≥10 sq mi
Method		Hydrologic Condition Method
HC_V	0.2946	0.2946
T_V Provided	1.0580	1.0580

Notes:

Overbank Flood Protection

	SN1
Standard Applies?	Yes
Pre-Dev Q (cfs)	N/A
Routed, Post-Dev Q (cfs)	N/A
Waiver	≥10 sq mi

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

Vermont Operational Stormwater Permit - Standards Compliance Workbook

General Discharge Point Information

Project name	Faith's Toyota Ford
Discharge point serial number (e.g. S/N 001)	1
Name of receiving water	Connecticut River
Latitude (decimal degrees to five decimal places)	43.10688
Longitude (decimal degrees to five decimal places)	-72.44156

Precipitation Data

* Preciptation 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	2.30	3.91	5.82

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	5.932	0.000	0.000	**5.932**
Woods	0.000	0.000	0.000	0.000	**0.000**
Existing Impervious	0.000	3.705	0.000	0.000	**3.705**
Impervious previously authorized under 2002 VSMM (not included in calculations)					**0.000**
Total Pre Site Area					**9.637**

Post Development Land Use (acres)

Landuse	A	B	C	D	Total	%
Grass	0.000	4.690	0.000	0.000	**4.690**	
Meadow	0.000	0.000	0.000	0.000	**0.000**	
Woods	0.000	0.000	0.000	0.000	**0.000**	
New Impervious	0.000	1.586	0.000	0.000	**1.586**	*16.5%*
Existing for Permit Coverage (Treated to New Standards)	0.000	0.412	0.000	0.000	**0.412**	*4.3%*
Existing Impervious Not for Permit Coverage					**0.567**	*5.9%*
Redeveloped Impervious					**2.382**	*24.7%*
Impervious previously authorized under 2002 VSMM					**0.000**	
Total Site Area					**9.637**	
Total Impervious for Permit Coverage					**4.380**	
Net Reduced Impervious					**0.000**	*0.0%*
Reduced Existing Impervious (for redevelopment)					**0.344**	*12.6%*

Information for Calculating T_C by the Watershed Lag Method

	Average Catchment Slope, Y (%)	Hydraulic Length, l (ft)
Pre Development	6.1	1872.00
Post Development	11	1230.00

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Runoff Calculations

	1 yr, 24-hr	10 yr, 24-hr	100 yr, 24-hr
Predevelopment runoff volume (ac-ft)	0.6840	1.4435	2.5370
Pre-routed, post development runoff volume (ac-ft)	0.9092	1.8801	3.3883

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	1.058		

Runoff Reduction Calculations

Standard	Re	WQ	CP	Q_{P10}	Q_{P100}
T_V Required (ac-ft)	0.0583	0.2994	0.2946	0.5458	0.9943
T_V Provided (ac-ft)	1.0580	1.0580	1.0580	1.0580	1.0580
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	91	87	85	86
CN_{adj}	n/a	n/a	n/a	n/a	n/a
Pre-Development CN	n/a	n/a	82	78	75

Groundwater Recharge Standard (Re)

Standard Applicable? (●) Yes ( ) No

Re_V: 0.0583

Standard met with Tier 1 Practices?: Yes

Recharge Notes:

Vermont Operational Stormwater Permit - Standards Compliance Workbook

Water Quality Treatment Standard (WQ)

	(ac-ft)
WQ_V - New & Existing	0.1900
WQ_V - Redevelopment	0.1094
Total WQ_V	0.2994
WQ_V met with Tier 1 practices	0.2994
WQ_V to be met with Tier 2 and/or Tier 3 practices	0.0000

		Apply Reduction?
% Net Reduction	0.0%	(•) No ( ) Yes
% Removed Existing Impervious (Redevelopment)	12.6%	(•) No ( ) Yes

Is all impervious treated by disconnection? (•) No ( ) Yes (WQv met)

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: Site balancing was used to meet standards. 2.24 acres of redeveloped impervious surface located in S/N 001 will be treated to 100% water quality in the proposed infiltration basin to compensate for 0.412 acres of untreated new and 0.140 acres of untreated redeveloped surface within S/N 001 as identified on sheet SW 02

Channel Protection Standard (CP)

Standard Applicable? (•) Yes ( ) No

Direct discharge to drainage area ≥10 sq.mi

Standard Met with HCM? Yes

The channel protection standard has been fully met with hydrologic condition method. Additional treatment of the 1 year storm is not required.

Provide Extended Detention for: n/a ac-ft

Warm or Cold Water Fishery? (•) Cold ( ) Warm

→ Provide: 12 hours of extended detention

OR

☐ The Alternative Extended Detention Method (§2.2.5.4) is being used.

See the Vermont Water Quality Standards for warm and cold water designations

Extended Detention STP: Infiltration Basin

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): 6.3 (Watershed Lag Method)

Channel Protection Notes:

Last Updated 8/28/2018

Overbank Flood Protection (Q_{P10})

Standard Applicable? (●) Yes ( ) No

Direct discharge to drainage area ≥10 sq.mi

Standard Met with HCM? **Yes**

The QP10 standard has been fully met. No additional STPs are required.

STP used: Infiltration Basin

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

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)	**78**	Pre Development T_C (min)	**22.8**	(Watershed Lag Method)
CN_{Adj}	**n/a**	Post Development T_C (min)	**6.3**	

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)	**75**	Pre Development T_C (min)	**24.5**	(Watershed Lag Method)
CN_{Adj}	**n/a**	Post Development T_C (min)	**6.3**	

Extreme Flood Notes: