

## **APPENDIX B**

**Problem Area Summary Table, Prioritization Matrix, and Culvert Summary Table (11"x17")**

Town of Arlington Stormwater Master Plan, Project Prioritization Matrix

Additional Benefits Codes	CPA	SF	E	IC	SW	BMP	HV	TH	PF
	Chronic Problem Area	Seasonal Flooding	Educational	Infrastructure Conflicts	Drains to Connected Stormwater Infrastructure	Improves Existing BMP Performance	High Visibility	Reduces Thermal Pollution	Peak Flow Reduction

Project	Project Type	Location	Problem Area Description	BMP Type/Description	Maximum Score:					Landowner Support	Operation & Maintenance Requirements	Cost and Constructability	Additional Benefits	Additional Benefits Score	Total Score	Photo Log					
					4	4	1	3	3								Nutrient Reduction	Sediment Reduction	Drainage Area	Impervious Drainage	Connectivity to Surface Waters
					Water Quality Mitigation																
SW-1	Stormwater Retrofit	Arlington Recreational Park	Runoff from the parking lot, lawn and soccer fields causes water to pool in a shallow swale beside the field. Culverts to convey flow are likely undersized.	Retrofit green space to improve drainage near fields and infiltrate runoff.	2	1	1	2	1	2	1	2	CPA, SF, BMP, TH, PF, HV	5	17	SW-1 (1-4)					
SW-2	Stormwater Retrofit	Route 7A, Carbonti Circle to the Arlington Dairy Bar	Drainage ditches with runoff from Route 7A and adjacent residential areas drain north to a first-order stream. Significant gravel deposits settle out in the ditch just north of Carbonti Circle.	Install check dams in the swale to provide pre-treatment for sediment. Treat runoff with an infiltration basin before it enters the stream.	2	3	1	2	2	1	1	4	BMP, HV, PF	3	19	SW-2 (1-3)					
SW-3	Stormwater BMP	Arlington Recreational Park Fishing Access Parking Lot	Runoff from the gravel parking lot and a portion of Route 313 drains directly into the Batten Kill. Some erosion is present along the stream bank.	Corral water with a berm along the north end of the parking lot. Install a small infiltration basin.	1	3	0	1	3	1	1	5	E, HV	2	17	SW-3 (1-3)					
SW-4	Stormwater Retrofit	Fisher Elementary School	An eroded channel extends from the west end of the swale to the north, around the parking lot.	Install a meandering channel in the swale to slow and infiltrate water.	2	3	0	1	2	2	1	3	E, BMP, PF, HV	4	18	SW-4 (1-3)					
SW-5	Stormwater Retrofit	Covered Bridge Road	Runoff from the gravel parking lot and a portion of Covered Bridge Road drains into the Batten Kill.	Corral water with a berm along the north end of the parking lot. Install a small infiltration basin to the west near the picnic area.	1	2	0	1	3	1	1	5	HV	1	15	SW-5 (1-2)					
SW-6	Stormwater Retrofit	Route 7A & Church Street	Stormwater from Route 7A is directed by curbs into a catch basin with no treatment.	Install two curb cuts with stone swales down to greenspace/swale. If allowed to access this area, the grated drop inlet sits up and would allow partial WQv treatment.	1	2	0	0	3	1	1	5	SW, TP, PF, HV	4	17	SW-6 (1-2)					
SW-7	Stormwater BMP	Chittenden Drive & Munn Terrace	Runoff from roads and parking area drains to a former loading dock for Miles Lumber Company. May be within railroad ROW.	Provide treatment for WQv in grass by unused building.	1	1	0	0	2	0	1	2	CPA, SW, PF	3	10	SW-7 (1-4)					
SW-8	Stormwater BMP	Chittenden Drive at Miles Lumber Company	Water from roads and Miles Lumber Company parking and rooftops drains to a catch basin. May be within railroad ROW.	Provide treatment for WQv in grass by railroad.	1	1	0	1	2	1	1	2	TH, PF	2	11	SW-8 (1-3)					

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					4	4	1	3	3								Water Quality Mitigation				
					Nutrient Reduction	Sediment Reduction	Drainage Area	Impervious Drainage	Connectivity to Surface Waters												
SW-9	Stormwater BMP	American Legion	The gravel parking lot drains to a catch basin located in the middle of the lot.	Cap the catch basin and install an infiltration basin at the northern end of the parking lot to treat runoff.	1	3	0	2	2	1	1	3	SW, TH, PF, HV	4	17	SW-9 (1-2)					
SW-10	Stormwater Retrofit	Fisher Elementary School	Runoff from the paved parking lot enters a catch basin in the adjacent greenspace.	Raise the grated inlet and grade the area to slow and infiltrate runoff.	2	1	0	0	2	1	2	5	E, BMP, TH, PF, SW	5	18	SW-10 (1-3)					
SW-11	Stormwater Retrofit	Martha Canfield Library	Runoff from the gravel parking lot drains to a catch basin located in the middle of the lot.	Consider paving the parking lot. A deep sump catch basin conveying runoff to a swirl separator or underground chambers may be installed to trap sediment.	1	3	0	1	2	1	1	1	HV, SW, TH, PF	4	14	SW-11 (1-2)					
SW-12	Stormwater Retrofit	Arlington Memorial High School	Runoff from the high school rooftop and paved parking/roadway is eroding a flowpath toward a catch basin located in the greenspace.	Install stone to dissipate energy and prevent erosion. Raise catch basin inlet grate and establish a basin to treat runoff.	2	2	0	1	2	2	1	4	CPA, E, BMP, TH, PF, HV. SW	5	19	SW-12 (1-3)					
RD-1	Road Erosion and Conveyance Improvement	Ball Mountain Rd	A 30' L X 4' W X 1' H eroded channel with a 10% slope drains directly into Dry Brook. It receives 80' of runoff from the north side of the road.	Line the conveyance with stone. Consider adding a sediment trap.	2	4	0	0	3	1	1	4			15	RD-1					
RD-2	Road Erosion and Ditch Improvement	Ball Mountain Rd & Birch Grove Road	The east side of Birch Grove Road has rill erosion along the roadway and at the intersection with Ball Mountain Road. 400' of ditch along the west side of the 9% slope road lacks stone.	Install stone in drainage ditches. Crown road to direct water into existing ditch to the east and remove grader berms to allow water to sheet flow to the west.	1	3	0	1	2	1	1	3			12	RD-2 (1-2)					
RD-3	Road Erosion and Conveyance Improvement	Ball Mountain Rd	The road embankment is severely eroded. The runoff and sediment extends directly into Dry Brook.	Install a stone lined sediment trap near the road with a stone spillway down to Dry Brook.	2	4	0	0	3	1	1	4	IC	1	16	RD-3 (1-2)					
RD-4	Road Erosion and Ditch Improvement	Wilcox Rd & Mountain View Drive to Wilcox Rd & Route 313	Runoff from Mountain View Drive and Wilcox Road is causing rill erosion along the roadway.	Install 100' of stone lined ditches along Mountain View Drive. Improve 300' of grass lined ditches along Wilcox Road. Remove grader berms and crown road to allow water to access ditches.	1	3	0	0	1	1	1	4			11	RD-4 (1-3)					

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					4	4	1	3	3								2	2	6	5	30
					Water Quality Mitigation																
					Nutrient Reduction	Sediment Reduction	Drainage Area	Impervious Drainage	Connectivity to Surface Waters												
RD-5	Road Erosion and Ditch Improvement	Wilcox Rd before the Country View intersection.	The existing stone lined ditch is somewhat unstable. Portions of the road lack stable ditches and grader berms present during road erosion inventories were causing rill erosion from water running down the road.	Install 80' of ditch where absent and stabilize 100' of ditch with stone.	1	3	0	0	1	1	1	4		11	RD-5						
RD-6	Road Erosion, Conveyance, and Ditch Improvement	Benedict Hollow Rd near the River Road Intersection	The road has an unstable drainage ditch and two areas where runoff drains via poor conveyances toward the adjacent stream.	Stabilize 100' of ditch with stone. Stabilize the two conveyances to the stream with stone or vegetation. Consider adding check dams to trap sediment.	2	4	0	0	3	1	1	4		15	RD-6 (1-2)						
RD-7	Road Erosion and Conveyance Improvement	Benedict Hollow Rd near transition to Private Road	No culvert is present to convey water across the road, causing it to pool and erode the roadway and embankment. A 15' gully is developing down the embankment 50' from a stream.	Install a cross culvert to convey water under the road. Stabilize the outlet and road embankment with stone. Consider installing a sediment trap to prevent eroded sediment from entering the stream.	2	4	0	0	2	1	1	3	IC	1	14	RD-7 (1-3)					
RD-8	Road Erosion and Conveyance Improvement	River Rd	270' of road drains to an eroded conveyance draining directly to the Batten Kill. The conveyance is 1'-2' deep, 2'-4' wide, and 22' long.	Stabilize the conveyance with large stone.	2	4	0	0	3	1	2	4	IC	1	17	RD-8 (1-2)					
RD-9	Road Erosion and Conveyance Improvement	River Rd	A 15' long and 8' tall stretch of road embankment is eroding directly into a wetland alongside a Batten Kill flood chute. Flowing water from a spring emerging from the slope is undermining the road embankment.	Stabilize road embankment with large stone. Consider installing an underdrain and cross culvert to prevent groundwater from undermining the road.	2	3	0	0	2	1	1	2	IC	1	12	RD-9 (1-2)					
RD-10	Road Erosion and Ditch Improvement	West Mountain Inn Rd	Water runs down the road, eroding the roadway. No ditch is present on the west side of the road, causing erosion alongside the road. The ditch on the east side of the road is paved. At the end of the paved ditch, there is 100' of rill erosion from the stonewall to the stream. Erosion extends uphill to the private section of the road, which lacks ditches.	Stabilize the rill erosion with stone and vegetation lined ditches where possible. Consider adding a sediment trap to catch road materials before they enter the stream.	2	4	0	1	3	1	1	3	CPA	1	16	RD-10 (1-3)					

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					Nutrient Reduction	Sediment Reduction	Drainage Area	Impervious Drainage	Connectivity to Surface Waters												
RD-11	Road Erosion and Ditch Improvement	Raven Rock Rd	This area has 115' of rill erosion on both sides of the road. An eroded conveyance 200' long on the south side of the road flows toward the adjacent stream.	Install a ditch and driveway culvert on the south side of the road. Consider adding a sediment trap at the conveyance on the south side of the road to catch road materials before they enter the stream.	1	3	0	0	3	1	1	3		12	RD-11 (1-3)						
RD-12	Road Erosion, Conveyance, and Ditch Improvement	Fisher Rd	Grader berms along the road are causing water to run along the roadway and erode the road surface. Water exits the roadway via a poor conveyance that is eroding the road embankment near a cross culvert outlet. Sediment is accumulating in the ditch on the inside bend.	Remove grader berms. Stabilize the conveyance with stone. Clean-out the drainage ditch and stabilize with stone where needed.	1	3	0	0	3	1	1	4	CPA	1	14	RD-12 (1-3)					
RD-13	Road Erosion and Ditch Improvement	Tory Lane	This area has rill and gully erosion on the side of the road due to unstable and absent drainage ditches. There are multiple unstable conveyances directly to an ephemeral channel that runs alongside the road.	Install a drainage ditch and stabilize all ditches with stone. Consider adding stone to the turnouts through the berm to prevent erosion and adding sediment traps where possible to catch road materials.	2	4	0	1	3	1	1	3	CPA, IC	2	17	RD-13 (1-3)					
RD-14	Road Erosion and Ditch Improvement	Tory Lane	Ditches are absent along both sides of a steep section of road, causing water to flow down the roadway and erode the road surface.	Install drainage ditches on both sides of the road and stabilize them with stone.	1	2	0	0	1	1	1	3		9	RD-14 (1-2)						
RD-15	Road Erosion and Ditch Improvement	Tory Lane	Water from a steep section of Class 4 road erodes the plow turnaround at the end of the Class 3 road. The Class 3 road is eroding on both sides. There is an unstable drainage ditch on the west side of the road.	Direct flow from the Class 4 road to a sediment trap or stone-lined ditch. Stabilize the roadside ditch with stone.	1	2	0	0	1	1	1	3		9	RD-15 (1-2)						
RD-16	Road Erosion and Conveyance Improvement	Crow Hill Rd	This area has a severely eroded conveyance down a steep slope draining directly to the stream on the north side of the road. Rill erosion is present on the south side of the road.	Stabilize the conveyance with large stone. Line ditches on the north side of the road with stone. Consider replacing driveway culvert with a larger diameter pipe.	2	3	0	0	3	1	1	3	IC	1	14	RD-16 (1-2)					

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RD-17	Road Erosion, Conveyance, and Ditch Improvement	Lost Lake Rd	Severe erosion present at the culvert header and road embankment.	Stabilize the road embankment and ditch with stone.	1	3	0	0	1	1	1	3		10	RD-17 (1-3)						
RD-18	Road Erosion and Ditch Improvement	Cemetery Rd and Route 7A	Ditches on both sides of the road near the intersection with Route 7A are eroding toward a culvert that crosses the highway. There are some rocks placed before the culvert inlet that have trapped some of the sediment.	Stabilize ditches with stone. If possible, expand stone lined area near the railroad to create a larger sediment trap.	1	3	0	1	2	1	1	4	CPA	1	14	RD-18 (1-3)					
RD-19	Road Erosion and Ditch Improvement	Cemetery Rd	Two 80' sections of ditch on the south side of the road are severely eroded.	Enlarge ditches and stabilize with stone.	2	2	0	0	1	1	1	4		11	RD-19 (1-2)						
DC-1	Culvert Outlet Stabilization	Ball Mountain Rd	Severe erosion is present at the culvert outlet, which is located 10' from Dry Brook.	Stabilize the culvert outlet with stone.	2	3	1	1	3	1	2	4		17	DC-1 (1-2)						
DC-2	Ditch and Culvert Outlet Stabilization	Buck Hill Rd and Route 7A	In this area there is an eroded drainage ditch that leads to a catch basin (by the barn) on Buck Hill. There is another catch basin on the other side of the road with a stable ditch. The catch basins are connected to an outfall with an eroded outlet channel.	Stabilize 50' of ditch on the southeast side of Buck Hill road with stone. Install a stone apron at the outfall.	2	3	0	1	1	1	1	3	SW	1	13	DC-2 (1-2)					
DC-3	Road and Culvert Outlet Stabilization	Benedict Hollow Rd	A board along the base of the guardrail is concentrating runoff, which is causing severe erosion of the road surface and embankment near the outlet of a cross culvert. There is 30' of rill erosion on the road and 20' of gully erosion down the road embankment. Large amounts of gravel have accumulated at the culvert outlet.	Stabilize the road embankment with stone, beginning at the tail end of the board along the guardrail. Crown as much of the road as possible into the ditch opposite the guardrail. Consider excavating a depression to contain sediment deposits to one area that can be cleaned out.	2	4	0	0	1	1	1	3	IC	1	13	DC-3 (1-3)					
C-1	Culvert Replacement	Berwal Rd	The culvert conveys a first order stream and is undersized. The channel downstream of the outlet is eroded.	Consider installing a larger structure with higher slope and a heavily armored splash pad at the outlet to halt erosion.	1	1	1	1	3	1	2	3		13	C-1 (1-2)						

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C-2	Culvert Replacement	Old West Rd	This 18" culvert is has a 3.5' outlet drop with severe erosion at the outlet. A large log in the channel that is helping trap sediment.	Install a heavily armored splash pad at the outlet to halt erosion.	2	2	1	1	3	1	2	3			15	C-2 (1-3)					
C-3	Culvert Replacement	Old West Rd	This 24" CMP has a 2.5' outlet drop with severe erosion at the outlet.	Install a heavily armored splash pad at the outlet to halt erosion.	2	3	1	1	3	1	2	3			16	C-3 (1-4)					
C-4	Culvert Replacement	Old West Rd	This 24" CMP has a 1' outlet drop downstream and an eroded downstream channel.	Armor the road embankment. Install a splash pad at the outlet to halt erosion.	1	2	1	0	3	1	2	3			13	C-4 (1-3)					
C-5	Culvert Replacement	Old West Rd	This 18" culvert is undersized and has a 2.8' outlet drop with severe erosion of the road embankment at the upstream and downstream headers. There is a 90° bend into the inlet, contributing to erosion of the upstream road embankment.	Stabilize upstream and downstream culvert headers. Consider installing a larger structure with higher slope and a heavily armored splash pad at the culvert outlet to halt erosion.	2	3	1	0	3	1	2	3			15	C-5 (1-3)					
C-6	Culvert Replacement	Tory Lane	This 15" culvert is undersized. Moderate erosion of the road embankment is present at the inlet and outlet.	Install a larger structure with headers stabilized with stone.	1	2	1	0	2	1	2	3			12	C-6 (1-2)					

**EXISTING CULVERT  
CONDITIONS**

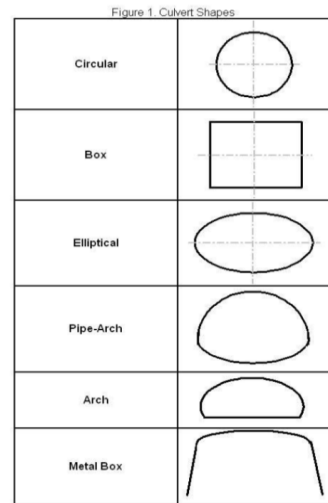
Structure	Site ID	Drainage Area		Bankfull Width (ft) <sup>1</sup>	Road Crown Elevation (ft)	Roadway Width (ft)	Crest Length (ft)	Current Culvert Type	Culvert Length (ft)	Culvert Inlet (ft)	Culvert Outlet (ft)	Outlet Drop (ft)	Slope	Diameter (ft)	Manning's Roughness	Discharge (cfs)					HydroCAD Peak Capacity (cfs)	Recommended Size (inches)			
		Acres	Square Miles													Q10	Q25 (design)	Q100 (extreme)	Culvert Capacity <sup>2</sup>	Q10 WSE (ft) <sup>3</sup>			Q10 Free-board (ft)	Q25 WSE (ft) <sup>3</sup>	Q25 Free-board (ft)
Ball Mountain Road	DC-1	3.0	0.005	N/A	96.4	22.5	80	CMP	40	91.71	91.21	4.50	0.01	2	0.03	2.3	3.54	5.7	25.6	92.5	3.93	92.7	3.72	13.2	15
Berwal Road	C-1	72.1	0.113	5.0	95.7	22	50	Smooth HDPE	50	90.18	86.32	2.50	0.08	2	0.05	26.7	43.24	72.8	32.5	94.3	1.36	95.9	-0.21	62.9	48
Old West Road	C-2	20.9	0.033	2.9	96.2	16	140	CMP	25	92.82	91.16	3.25	0.07	1.5	0.04	5.4	9.91	18.6	14.0	94.1	2.07	95.0	1.18	14.1	30
Old West Road	C-3	25.8	0.040	3.2	96.2	16	80	CMP	30	90.37	86.80	2.50	0.12	2	0.06	7.5	13.49	24.8	34.3	91.7	4.54	92.3	3.88	40.6	30-36
Old West Road	C-4	19.5	0.030	2.8	95.9	19	80	CMP	32	92.34	91.69	1.00	0.02	1.5' H x 2' W	0.04	7.5	12.85	22.8	17.9	93.7	2.23	94.5	1.45	11.1	30
Old West Road	C-5	80.2	0.125	5.3	96.0	17	100	CMP	30	90.56	90.04	2.80	0.02	1.5	0.04	25.9	45.33	81.5	16.4	96.1	-0.13	96.2	-0.25	7.2	48
Tory Lane	C-6	28.5	0.045	3.3	95.6	14	120	CMP	30	89.80	87.60	0.00	0.07	1.25	0.08	8.2	14.68	27.0	12.5	92.3	3.28	95.6	-0.04	14.8	30-36

1 - Calculated using VTANR Hydraulic Geometry Regressions, drainage areas <1sqmi not applicable

2 - Culvert capacity before road overtops using HY-8 model

3 - WSE = Water Surface Elevation. All elevations are relative to the laser level used for field data collection.

HY-8 User Manual



**Active Channel Culvert  
Sizing for Intermittent  
Stream Crossings**

Drainage Area (acres)	Culvert Size (inches)
4	15
8	18
16	24
20	30
40	36
50	42
80	48
120	60
160	66
200	Likely Perennial - Refer to VTDEC Technical Guidance for Identification of Perennial Streams
320	
350	
450	
640	

Source: [https://dec.vermont.gov/sites/dec/files/wsm/stormwater/docs/Permitinformation/MunicipalRoads/sw\\_MRGP\\_IntermittentStreamCulvertSizingGuidance.pdf](https://dec.vermont.gov/sites/dec/files/wsm/stormwater/docs/Permitinformation/MunicipalRoads/sw_MRGP_IntermittentStreamCulvertSizingGuidance.pdf)