PANTHER POND – STORMWATER MITIGATION PROJECT

Grantee Name Town of Raymond Project ID CP06009

Contact Person Noralee Raymond

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City Raymond State ME Zip Code 04071

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Email lakes@raymondmaine.org

Vendor or IRS Employer Identification Number: # 016000342

Amount requested from Stormwater Compensation Fund: $17,700

Value of matching funds or services from other sources: $30,696

Project Summary:

The goal of this project was to address several high and medium impact sites identified in the Panther Pond Watershed Survey and provide a significant reduction in phosphorus export to Panther Pond. The proposed project complimented the Panther Pond Conservation Project-Phase I (PPCP-PI). Project work completed with the Stormwater Compensation funds includes the following:

- **Curb town road & install two catch basins with outlet into settling basin**
- **Regrade & add turnouts on private camp road to shed water away from lake**
- **Discontinue driveway #1 – formalize as parking area, redirect stormwater**
- **Install speed bump on driveway #2 to direct water into 15' diameter rain garden**
- **Install 40'x12' rain garden to catch runoff from boat launch & camp paths**
- **Establish 20'x20' vegetated buffer on bank next to launch below parking area**
- **Formalize crushed rock parking area and plant 25'x40' vegetated buffer**
- **Stabilize five camp paths with water diverters and EC mulch**

The Town-owned portion of David Plummer Road was a significant source of stormwater runoff to five medium impact and one high impact sites at the Plummerville rental camp complex. The steep, narrow, paved road with dirt shoulders currently does not have any stormwater management controls. Runoff washes directly from this road causing severe to moderate erosion on the road shoulders, gravel driveway, several camp paths, and the beach, The private-owned portion of David Plummer Road has moderate surface erosion and road shoulder erosion (180') with direct flow down the boat access and camp paths into the lake.

To fix the identified sites the stormwater runoff was treated starting at the top of the watershed. See the attached sketch in Appendix A. Three watershed survey sites were fixed (BE1, BA6, PR1) as part of the stormwater compensation project with an additional five sites fixed (R9, R10, R11, R12, R13) as part of the PPCP-PI.

Project Outcomes

- Pollutant load reduction of 9.93 tons of sediment per year
- Comprehensive repair of 1 high and 7 medium impact sites
- Permanent treatment of runoff from town road with long-term scheduled maintenance of installed catch basins
- Permanent reduction in phosphorus export to Panther Pond with the conversion of 20'x50' driveway with direct flow to lake into an infiltration parking area
- Improvement of alternate driveway to divert runoff into 15' diameter rain garden and away from Panther Pond
- Diversion of runoff from the camp road, boat launch, and paths into 40'x12' rain garden
- 25' buffer depth installed along 40' sparsely vegetated bank that received high volume of runoff from camp road
- 20'x20' vegetated buffer established on bank next to launch below parking area

Project Tasks and Deliverables

Task 1 Project Management

The Town of Raymond and MDEP signed a grant agreement outlining project roles, responsibilities and funding arrangements. The Town of Raymond tracked project progress, expenses and local match and completed a "Grant Agreement Completion Report." In addition, the Town of Raymond will provide estimates of pollutant reductions to MDEP at the completion of the project. (4/06 to 6/08)

Cost: Grant-$750 Match-$0 Total-$750

Deliverables:

1. Grant Agreement - **complete**
2. Grant Agreement Completion Report - **complete**

Task 2 Phosphorus Mitigation Project

The Town Watershed Coordinator and Watershed Solutions Engineer provided the town road crew and landowner David Allen with technical assistance to address erosion and runoff problems on David Plummer Road and the Plummerville Rental Camp complex. One high and seven medium impact sites were fixed.

The Town of Raymond repaved and curbed the David Plummer Road and installed two catch basins and a settling basin to eliminate the road shoulder erosion and direct water away from the driveway, boat access, paths, and the lake. The catch basins were added to the town contract for catch basin cleanout. The Town of Raymond public works provided excavation work for the 15' diameter rain garden to catch driveway runoff. The Town provided labor and equipment to assist volunteers with installing crushed rock parking area and spreading mulch in bare soil open areas. Additionally, the Town assisted with delivery of project materials.

A contractor was used to add better surface material, re-grade, and install turnouts on the private portion of the David Plummer Road. A contractor was used to speed bump the alternate driveway.

The landowner closed off the main driveway that received a large volume of runoff which flowed directly toward the lake. The main driveway was converted into a crushed rock parking area. The landowner installed a rubber blade diverter on the boat access, and provided material delivery and excavation work for the 40'x12' rain garden to catch runoff from camp road, boat access, and two paths.

Volunteers provided labor to fix five camp paths, install two vegetated buffers, plant vegetation in both rain gardens, and install timbers to define parking area.

(4/06 to 6/08)

Cost: Grant-$16,000 Match-$30,140 Total-$46,140

Deliverables:

1. Design and permits – **complete (PAGE 6 & 7)**
2. NPS Site Report with pre and post construction photos - **complete**

Task 3 Pollution Reduction Estimates

The Town Watershed Coordinator estimated the nonpoint source pollutant load reduction (sediment and phosphorus) that was achieved due to the implementation of the conservation practices at the project site. The methods used are described in the publication, "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual, Revised June, 1999, Michigan Department of Environmental Quality."

The 2006 and 2007 "Pollutants Controlled Report" were submitted as part of the Panther Pond Conservation Project – Phase I and include sites fixed using the Stormwater Compensation funds. The project sites completed in 2008 will be reported in the Panther Pond Conservation Project – Phase I 2008 "Pollutants Controlled Report". The Town Watershed Coordinator will prepare a "Pollutants Controlled Report" to summarize estimated load reductions and attach supporting calculations. (4/06 to 6/08)

Cost: Grant-$200 Match-$0 Total-$200

Deliverable: Pollutants Controlled Report – **2006 and 2007 reports submitted**

Task 4 Education and Outreach

The Raymond Waterways Protective Association and the Panther Pond Association advertised project activities via e-mail, at the 2006 and 2007 Annual Meetings, and via word of mouth. No newspaper article was written as the local newspaper was discontinued. The Panther Pond Association and RWPA staff organized an educational workshop for the rain garden and infiltration steps installation. Project summary and photos will be in the 2008 RWPA Newsletter, distributed in July 2008. (4/06 to 12/06)

Cost: Grant-$750 Match-$556 Total-$1306

Deliverable: Copies of outreach article attached to the final report - **complete**

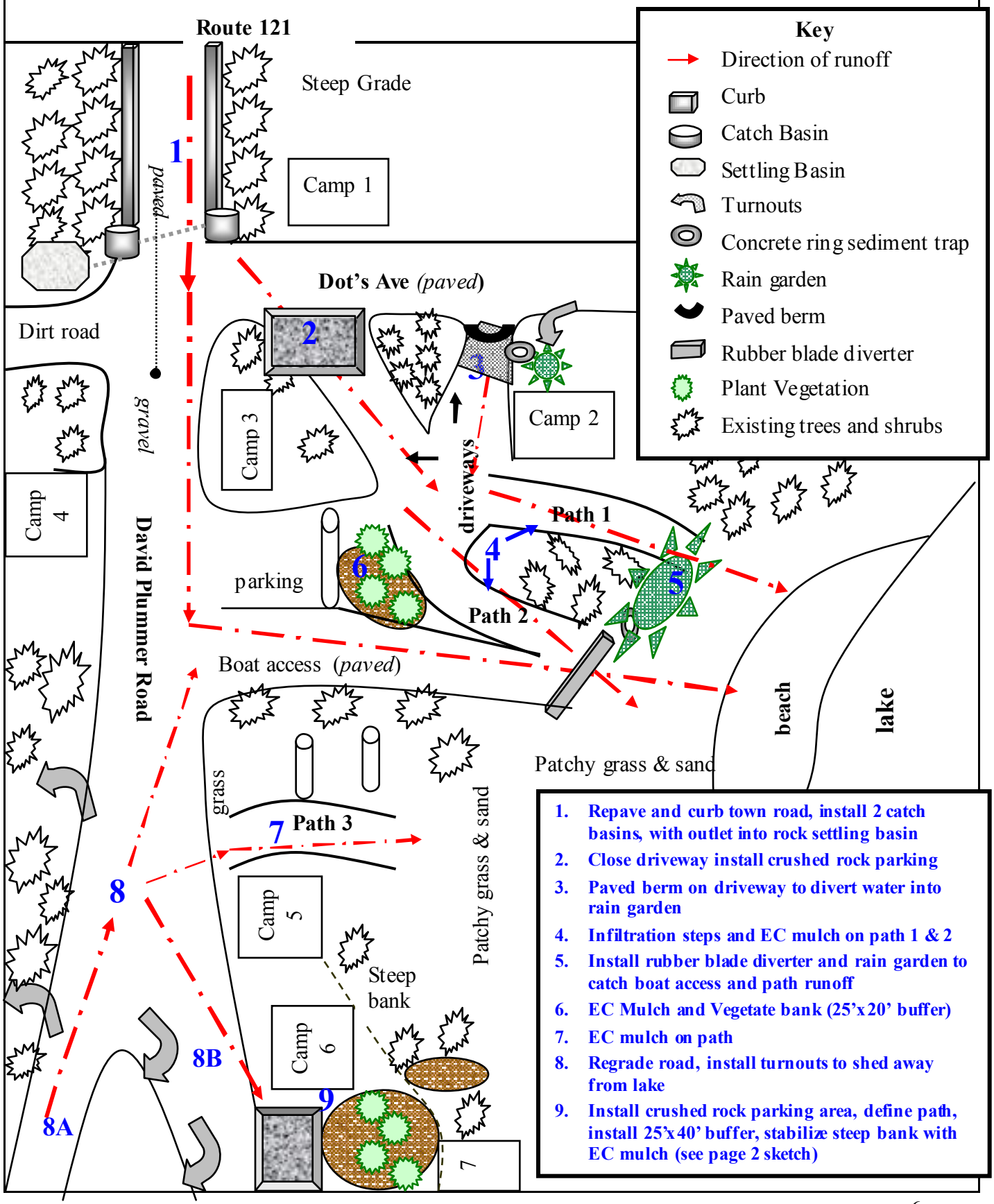
Budget Details

Panther Pond Stormwater Mitigation Project			
Description	**Grant**	**Match**	**Total**
David Plummer Road Materials			
Pave	$0	$6,260	$6,260
Curb	$1,890	$0	$1,890
Catch basins	$1,988	$0	$1,988
Settling Basin (28 yds)	$448	$0	$448
Erosion Control Mulch	$770	$0	$770
1/2" stone (10 yds)	$168	$0	$168
3/4" gravel (7 yds)	$70	$0	$70
Town Crew and Equipment			
Town Crew Labor - road, settling basin	$0	$9,870	$9,870
Town Crew Labor - rain garden		$705	$705
Backhoe		$650	$300
Dump Truck	$0	$375	$225
Contract Labor Road Base	$715		$715
Excavator Contract $75/hr x 66	$0	$4,950	$4,950
Conservation Project Materials & Labor			
Town Road Landowner Labor		$526	
Rain gardens - boat launch & driveway	$1,195	$3,161	$4,356
Driveway Stabilization	$0	$1,249	$1,249
Paved driveway	$220	$0	$220
Vegetative Buffers	$198	$935	$1,133
Define Parking & Path Stabilization	$428	$1,258	$1,686
Camp Road	$4,259	$201	$4,460
Staff Hours			
Engineer 30 hrs x $55/hr	$1,650	$0	$1,650
Project Manager 148 hrs x $25/hr	$3,700	$0	$3,700
Volunteer Outreach	$0	$556	$556
Totals	**$17,700**	**$30,696**	**$48,396**

Match Information

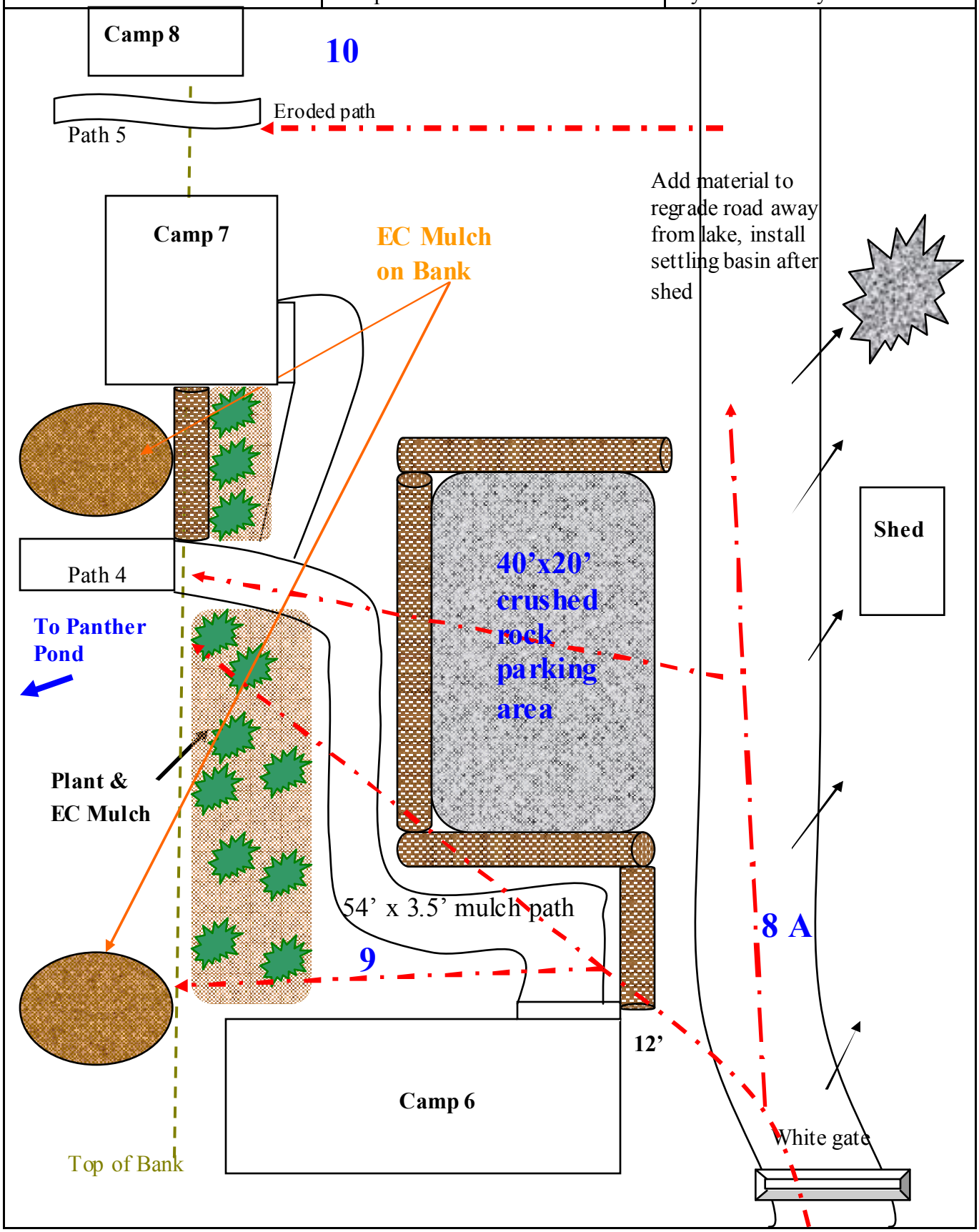
Panther Pond Stormwater Mitigation Fund Project Match					
Description	**Town**	**Landowner**	**Volunteers**	**319 grant**	**TOTAL**
Town Road Materials	$6,260				$6,260
Town Road Labor	$9,300	$526			$9,826
Town Road Equipment	$4,950				$4,950
Camp Road				$201	$1,000
Rain Gardens/Paths Labor	$705	$473	$1,168		$2,346
Rain Gardens Materials	$500	$377		$93	$970
Rain Garden Equipment		$1,050			$1,050
Vegetative Buffers/Paths			$779	$156	$935
Driveway Labor		$556			$556
Driveway Materials		$313			$313
Driveway Equipment		$380			$380
Parking & Path Labor/Equip	$1,095		$964		$2,059
Parking Materials				294	
Outreach			$556		$556
TOTAL	**$22,810**	**$3,675**	**$3,467**	**$744**	**$30,696**

Town of Raymond Raymond Waterways Protective Association	Project: Stormwater Mitigation Fund Grant Project	Page No. 1
	Subject: David Plummer Rd and Allen Rental Camps	Date: 10/10/05
		By: Noralee Raymond, RWPA



1. Repave and curb town road, install 2 catch basins, with outlet into rock settling basin
2. Close driveway install crushed rock parking
3. Paved berm on driveway to divert water into rain garden
4. Infiltration steps and EC mulch on path 1 & 2
5. Install rubber blade diverter and rain garden to catch boat access and path runoff
6. EC Mulch and Vegetate bank (25'x20' buffer)
7. EC mulch on path
8. Regrade road, install turnouts to shed away from lake
9. Install crushed rock parking area, define path, install 25'x40' buffer, stabilize steep bank with EC mulch (see page 2 sketch)

Town of Raymond Raymond Waterways Protective Association	Project: Panther Pond Conservation Project	Page No. 1
	Subject: Plummerville Rental Camps	Date: 5/24/08
		By: Noralee Raymond



Curb & Catch Basin Town Road with Outlet to Rock Settling Basin

1

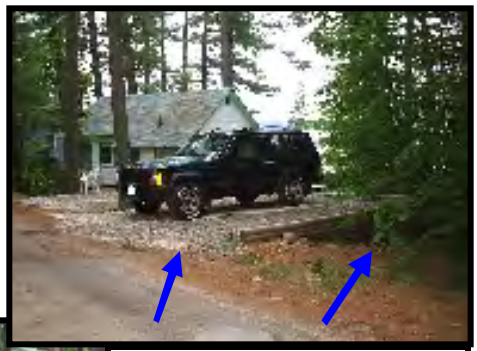
BEFORE – road shoulder erosion on town road. Stormwater washes out camp road, driveway, paths, and beach.

AFTER – paved road, installed two catch basins and directed runoff to settling basin

Runoff from road causes driveway erosion → Discontinue driveway, install crushed rock parking

2

Driveway # 1



BEFORE: Stormwater from the road causes driveway erosion and path erosion (see path #1 & #2 on page 10)

AFTER: Raised, crushed rock parking area installed. Runoff diverted into adjacent vegetation next to parking area and into crushed rock

Stormwater from road and paved driveway erodes dirt driveway and paths → Install paved diverter and rain garden to capture road and driveway runoff, stabilize path at driveway edge

Stormwater runoff comes from 3 directions (road & bank) puddles and heads toward driveway

Driveway # 2

3

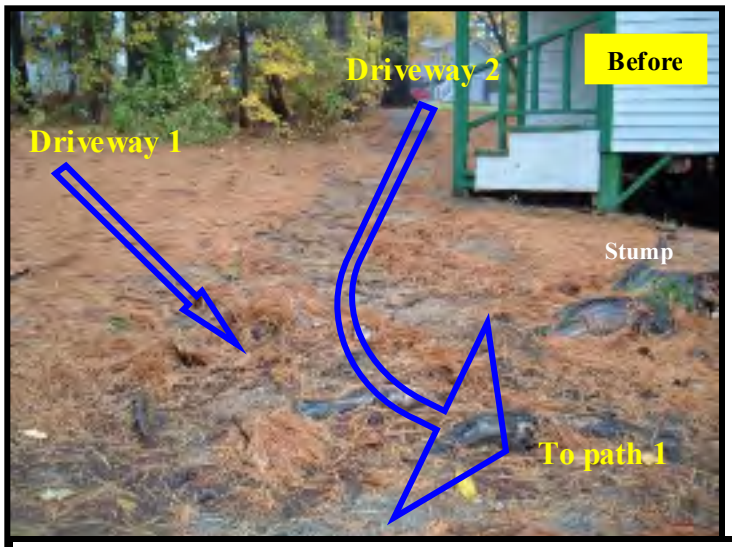
Before

After

BEFORE: Runoff from paved road & driveway erodes end of paved driveway & camp paths

AFTER: Paved diverter directs water to rain garden. EC mulch at edge of driveway

Install Infiltration Steps and Erosion Control Mulch on Camp Paths 1 & 2



4

Path 1

BEFORE (above): Road and driveway runoff causes severe erosion on camp path to lake
AFTER (below): Infiltration steps and EC mulch on path. Rock trench directed toward vegetation (right bottom photo) added at top of path to receive additional runoff

4

Path 2

BEFORE: Upland runoff erodes camp path, continues toward lake, eroding beach
AFTER: Infiltration steps & EC mulch stabilize path, runoff directed to rain garden (next page)

Rubber Diverter Directs Camp Road and Boat Access Stormwater into Rain Garden

BEFORE: Stormwater runoff from camp road and boat access cause erosion on open area and beach

5

DURING: Landowner places sediment ring in rain garden, volunteers installing plants

AFTER: Rubber blade diverts water from road and boat launch into the rain garden. Sediment ring catches sediment before it reaches the garden.

Plant 20'x25' vegetated buffer on bank next to boat launch, below parking area

6

BEFORE: Stormwater runoff from road, launch and parking area erode steep bank

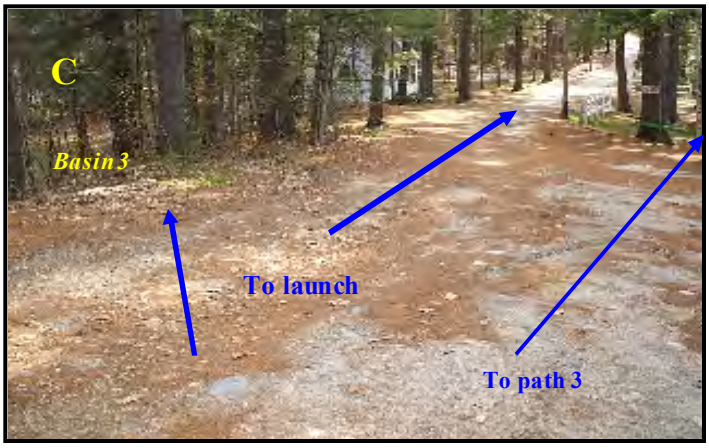
AFTER: EC mulch and vegetation stabilize eroded bank - 20'x20' vegetative buffer established

Stabilize path with EC mulch. Camp road at top of path re-graded to shed away from path.

7

Camp Road: Add hard packing material, grade road away from lake; install turnouts & 3 settling basins

BEFORE: Large volume of storm runoff washes out camp road, camp paths, bank, and boat launch



8 A

AFTER: Road crowned away from lake, path, & launch, water directed toward 3 settling basins

Camp Road: Add hard packing material, grade road away from lake, install swale & settling basin

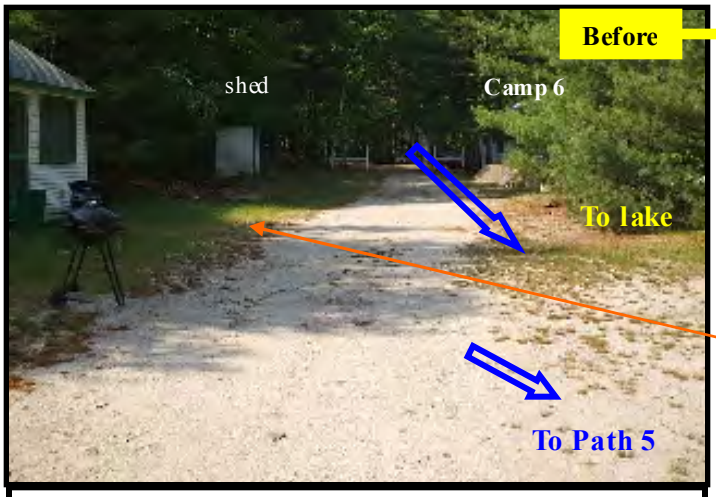
BEFORE: Stormwater runoff from camp road washes toward lake. Erodes open area and bank

AFTER: Mono-crown road away from lake toward grass swale and settling basin, loam and seed new shoulder on lake side

8 B

BEFORE: Runoff from road causes erosion on open area, path, and bank (photos - page 15, 16)

AFTER: crown road to shed away from lake, loam and seed road edge & swale, define parking



BEFORE: Camp road washes toward paths / lake

AFTER: Mono-crown road to direct runoff away from lake into grass swale and settling basin

Install 25'x40" Buffer, Define Path & Parking Area, & Stabilize Bank Erosion w/ EC Mulch

BEFORE

9

Bare Soil Open Area (left photos)
Eroded Bank (top photo)

Stormwater runoff from camp road and parking area erode bare soil undefined open area (1, 2).

Runoff concentrates and causes erosion across open area and severe erosion on steep bank (3)

AFTER

Vegetated Buffer – planted vegetation to establish 25' buffer at top of bank (1, 2)
Open Area Stabilized – defined path & parking area. Covered bare soil with EC mulch, created infiltration area for runoff in 20'x40' parking area with crushed rock (1, 2)
Stabilized Bank – steep eroded bank stabilized with EC mulch (3)

Volunteers create crushed rock parking area to serve 2 camps, define path, and create 25' buffer

Staff: Noralee Raymond (RWPA), Wendy Garland (DEP), Ann Speers (DEP – Americorp)
Volunteers: Diane Anderson, Phil Boissonneault, Fabienne Cattell, Robert French, Sibyl French, Elden Lingwood, Ben Severn, Charlie Turner

Camp Road Runoff Washes out Open Area & Path → EC Mulch and Infiltration Steps Installed

Camp Path #5

BEFORE: Runoff from open area (top photo) washes out camp path (bottom photo) directly to lake
AFTER: Water diverter (timber) directs water into vegetation and away from path, EC mulch covers and stabilizes bare soil (top right photo). Infiltration steps (timbers with crushed rock behind) installed on bank path, EC mulch stabilizes the path (bottom right photo).

10