



STORMWATER MANAGEMENT Revised OCT. 2024

NARRATIVE

The intent of this Stormwater Management Plan is to comply with the requirements of the Maine Department of Environmental Protection (MDEP) Chapter 500 regulations.

This project involves the creation of a residential subdivision in Cross Lake Township, Maine. This permit application will account for the development of the subdivision access road by the applicant/owner. The individual lots will be developed as single-family homes by future lessees and are therefore exempt from Chapter 500 standards. Based on the Chapter 500 rules, the Basic Standards, Phosphorous Standards, and Flooding Standards apply to this project.

The proposed roadway will result in approximately 1.12 Acres of new impervious area and 3.50 Acres of developed area. These areas were included in determining compliance with the Basic and Phosphorous Standards.

We have included assumptions for lot development (4,000 s.f. of impervious area and 6,000 s.f. of developed, lawn area) in determining compliance with the Flooding Standard and Section 10.32, **Phosphorus Control for Cross, Long, Mud, and Square Lake Watersheds, within the “Fish River Chain of Lakes Concept Plan”**, dated June 2019 (from here on out referred to as the **Concept Plan**). Please refer to the **Cross Lake Development Area Phosphorus Budget Scorecard** section of this report.

Basic Standard Submission: Information is provided as required for the Basic Standard Submission in **Section 14.0-Basic Standards**.

Urban Impaired Stream Standard Submission: This development is not located within an urban impaired stream watershed; this standard does not apply.

Phosphorous Standards Submission: Please refer to the **Cross Lake Development Area Phosphorus Budget Scorecard** section of this report.

The road is defined as linear and is only required to treat 75% of new impervious and 50% of developed area for that portion. We are proposing roadside forested buffers to provide the stormwater management for this project.

1. Narrative: This project involves the creation of a residential subdivision in Cross Lake Township, Maine. This permit application will account for the creation of approximately 1.12 acres (49,035 square feet) of new impervious surface and 3.50 acres (152,845 square feet) of total developed area.



2. Drainage Plans: A set of Hydrology Plans and Proposed Site Plans are provided in this Application. These plans include watershed boundaries and locations of the stormwater management features.
3. Calculations: This project will include roadside forested buffers which have been designed in accordance with Chapter 5 of the MDEP Stormwater BMP Technical Design Manual, Volume III.
4. Details, Designs, and Specifications: Please refer to the plans for stormwater management details, designs, and specifications.

Flooding Standard Submission: The following information is provided as required in the Flooding Standard Submission.

1. Control of Peak Flows: The project is required to meet Flooding Standards in accordance with Chapter 500 requirements. The Pre- and Post-Development Hydrology models and narrative are located in Section 12B.
2. Details, Design, and Specifications: The model runoff calculations are performed using a HydroCAD 10.0 model. Sizing of the required stormwater treatment methods are included in Section 12A.

Cross Lake Development Area Phosphorus Budget Scorecard:

The **Cross Lake Development Area Phosphorus Budget (Budget)** is 44 pounds per year, as defined within Section 10.32 of the **Concept Plan**. There are five development areas defined within the **Concept Plan** and this project/development is located within the “Cross Lake A” development area. Using the impervious areas and developed areas for the development of the proposed roadway and lots, we have filled out the Pre-PPE and Post-PPE Calculation worksheets. This information is summarized within Table 12.1 below. Proposed BMP’s and their associated treatment areas used to calculate the “treated” portions of the development are provided in Table 12.3.

Table 12.1: Pre-PPE and Post-PPE Calculations						
Land Surface Type	Acres	Export Coefficient from Table 3.1 Table 3.2	Pre-treatment Algal Av. P Export (lbs P/year)	Treatment Factor for BMP(s) from Chapter 6	Post- treatment Algal Av. P Export (lbs P/year)	Description of BMPs
Untreated Road	0.49	1.75	0.857	1	0.857	
Treated Road	0.63	1.75	1.10	0.4	0.44	Forested Buffers
Untreated Lawn	1.07	0.8	0.856	1	0.856	
Treated Lawn	0.87	0.8	0.696	0.4	0.279	Forested Buffers



Untreated Emergency Egress Road	0.14	1.75	0.245	1	0.245	
Untreated Emergency Egress Road ⁽¹⁾	0.21	1.75	0.368	1	0.368	
Untreated Subdivision Lot Development	4.14	0.34	1.408	1	1.408	
Untreated 50'x50' parking lot ⁽¹⁾	0.057	1.75	0.100	1	0.100	
Untreated access to hand-carry ramp ⁽¹⁾	0.014	1.75	0.024	1	0.024	
		Total Pre-PPE (lbs P/year)	5.654	Total Post-PPE (lbs P/year)	4.677	

Note (1): Proposed impervious area directly associated with access to a possible, future hand-carry boat ramp lot, which is not part of the Subdivision Application at this time.

As part of the record keeping requirements for the **Cross Lake Development Area Phosphorus Budget**, we have included Table 12.2 as a Scorecard to illustrate the impact of this project on the **Budget** and what is remaining for future projects.

Table 12.2: Cross Lake Development Area Phosphorus Budget Scorecard		
Total Cross Lake Development Area Phosphorus Budget* (lbs P/year) =		44.00
Cross Lake Development Area	Post- treatment Algal Av. P Export (lbs P/year)	Remaining Cross Lake Phosphorus Budget
CD-3 and/or CD-4 Zones	4.00 (reserved)	40.00
Cross Lake A	4.677	35.323
Cross Lake B	TBD	TBD
Cross Lake C	TBD	TBD
Cross Lake D	TBD	TBD
Cross Lake E	TBD	TBD

***Cross Lake Development Area Phosphorus Budget** is defined and discussed in the "Fish River Chain of Lakes Concept Plan", dated June 2019, Part 2,E, Section 10.32 (starting on page 115).



Table 12.3: Stormwater Treatment BMP's

TREATMENT METHOD	AREA TREATED	
	IMPERVIOUS AREA	DEVELOPED AREA
Roadside Buffer A	3,600 SF	6,542 SF
Roadside Buffer B	1,800 SF	4,800 SF
Roadside Buffer C	2,970 SF	6,314 SF
Roadside Buffer D	4,230 SF	9,217 SF
Roadside Buffer E	4,500 SF	10,599 SF
Roadside Buffer F	2,340 SF	6,007 SF
Roadside Buffer G	1,170 SF	2,375 SF
Roadside Buffer H	2,070 SF	4,486 SF
Roadside Buffer I	3,960 SF	12,302 SF
Roadside Buffer J	810 SF	5,005 SF
TOTAL TREATED ROADWAY	27,450 SF (0.63 acres)	67,647 SF (1.55 acres)
TOTAL ROADWAY	49,035 SF (1.12 acres)	152,845 SF (2.85 acres)
TOTAL UNTREATED ROADWAY	21,585 SF (0.49 acres)	85,198 SF (1.95 acres)



SECTION 12A STORMWATER QUALITY CONTROL NARRATIVE (GENERAL STANDARD)

UPDATED JUNE 2024

Narratives and calculations were originally provided demonstrating how this project complies with the General Standard, this standard does not apply. As discussed with MaineDEP staff, the Phosphorous Standard is the applicable standard for providing stormwater treatment for this development.

BMP DESCRIPTIONS AND SIZING CALCULATIONS

The proposed stormwater quality control devices have been designed in accordance with the standards outlined in Stormwater Management for Maine, Volume II BMP Manual, January 2006 and revised May 2016. Construction and maintenance will be done according to the standards outlined in this manual.

Description of the treatment types are as follows:

1. Roadside Forested Buffers

The only stormwater BMPs proposed for this project are "Buffers Adjacent to the Downhill Side of a Road," as described in Chapter 5.3 of the MDEP BMP Manual. These forested buffers are located on slopes less than 20% and are not proposed in wetlands. The road is 18' wide with two lanes; therefore, the buffers have a flow path of 55 feet. The locations of these buffers are shown on Sheet C703. These buffers will be deed restricted; sample deed language has been provided.

The proposed stormwater quality control devices have been designed in accordance with the standards outlined in Stormwater Management for Maine, Volume II BMP Manual, January 2006, and revised May 2016. Construction and maintenance will be done according to the standards outlined in this manual.



SECTION 12B
STORMWATER PEAK RUNOFF CONTROL NARRATIVE (FLOODING STANDARD)

As previously stated, the project is required to meet the flooding standard under Chapter 500 Section 4.E(2)(a). To meet the flooding standard, HydroCAD calculations were performed to compare pre-development and post-development conditions. Curve numbers and peak runoff flows were calculated using HydroCAD.

The pre-development site is undeveloped woodland with wetlands and streams. Soils on the site per the USDA web soil survey are classified as Howland Loam (Hydrologic Soil Group C/D) and Monarda-Burnham complex (Hydrologic Soil Group D.) The Site uniformly drains to the northeast to a roadside ditch along West Side Road, which ultimately drains to Cross Lake. The post-development site was broken into 8 subareas encompassing the same footprint as pre-development. Developed site areas will continue to flow to natural drainage pathways.

Summation Points were chosen in similar areas between pre-development and post-development to compare peak flow runoff for the 2-year, 10-year, and 25-year storm events. Summation Points 1 and 2 are located northeast and northwest of the site and compare the runoff flowing to the roadside ditch along West Side Road, and to a stream west of the site.

Based on results of the HydroCAD, it is expected that stormwater runoff from the site will be similar or lessened in post-development conditions as in pre-development conditions. Overall, it is expected that runoff from the site will be similar to post-development conditions and a similar stormwater runoff will be realized. A comparison of each of the watershed areas in both Pre- and Post-Development is organized in the table below.

		2 Year (cfs)	10 Year (cfs)	25 Year (cfs)	25 Year Net Change (cfs)	25 Year % Change (%)
Summation Point 1	Pre	16.04	36.72	52.41	-2.78	-5.30
	Post	13.47	33.57	49.63		
Summation Point 2	Pre	16.09	36.36	51.68	-0.4	-0.77
	Post	14.99	35.65	51.28		

As can be seen in the table above, the summation points will see slight decreased post development flow rates due to division of the site watersheds and increased times of concentration. The increase in impervious surface is generally small compared to the overall watershed area, and thus does not result in an increased curve number. Development

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