ATTACHMENT C

SUPPLEMENTAL STORMWATER MANAGEMENT MEMORANDUM

SUPPLEMENTAL STORMWATER MANAGEMENT REPORT FOR COMMON ROADWAY EXTENSION LEVEL II SITE PLAN APPLICATION (GENERAL STANDARDS)

THE FOREFRONT AT THOMPSON'S POINT PORTLAND, ME

PREPARED FOR:

FOREFRONT PARTNERS I, LP
501 DANFORTH STREET
PORTLAND, MAINE 04102
(207) 747-5288

PREPARED BY:

PLACEMAKER PARTNERS, LLC
501 DANFORTH STREET
PORTLAND, MAINE 04102
(207) 747-5288

March 2017

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SUPPLEMENTAL STORMWATER MANAGEMENT REPORT

1.0 Introduction

The proposed roadway extension is depicted on the Master Development Plan (approved Jan. 2015) and more specifically detailed on the Overall Subdivision Plan (approved January 12, 2016). The roadway plans contained in a standalone City of Portland Level II site plan application dated March 20, 2017 provide additional construction details and including minor adjustments to accommodate the evolving Master Development Plan. This section of roadway is shown through-out these plan sets and more specifically located between Stations 18+00 and 22+50.

This supplemental report is intended to describe the improvements included with the common infrastructure required to support the Sectional 2 Subdivision Plat as well as demonstrate the integration of stormwater treatment and conveyance design measures approved under the Master Development and Subdivision Plans Stormwater Management Strategy. The enclosed computations show that this phase of the project has been designed to meet the Portland Stormwater Management Standards adopted 7/19/10 and General Stormwater Standards of MeDEP (revised October 2010) and are consistent with the overall goals presented in previous Stormwater Reports. The intent of the stormwater management design, erosion and sediment control, and Inspection and Maintenance Manual have remained the same as approved in June 5, 2012 and include full compliance with Chapter 32 of the City's Technical Manual Stormwater rules and Chapter 500 of the MeDEP Stormwater law. This phase of the project will have a cumulative redeveloped area of 0.73 acres of which 0.55 acres are newly constructed impervious surfaces. The overall project will disturb approximately 1.24 ac of developed land. Revisions to the site plan and how it relates to each Stormwater Management Discharge Zone is outlined below and tabulated in the attached spreadsheet.

2.0 Stormwater Management Revisions

Zone D (Access Road):

The proposed roadway section is associated with the Sectional 2 Subdivision Plat and is included in the Zone D discharge area of the Overall Stormwater Management Strategy report. This supplemental report is intended to describe the changes to the water quality treatment approach and refine the treatment areas as a result of minor site plan revisions.

The area of proposed development included with this application affects the zones and subzones identified on the Overall Stormwater Management Plan as Zone D and C and summarized in Table 1 below:

TABLE 1 – Summary of Changes to Stormwater Management Zone

Subdivision Plan Discharge Zone ID	CB Inlet ID	Description of Change
D – 601	N/A	Future development area will be combined with Stormwater Management Zone A or B upon design development of lot.
D – 602	D-24.1	The roadway profile was revised to combine drainage areas 602 and 604. The Filterra tree box filter was upsized to the appropriate size for the increase in tributary area.
D – 603	D-25.1	The roadway profile was revised to combine drainage areas

		603 and 605. The Filterra tree box filter was upsized to the appropriate size for the increase in tributary area.
D – 604	D-24.1	The roadway profile was revised to combine drainage areas 602 and 604. The Filterra tree box filter was upsized to the appropriate size for the increase in tributary area.
D – 605	D-25.1	The roadway profile was revised to combine drainage areas 603 and 605. The Filterra tree box filter was upsized to the appropriate size for the increase in tributary area.
C – 1	D-25.1	A portion of the Brick South Building area was assumed to drain towards the road and is now included in the Zone D treatment area. C – 1 will be broken up into smaller catchments split between Zone D and Zone C. Filterra D – 25 has been increased in size to accommodate the additional tributary area.

An updated Water Quality Treatment table is shown on plan Sheet C-4.1 Stormwater Management Plan and enclosed in Appendix A. Filterra Tree Box Filters have been sized in accordance with the MeDEP approval letter dated February 2, 2017 addressed to Filterra Bioretention Systems. A copy of the letter is enclosed in Appendix C for reference.

The proposed stormwater conveyance system for the proposed roadway section ties into the Zone D 36" diameter outfall installed in 2016 as part of the Brick South development. The extended conveyance system collects runoff from the overflow discharge from the Filterra® units as well as a future treatment area to the south of the Brick South Building. The trunk line has been sized with consideration of potential flow from future phases of the project.

A portion of the Zone D discharge area identified as area D-601 will be redirected to a new treatment zone to offset new flow for a new tributary area from Zone C. The final discharge location will be determined as part of a subsequent design phase. However, it is noted that the area is still anticipated to be treated using the Jellyfish filter technology.

The Filterra® tree box filters are considered adequate to meet the Chapter 500 General Standards for water quality treatment.

3.0 Conclusion

The stormwater management strategy for this phase of the project presented herein has remained the same as the Master Development Plan and Subdivision Plan Strategies. The amended site plan treats 78% or 0.57 ac of the 0.73 ac. redeveloped area and 90.9% or 0.50 ac. of the 0.55 ac. redeveloped impervious area; however, when a 60% credit is taken for the treatment of a portion of the Brick South building the amended site plan treats 88.58% of the net developed area and 105.5% of the net developed impervious area. The individual systems have been adjusted to accommodate layout revisions but ultimately the detailed design remains the same and meets or exceeds the City of Portland Stormwater Management Requirements.

4.0 Appendices

Appendix A – Summary of Water Quality Treatment
Appendix C – Filterra Approval and Sizing letter from MeDEP

APPENDIX A

Summary of Water Quality Treatment

Summary of Water Quality Treatment

Zone	Inlet ID	Impervious Area (sf)	Pervious Area (sf)	Total Area (sf)	Total Area (Acres) [1]	Required Water Quality Volume (CF) [2]	Existing Developed Area Mitigation Credits (SF) [9]	Treatment Approach [6]	Filterra Size Required	Jellyfish Unit Provided [5]	1 Yr 24-hr Storm Event Peak Flow Rate (cfs)[3]	Required StormTech Isolator Row Chambers (SC-740)[4]	Provided Water Quality Volume (CF) [7]	StormTech Isolator Row Chambers (SC-740) Provided (EA)[10]
Zone D	D-24	8,527.00	600.00	9,127.00	0.21	730.58	-	Filterra	1-(6'x'6)	-	0.53	NR	-	N/A
	D-25	13,197.00	2,393.00	15,590.00	0.36	1179.52	-	Filterra	1-(13'x7')	-	1.19			
	Brick South (Partial South Side)	5,812.00	0.00	5,812.00	0.13	484.33	3487.20	Filterra D25	included in D-25					
	Disturbed Perimeter Area	0.00	4,949.00	4,949.00	0.11	-	-	None	-	-	-	-	-	-
Zone D Totals	-	**27,536.00**	**7,942.00**	**35,478.00**	**0.81**	**2,394.43**	**3,487.20**	-	-	-	-	-	-	-
Zone B Developed Area	401	1,087.00	0.00	1,087.00	0.02	90.58	0.00	None this Phase	-	-	-	-	-	-
	402 (Partial area)	1,087.00	0.00	1,087.00	0.02	90.58	0.00	None this Phase	-	-	-	-	-	-
	Disturbed Perimeter Area	0.00	0.00	0.00	0.00	0.00	0.00	None this Phase	-	-	-	-	-	-
Zone F Developed Area Subtotals		**2,174.00**	**0.00**	**2,174.00**	**0.05**	**0.00**	**0.00**	**0**	-	-	-	-	-	-
Zone F Existing Buildings	BNB-North Side	0.00	0.00	0.00	0.00	0.00	0.00	0	-	-	-	-	1,460.00	-
	BNB-South Side	0.00	0.00	0.00	0.00	0.00	0.00	0	-	-	-	-	1,460.00	-
Zone F Existing Building Subtotal	-	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0**	-	-	-	-	**2,920.00**	-
Zone F Totals	-	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0**	-	-	-	-	-	-

****Previously Approved Filterra Box**

Developed Area Breakdown		
A.) Total New Developed Area Treated (SF)	24,717.00	**0.57**
B.) Total New Developed Area untreated (SF)	7,123.00	**0.16**
C.) Total New Developed Area (SF) = A+B	31,840.00	**0.73**
D.) Existing Developed Area Treated (SF)	5,812.00	**0.13**
E.) Adjusted Existing Developed Area Treated (SF)	3,487.20	**0.08**
F.) Total Net Developed Area Treated (SF) = A+E	28,204.20	**0.65**
Impervious Area Breakdown		
G.) Total New Impervious Area treated (SF)	21,724.00	**0.50**
H.) Total New Impervious Area untreated (SF)	2,174.00	**0.05**
I.) Total New Impervious Area (SF) = G+H	23,898.00	**0.55**
J.) Existing Impervious Area Treated (SF)	5,812.00	**0.13**
K.) Adjusted Existing Impervious Area Treated (SF)	3,487.20	**0.08**
L.) Total Net Impervious Area Treated (SF) = G+K	25,211.20	**0.58**

Treatment Breakdown	Required	Provided
% of Net Developed Area Treated = F/C	80.00%	88.58%
% of Net Impervious Area Treated = L/I	95.00%	105.50%

NOTES AND ASSUMPTIONS:

1. All areas are based on the FST Permit drawings dated June 2014
2. The required water quality volumes have been computed based on Sections 7.4, 7.5 and 7.6 of the Maine DEP Volume III BMP's Technical Design Manual. The volume is computed to be 1" times the subcatchments impervious area and 0.4" times the subcatchments vegetated area. Exisiting buildings to remain are not required to be treated.
3. The 1 year peak flow rates have been computed using the rational method. The rainfall intensities are derived from the Cumberland County IDF curve.
4. Subsurface storage system sizing is based on a Stormtech SC-740 chamber system. All isolator rows have been computed per section 7.3.3 Pretreatment Isolator Row of the Maine DEP Volume III BMP's Technical Manual. One chamber is required for each 0.2 cfs of the computed tributary 1 year peak flow rate.
5. The required number of Jelly Fish treatment units have been computed based on Contech Sizing requirements. The water quality volume for each unit is storage up stream and the amount of treatment cartridges are computed based sediment mass loading.
6. The owner reserves the right to use an alternate tree box filter device provided it has been approved by the Maine DEP Chapter 500 delegated review authority of the City of Portland.
7. Provided Water Quality Volume for stormtreat storage system computed using 61.38 CF of storage per chamber based on Storm Tech Chamber Design Manual
8. The Stone Drip Edge was based on section 7.6 of the Maine DEP Volume III BMP's Technical Design Manual. The Width of stone is dervived from a required WQV based off 1" of runoff and a desired stone resevior depth. See sizing computations on separate sheet.
9. According to Chapter 500 Maine DEP stormwater rules; the department allows applicants to take credit for the treatment of existing impervious areas on site. For existing roofs the credit can be calculated by multiplying the total treated area by 0.6.
10. The MEDEP will now accept a Filterra tree box filter as a stand alone treatment unit and does not require an Isolator Row for eligible projects. This project meets the eligibility criteria noted in a letter dated June 27th, 2014 from the MEDEP

APPENDIX B

Filterra Approval and Sizing letter from MeDEP

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PAUL R. LEPAGE
GOVERNOR

PAUL MERCER
COMMISSIONER

February 2, 2017

Derek Berg
Filterra Bioretention Systems
Contech Engineered Solutions LLC
71 US Route 1, Suite F
Scarborough, ME 04074

Dear Mr. Berg:

This letter replaces the April 19, 2016 approval from the Department of Environmental Protection (Department) that authorized the use of the Filterra Bioretention System. The Filterra Bioretention System (FBS) was permitted for use by the Department of Environmental Protection (Department) on November 12, 2009, as part of a stormwater treatment train that included the use a StormTech Isolator Row following the structure as an approved alternative to the General Standards (Section 4.C) of the Stormwater Management Rules (Chapter 500). Based on new testing data, the installation of FBS structures without the StormTech Isolator Row was approved on an interim use by the Department on January 21, 2015.

The FBS structures sizing criteria must be revised based on data you provided of an appropriate rainfall intensity rate that would allow for the full treatment of 90% of an average annual runoff volume. Therefore, the Department will review and approve, on a case-by-case basis, the use of the FBS when the system is sized, installed and maintained in accordance with the following provisions:

1. The structure may be a standard concrete box or a soft shell system that is filled with the Filterra engineered filter media, provided it is sized to meet the requirements of the General Standards (Section 4.C) and is installed, operated and maintained in accordance with the manufacturer's specifications.

2. The FBS must be sized in accordance with the manufacturer's standard New England testing results and revised sizing guidelines outlined in the following table to treat 90% of the annual runoff volume:

AUGUSTA
17 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688 FAX: (207) 287-7826

BANGOR
106 HOGAN ROAD, SUITE 6
BANGOR, MAINE 04401
(207) 941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04769
(207) 764-0477 FAX: (207) 760-3143

website: www.maine.gov/dep

Filterra Model Number	*Area in Acres*	*Treatment Flow Rate at 140"/hr (cfs)*	*Outlet Pipe Size*
4x4	0.100	0.05	4"
4x6	0.151	0.08	4"
4x8	0.202	0.10	4"
6x6	0.227	0.12	4"
6x8 / 4x12	0.301	0.16	4"
6x10	0.378	0.19	6"
6x12	0.454	0.23	6"
7x13	0.573	0.29	6"

Alternatively, the runoff from the entire contributing drainage area, including all pervious areas, may be modelled to provide treatment of the 0.95" storm at the approved hydraulic loading rate of 140" per hour.

3. When designed with the standard curb inlet design, the FBS must be configured "off-line" with the surface elevation at the FBS unit being up gradient of an overflow inlet. When designed with the grated inlet design, the FBS must incorporate an internal bypass and will not require an overflow inlet. The applicant must demonstrate that the proposed design meets all the manufacturer's specifications prior to submission for Department approval. Review and approval of the proposed design by the manufacturer will be sufficient to demonstrate conformance with the manufacturer's specifications.

4. The treated flow and bypass flow must be combined and directed to a detention system/structure that will store the water quality/channel protection volume (WQv) consisting of the first 1.0 inch of runoff from impervious areas and 0.4 inch of runoff from lawns and landscaped areas. An external outlet control structure must control the flow out of the system and the WQv must be detained between 24 hours and 48 hours.

5. When a boxed structure is proposed, the FBS must be delivered to the site with the engineered filter media and plumbing fully installed. The concrete box must be sealed to prevent debris and sediment from entering the system during construction. The activation of the FBS and opening of the protective mesh cover, installation of plant(s) and mulch layers as necessary, can be performed only by the supplier (Contech or its authorized dealer). The activation process must not commence until the project site is fully stabilized and cleaned (i.e., full landscaping, grass cover, final paving and street sweeping completed), minimizing the risk of construction materials contaminating the FBS system.

6. When a soft shell structure is proposed, the FBS(s) must be built on site and must include all the components of a boxed structure. The FBS must be designed per the manufacturer's specifications and must be installed on-site by the manufacturer's representative.

7. Prior to construction, a five-year binding inspection and maintenance contract must be provided for review and approval by the Department, and must be renewed before contract expiration. The contract will be with a professional with knowledge of erosion and stormwater control, including a detailed working knowledge of the proposed system. The first year's maintenance must be provided by the manufacturer to ensure that the system is operating according to the established specifications.

8. The overall stormwater management design must meet all Department criteria and sizing specifications and shall be reviewed and approved by the Department prior to use.

9. Each project must be reviewed and approved by the manufacturer for proposed use, layout and sizing of the system and for conformance with their design specifications. The system must be installed under the manufacturer's representative supervision.

10. This approval is conditional to on-the-ground experience confirming that the FBS's pollutant removal efficiency and sizing are appropriate. The "permit shield" provision (Section 14) of the Chapter 500 rules will apply, and the Department will not require the replacement of the system if, with proper maintenance, pollutant removals do not satisfy the General Standard Best Management Practices.

We look forward to working with you as these stormwater management structures are installed on new projects. Questions concerning this decision should be directed to Jeff Dennis at (207) 215-6376.

Sincerely,

Mark Bergeron, P.E.
Director
Bureau of Land Resources

cc: Don Witherill, Maine DEP