STORMWATER MANAGEMENT REPORT

River's Edge Apartments
Auburn, Maine

Survey Works, Inc have retained Terradyn Consultants, LLC to prepare the site stormwater management plan for a proposed site plan to construct three apartment buildings on the easterly side of North River Road, just south of the intersection with Northern Avenue and adjacent to the Androscoggin River. Survey Works, Inc is completing the site plans and application materials on behalf of the applicant, River's edge Apartments, LLC. The applicant is proposing to construct three approximately 4,500 SF apartment buildings served by public utilities, paved parking areas, and stormwater management infrastructure on the western portion of the site along North River Road. The proposed development will be located outside of the 25' setback from the riverbank and designed to be above the 100-year flood elevation. This summary describes the effect that the development is expected to have on stormwater runoff from the site and on downstream properties and waterbodies.

Development Summary	
Site Area	98,917 SF
Existing Developed	6,000 SF
Proposed Developed	65,525 SF
Proposed Impervious	38,176 SF

EXISTING PROJECT SITE

The project site, identified as lot 101 on Tax Map 271, is 2.27 acres in size and is located on the eastern side of North River Road in Auburn, Maine. The site is located in the City of Auburn General Business District and within the Flood Plain and Shoreland overlay zone. Residential and commercial uses surround the site. Overhead electric utilities and public water exist in North River Road.

The parcel is undeveloped forestland with wetlands mapped along the Androscoggin River. An existing gravel road/path enters the site from North River Road on the northern portion of the site and runs along the river. The existing developed area, which is considered impervious, is approximately 6,000 SF. Wetlands were mapped by Joseph Noel of South Berwick, ME in August 2019. The wetland delineation is included in Attachment 1. There is also a FEMA Flood Way defined along the Androscoggin River, and a FEMA defined base flood elevation of 176.8'. The FEMA Firm for this site is included in Attachment 2. The applicant previously submitted a Flood

Hazard Development Application for work within the flood zone, which was included with Survey Work's preliminary submission to the City. Work associated with the project will maintain a 25' setback from the riverbank. The site generally slopes from west to east towards the river. Runoff from the existing site drains directly to the Androscoggin River.

The Natural Resource Conservation Service (NRCS) identifies onsite soils as Adams loamy sand and Winooski silt loam. An excerpt of the NRCS Medium Intensity Soils Map is provided in Attachment 3.

PROPOSED PROJECT

The proposed project includes construction of three approximately 4,500 SF apartment buildings, parking areas, utilities and stormwater management infrastructure. The proposed developed area is approximately 65,525 SF, and the proposed impervious area is approximately 38,176 SF. The developed area will be above the 100-year flood elevation and setback at least 25' from the riverbank. The project is required to meet the City of Auburn Code of Ordinance Chapter 18 Article III Post Construction Stormwater Management requirements.

The stormwater management system for this project is designed to treat stormwater to Maine DEP Chapter 500 Basic and General Standards. Stormwater runoff from at least 95% of the impervious area and 80% of the developed area on site will be treated in approved BMPs. The site is directly tributary to the Androscoggin River, so the Flooding Standard is not applicable.

METHODOLOGY OF ANALYSIS – STORMWATER QUANTITY

A hydrologic analysis of the designed BMPs was conducted based upon the methodology contained in the USDA Soil Conservation Service's Technical Releases No. 20 and 55 (SCS TR-20 and TR-55). For Androscoggin County, Maine, a 24-hour SCS Type III storm distribution was used for the analysis using the following storm frequencies and rainfall amounts, per Maine DEP Chapter 500:

Storm Event	24-Hour Rainfall
2–Year Storm	3.0 inches
10–Year Storm	4.3 inches
25–Year Storm	5.4 inches

Land use, cover, delineation of watershed subcatchments, hydraulic flow paths, and hydrologic soil group (HSG) types were obtained using the following data:

1. Lewiston, Maine USGS 7.5 minute quadrangle maps.

2. NRCS Medium Intensity Soils Survey.

3. Aerial topographic survey with 2-foot contour intervals, made available by the State of Maine.

4. Boundary & Topographic Survey, prepared by Survey Works, Inc.

5. Field reconnaissance by Terradyn Consultants.

Runoff curve numbers, time of concentration, and travel time data were established based on methods outlined in the USDA TR-55 manual. A minimum time of concentration of 5 minutes was used in the models.

POST-DEVELOPMENT CONDITIONS

The proposed (post-development) condition includes the developed lot with approximately 38,176 SF of impervious area and 65,525 SF of developed area. Other areas of the site that will be disturbed as part of the project will be re-vegetated to a meadow condition mowed less than twice per year, so are not considered developed. Stormwater management is provided for stormwater runoff from the parking areas, buildings, and portions of the lawn through two underdrained soil filters (UDSF) and roof dripedge filter strips along each of the three buildings.

This project is tributarty to the Androscoggin River so an analysis of peak flows leaving the site and a comparison to pre-development flow rates is not necessary. However, we did study the watersheds tributary to each of the two UDSFs to ensure the treatment measures are sized appropriately and will release stormwater in such a way to minimize erosion and sedimentation impacts.

A Post-development Treatment Map, showing treatment measures and their tributary sub-watersheds is provided in Attachment 4. The Post-development HydroCAD model of the two UDSFs is attached in Attachment 5.

Peak rates of runoff from the two UDSFs, computed for the proposed condition are as follows:

Post-Development Peak Rates of Runoff			
Peak Discharge (cfs)			
	2-Year	**10-Year**	**25-Year**
UDSF 1	0.03	0.14	0.97
UDSF 2	0.03	0.78	2.08

The Underdrained Soil Filters were also analyzed in the 100-year storm with the tailwater set at the base flood (100-year flood) elevation of 176.8'. This analysis was done to ensure the UDSFs will function in a flood event without overtopping the berms. These calculations are also included in Attachment 6.

STORMWATER QUALITY

The proposed project was designed to meet Maine DEP Chapter 500 requirements for stormwater treatment using approved BMP measures. Treatment must be provided for stormwater runoff from 95% of the proposed impervious areas and 80% of the proposed developed areas. Stormwater treatment will be provided by two underdrained soil filters and roof drip edge filters at each of the three buildings. The proposed project provides the following treatment percentages:

Treatment Calculations	
Proposed Developed Area	65,525 SF
Proposed Impervious Area	38,176 SF
Treatment Provided:	
Drip Edge Filters (total)	
Developed Treated	15,405 SF
Impervious Treated	13,485 SF
UDSF #1	
Developed Treated	14,720 SF
Impervious Treated	9,377 SF
UDSF #2	
Developed Treated	22,300 SF
Impervious Treated	14,500 SF
Treatment Amounts	
Total Developed Treated	52,425 SF
% Developed Treated (80% required)	**80%**
Total Impervious Treated	37,362 SF
% Impervious Treated (95% required)	**98%**

These treatment percentages are achieved by the following treatment measures:

Roof Dripline Filters:

The proposed building roof on each building pitches to all four sides, and the stormwater runoff from the majority of each roof will be captured in a roof dripline filter along the edge of the building. The roof dripline filter sizing calculations can be found in Attachment 6.

UDSFs:

The paved parking, walkways, and lawn areas were designed to direct stormwater toward two underdrained soil filters. Stormwater will flow overland and through closed drainage systems in the parking areas to the two UDSFs. The southern portion of the site will direct stormwater to UDSF #1, and the northern portion of the site will direct stormwater to UDSF #2. Design calculations for the UDSFs are included in Attachment 6. Each UDSF design calculation section attached include the following items:

1. BMP design calculations sheet
2. UDSF Peak Elevation Hydrograph & Pond Summary (from HydroCAD)
3. UDSF Hydrograph table (indicating drawdown time, from HydroCAD)
4. UDSF Summary in 100-year storm with 176.80 tailwater set (from HydroCAD)

UDSF #1 summary:

- 1.5" orifice applied to underdrain outlet
- Pond drains in approximately 36 hours
- Peak elevation in 25-year storm = 179.58'
- Peak elevation in 100-year storm with tailwater set (flooding) = 179.65'
- Berm elevation = 181.00'
- Pond drains in 24-48 hours and overflow structure can convey stormwater in normal conditions and flooding conditions without overtopping the berm

UDSF #2 summary:

- 1.5" orifice applied to underdrain outlet
- Pond drains in approximately 37 hours
- Peak elevation in 25-year storm = 178.64'
- Peak elevation in 100-year storm with tailwater set (flooding) = 178.69'
- Berm elevation = 180.00'
- Pond drains in 24-48 hours and overflow structure can convey stormwater in normal conditions and flooding conditions without overtopping the berm

EROSION & SEDIMENTATION CONTROL

A site-specific Erosion and Sediment Control Plan has been developed for the project with the goal of reducing erosion and sedimentation during and after construction. The plan utilizes perimeter sediment control during construction and rapid stabilization of denuded areas to reduce erosion and sedimentation. The Plan narrative and details are located directly on the project drawings (plan sheet SW-3) for convenient reference during construction.

The proposed project includes grading the site and raising the elevation of a portion of the development area to be above the 100-year flood elevation. This will result in the construction of a steep slope between the buildings and the river. This slope shall be constructed with

permanent erosion control mesh and re-vegetated with a meadow seed mix. This slope will be maintained as a meadow area, not lawn, and shall be mowed less than 2 times per year. A detail for the construction of this slope is provided on plan sheet SW-1.

INSPECTION & MAINTENANCE PLAN

Stormwater management and treatment measures require regular inspection and maintenance to maintain their effectiveness. A site-specific Inspection & Maintenance Plan of Stormwater Management Facilities for River's Edge Apartments is included in Attachment 7.

CONCLUSION

The proposed project will result in approximately 38,176 SF of impervious area and 65,525 SF of developed area on the site. Runoff patterns will remain similar to existing conditions and Stormwater BMPs will be constructed to provide water quality treatment and control peak flows leaving the developed area in order to protect downstream properties and waterbodies from the effects of increased development. Based on the results of this evaluation, the proposed project is note expected to cause flooding, erosion or other significant adverse effects downstream of the site. Proper implementation of the Erosion & Sedimentation Control Plan developed for the project is expected to ensure that the project will not cause flooding and/or erosion on or downstream of the project site.

Prepared By:

Terradyn Consultants LLC

Attachments

1 – Wetland Delineation
2 – FEMA FIRM Map
3 – Soils Report from NRCS
4 – Post-Development Stormwater Treatment Plan
5 – Post-Development HydroCAD Model for UDSFs
6 – BMP Sizing Calculations
7 – Inspection & Maintenance Plan of Stormwater Management Facilities

ATTACHMENT 1

Wetland Delineation

WETLAND DELINEATION

FOR

TAX MAP 271, LOT 101
NORTH RIVER ROAD
AUBURN, MAINE

PREPARED FOR:

RIVER'S EDGE APARTMENTS, LLC
155 CENTER STREET
AUBURN, MAINE 04210

PREPARED BY:

SURVEYWORKS, INC.
528 RIVER ROAD
GREENE, MAINE 04236

&

JOSEPH W. NOEL
P.O. BOX 174
SOUTH BERWICK, MAINE 03908

AUGUST 20, 2019
SWI #18-4036
JWN # 19-83

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SOUTH BERWICK, MAINE 03908
(207) 384-5587

*CERTIFIED SOIL SCIENTIST * WETLAND SCIENTIST * LICENSED SITE EVALUATOR*

INTRODUCTION

The 2.85+/- acre subject property (Tax Map 271 Lot 101) is located on the east side of North River Road and along the Androscoggin River in Auburn, Maine. This report was prepared to assist the city, state and federal regulators in the permitting process. A proposed apartment building and associated access and parking are proposed in the uplands along North River Road. The services included flagging and locating the wetland boundary and conducting Corps Wetland Determination Data Forms. In addition, it was requested that flagging extend northerly onto land that is assumed to be owned by the City of Auburn (i.e., Tax Map 271 Lot 100).

WETLAND DELINEATION

Methodology

To determine the wetland boundary, the methodologies in the U.S. Army Corps of Engineers document *Corps of Engineers Wetlands Delineation Manual* (1987) along with the required *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*, (Version 2.0)[1] were used. Wetlands were identified based on soils, vegetation, and wetland hydrology. Except in special cases, all three factors (hydric soils, hydrophytic vegetation, and wetland hydrology) must be present for an area to classify as wetland. A predominance of wetland and upland vegetation was determined from visual estimates in the vegetative layers (herbaceous, shrub/sapling, and tree layers). Shallow soil observations were made using a sharpshooter shovel and hand auger to assess the soil morphological features and to examine for wetland hydrology.

The wetland boundaries were field delineated on August 12, 2019, with sequentially numbered pink and black striped flagging (A1-35 and B1-21). These flags were located by SurveyWorks, Inc. and placed on the project plans.

Findings

The "A" series follows the edge of the Androscoggin River and includes a forested floodplain wetland on the northern end of the lot. This floodplain system is adjacent to the river and serves as a throughflow[2] system at times of high water. North of the project area on Lot 100, the "A" wetland boundary includes a drainage swale that extends up to North River Road.

The "B" series delineates an irregularly shaped bedrock controlled "upland island" along the shore of the river. Around the bedrock outcrop are sugar maple (*Acer saccharum*), speckled alder (*Alnus incana*), red osier (*Cornus alba*), and a diverse array of herbaceous species.

The National Wetland Inventory (NWI) - Wetlands Mapper Website has the river system designated as R2UBH (Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded). The wetlands along the river are dominated by: red maple (*Acer rubrum*), sensitive fern (*Onoclea sensibilis*), northern lady fern (*Athyrium angustum*), and interrupted fern (*Osmunda claytoniana*). The soils observed were fine sandy loam to loamy fine sand and met the criteria of a hydric soil.

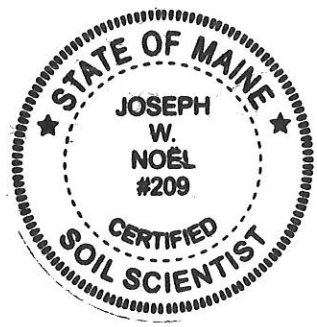
Adjacent to the riverbank is a narrow gently sloping, slightly elevated upland terrace. Northern red oak (*Quercus rubra*) and sugar maple (*Acer saccharum*) occupy this terrace. From here the slopes are steeper (~12%) up to North River Road. These upland areas where the apartment building and associated parking and access are planned have been recently cleared of vegetation. Exposed soils from the activity are predominantly a fine sandy loam to loamy fine sand of glaciofluvial origin and were non-hydric. As requested, two Wetland Determination Data Forms were conducted in representative areas along the wetland-upland boundary. These data forms along with a list of plants observed during the fieldwork and photos of the site are attached. Database reviews should be requested from the Maine Natural Areas Program and the Maine Department of Inland Fisheries & Wildlife.

Please feel free to call with any questions or if you need additional information.

Sincerely,

George A. Courbron, Jr.
Licensed Site Evaluator
Professional Land Surveyor #1126
Wetland Scientist

Joseph W. Noel
Maine Certified Soil Scientist #209
Wetland Scientist



[1] U.S. Army Corps of Engineers. 2011. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Versions 2.0)*, ed. J. S. Wakeley, R. W. Lichvar, C. V. Noble, and J. F. Berkowitz. ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

[2] Tiner. R.W. 2014. *Dichotomous Keys and Mapping Codes for Wetland Landscape Position, Landform, Water Flow Path, and Waterbody Type Descriptors: Version 3.0.* U.S. Fish and Wildlife Service, National Wetlands Inventory Program, Northest Region, Hadley, MA. 65 pp. plus Appendices.

Plant List (Noted During Fieldwork)

Allegheny blackberry	*Rubus allegheniensis*
American basswood	*Tilia americana*
American beech	*Fagus grandifolia*
American hog-peanut	*Amphicarpaea bracteata*
American witch-hazel	*Hamamelis virginiana*
American white water-lily	*Nymphaea odorata*
Asian bittersweet	*Celastrus orbiculatus*
Ash	*Fraxinus sp.*
Aster	*Symphyotrichum spp.*
Beaked hazelnut	*Corylus cornuta*
Bearded shorthusk	*Brachyelytrum erectum*
Bent	*Agrostis spp.*
Black cherry	*Prunus serotina*
Black elder	*Sambucus nigra*
Bluejoint	*Calamagrostis canadensis*
Bristly dewberry	*Rubus hispidus*
Canadian moonseed	*Menispermum canadense*
Common morning-glory	*Ipomoea purpurea*
Deer-tongue rosette grass	*Dichanthelium clandestinum*
Eastern hop-hornbeam	*Ostrya virginiana*
Eastern white pine	*Pinus strobus*
Feathery false solomon's-seal	*Maianthemum racemosum*
Horsetail	*Equisetum spp.*
Indian-hemp	*Apocynum cannabinum*
Interrupted fern	*Osmunda claytoniana*
Jack-in-the-Pulpit	*Arisaema triphyllum*
Jerusalem-artichoke	*Helianthus tuberosus*
King-of-the-meadow	*Thalictrum pubescens*
Late lowbush blueberry	*Vaccinium angustifolium*
Little false bluestem	*Schizachyrium scoparium*
Maple-leaf arrow-wood	*Viburnum acerifolium*
Northern bracken fern	*Pteridium aquilinum*
Northern lady fern	*Athyrium angustum*
Northern red oak	*Quercus rubra*
Paper birch	*Betula papyrifera*
Parasol white-top	*Doellingeria umbellata*
Red maple	*Acer rubrum*
Red osier	*Cornus alba*
Rough bedstraw	*Galium asprellum*
Sedges	*Carex spp.*
Sensitive fern	*Onoclea sensibilis*
Silky dogwood	*Cornus amomum*
Smooth arrow-wood	*Viburnum recognitum*
Speckled alder	*Alnus incana*
Sugar maple	*Acer saccharum*
Swampcandles	*Lysimachia terrestris*
Tall scouring-rush	*Equisetum hyemale*
Virginia-creeper	*Parthenocissus quinquefolia*
Western poison ivy	*Toxicodendron rydbergii*
White ash	*Fraxinus americana*
Wild sarsaparilla	*Aralia nudicaulis*
Wood-sorrel	*Oxalis sp.*
Woodland horsetail	Equisetum sylvaticum

PHOTOS
Tax Map 271 Lot 101 – North River Road – Auburn, Maine
(Photos taken by Joseph W. Noel on August 12, 2019)

Upland Plot #1

Wetland Plot #2

PHOTOS
Tax Map 271 Lot 101 – North River Road – Auburn, Maine
(Photos taken by Joseph W. Noel on August 12, 2019)

Upland Island/Bedrock Outcrop

Upland Photo Showing Cutting In Project Area

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: North River Road (Tax Map 271 Lot 101) City/County: Auburn/Androscoggin Sampling Date: August 12, 2019

Applicant/Owner: River's Edge Apartments, LLC (Mr. Tim Millett) State: ME Sampling Point: #2 Wetland

Investigator(s): Joseph W. Noel Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR or MLRA): NE-R Lat: 44° 06' 48" Long: 07° 13' 05" Datum: NAD83

Soil Map Unit Name: Winooski per NRCS mapping NWI classification: R2UBH

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [X] No [ ] (If no, explain in Remarks.)

Are Vegetation [ ], Soil [ ], or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes [X] No [ ]

Are Vegetation [ ], Soil [ ], or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes [X]	No [ ]	**Is the Sampled Area within a Wetland?**	Yes [X] No [ ]
Hydric Soil Present?	Yes [X]	No [ ]		
Wetland Hydrology Present?	Yes [X]	No [ ]	If yes, optional Wetland Site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)
Community type: Select from list

Refer to Wetland Delineation Report dated August 20, 2019.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [X] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [X] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [X] Sparsely Vegetated Concave Surface (B8)
- [X] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes [ ]	No [X]	Depth (inches): _____
Water Table Present?	Yes [ ]	No [X]	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes [X]	No [ ]	Depth (inches): 18" (seep)

Wetland Hydrology Present? Yes [X] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: #2 Wetland

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus sp. (1 tree just outside of radius - not included)			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15' radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5' radius)			
1. Onoclea sensibilis	50	Y	FACW
2. Athyrium angustum	10	N	FAC
3. Amphicarpaea bracteata	10	N	FAC
4. Lysimachia terrestris	5	N	OBL
5. Viburnum recognitum	5	N	FAC
6. Doellingeria umbellata	T	N	FACW
7. Brachyelytrum erectum	T	N	FACU
8. Carex spp	T	N	varies
9.			
10.			
11.			
12.			
	80 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: (Include photo numbers here or on a separate sheet.)

Refer to Wetland Delineation Report dated 8/20/19 for photos

T = trace - percentages not determined

SOIL

Sampling Point: #2 Wetland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	2.5Y 2.5/1	80	7.5YR 4/6	20	C	PL	fsl	A horizon
7-15	5Y 4/1	70	7.5YR 3/4	25	C	M	fsl	Bg horizon
15-20	2.5Y 4/2	65	10YR 4/6	20	C	M	fsl	Bg horizon

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

M for Redox Features Location = Ped Faces

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: North River Road (Tax Map 271 Lot 101) City/County: Auburn/Androscoggin Sampling Date: August 12, 2019

Applicant/Owner: River's Edge Apartments, LLC (Mr. Tim Millett) State: ME Sampling Point: #1 Upland

Investigator(s): Joseph W. Noel Section, Township, Range: _____

Landform (hillslope, terrace, etc.): slightly elevated terrace Local relief (concave, convex, none): slight convex Slope (%): ~3

Subregion (LRR or MLRA): NE-R Lat: 44° 06' 48" Long: 70° 13' 06" Datum: NAD83

Soil Map Unit Name: Adams per NRCS mapping NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [X] No [ ] (If no, explain in Remarks.)

Are Vegetation [X], Soil [ ], or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes [ ] No [X]

Are Vegetation [ ], Soil [ ], or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes [ ]	No [X]	**Is the Sampled Area within a Wetland?**	Yes [ ] No [X]
Hydric Soil Present?	Yes [ ]	No [X]		
Wetland Hydrology Present?	Yes [ ]	No [X]	If yes, optional Wetland Site ID: _____	

Remarks: (Explain alternative procedures here or in a separate report.)
Community type: Select from list

Refer to Wetland Delineation Report dated August 20, 2019.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes [ ]	No [X]	Depth (inches): _____
Water Table Present?	Yes [ ]	No [X]	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes [ ]	No [X]	Depth (inches): _____

Wetland Hydrology Present? Yes [ ] No [X]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: #1 Upland

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer saccharum	40	Y	FACU
2. Quercus rubra	25	Y	FACU
3. Acer rubrum	5	N	FAC
4.			
5.			
6.			
7.			
	70	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Acer saccharum	30	Y	FACU
2. Corylus cornuta	8	Y	FACU
3. Prunus serotina	2	N	FACU
4.			
5.			
6.			
7.			
	40	= Total Cover	

Herb Stratum (Plot size: 5' radius)			
1. Acer saccharum	12	Y	FACU
2. Prunus serotina	4	Y	FACU
3. Maianthemum racemosum	4	Y	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	= Total Cover	

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = 1
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: (Include photo numbers here or on a separate sheet.)

Refer to Wetland Delineation Report dated 8/20/19 for photos.

On-site much of the upland vegetation was recently cut - in the plot some of upland was uncut - all above cover percentages are estimated.

SOIL

Sampling Point: #1 Upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/3	>80%	None				lfs	A horizon
12-15	10YR 3/6	>80%	None				lfs	Bw1 horizon
15-18	10YR 4/6	>80%	None				lfs	Bw2 horizon

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

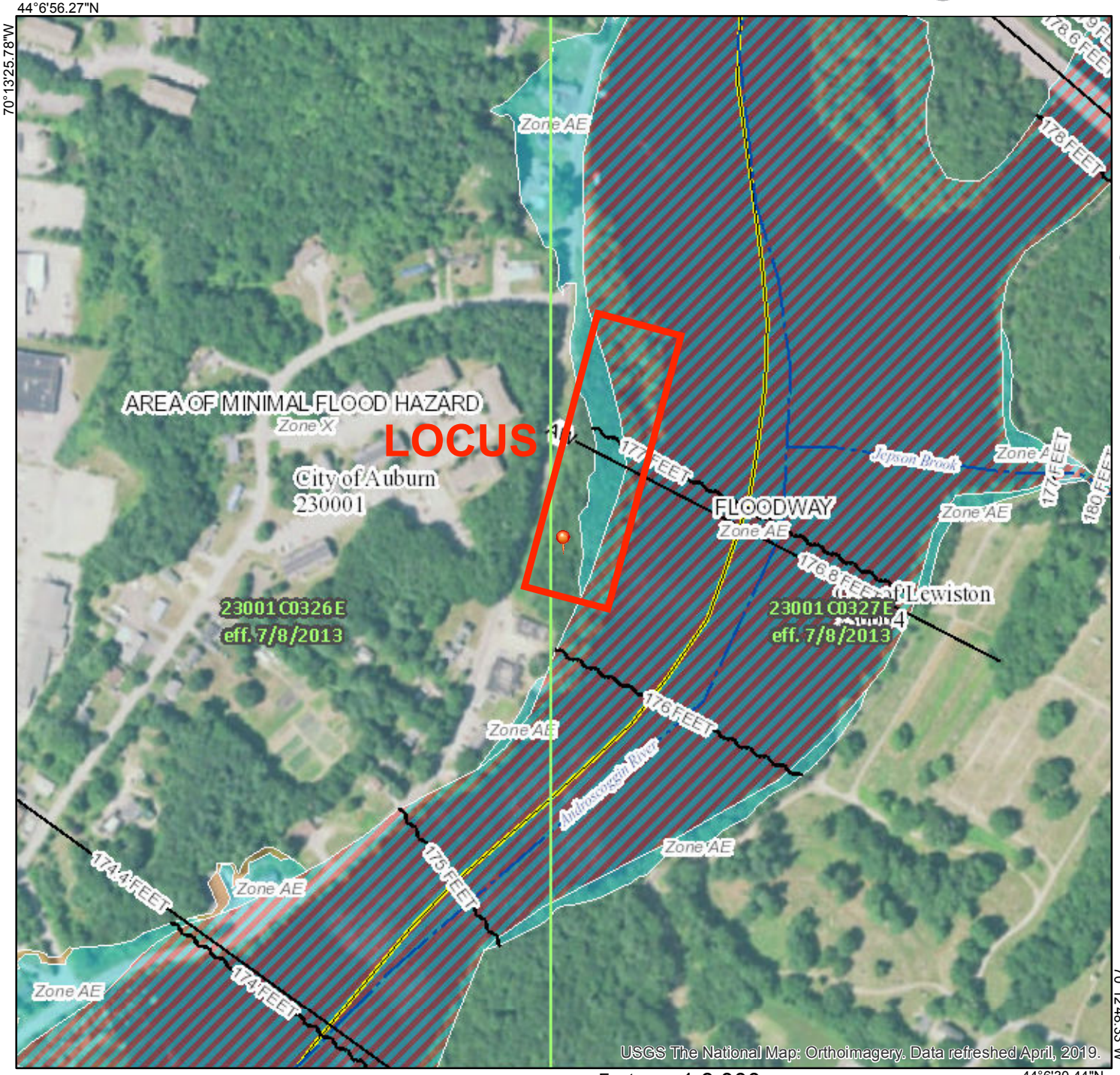
Remarks:

ATTACHMENT 2

FEMA FIRM Map

National Flood Hazard Layer FIRMette

FEMA



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- 513 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/8/2019 at 3:00:39 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

ATTACHMENT 3

Soils Report from NRCS


70° 13' 13" W
70° 12' 58" W
44° 6' 52" N
44° 6' 38" N
402350
402400
402450
402500
402550
402600
402650
4885310
4885260
4885210
4885160
4885110
4885060
4885010
4884960
4884910
N River Rd
Northern Ave
Wn
W
AaC
Androscoggin River
Soil Map may not be valid at this scale.
Map Scale: 1:2,130 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 30 60 120 180
Feet
0 100 200 400 600
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Androscoggin and Sagadahoc Counties, Maine
Survey Area Data: Version 20, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 18, 2012—Nov 1, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AaC	Adams loamy sand, 8 to 15 percent slopes	A	2.3	40.4%
W	Water		1.3	22.2%
Wn	Winooski silt loam	C	2.2	37.5%
Totals for Area of Interest			**5.8**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

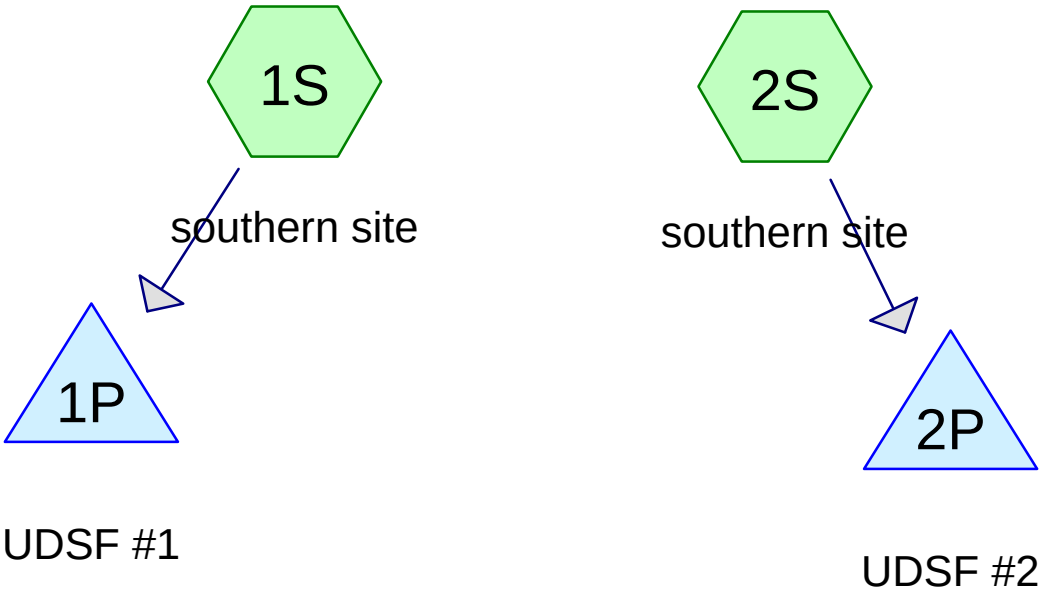
Tie-break Rule: Higher

ATTACHMENT 4

Post-development Stormwater Treatment Plan

ATTACHMENT 5

Post-Development HydroCAD Model for UDSFs



Subcat Reach Pond Link

Routing Diagram for 1931 Post
Prepared by Terradyn Consultants, Printed 11/6/2019
HydroCAD® 10.00-20 s/n 03654 © 2017 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.302	74	>75% Grass cover, Good, HSG C (1S, 2S)
0.548	98	paved (1S, 2S)
0.850	**89**	**TOTAL AREA**

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: southern site Runoff Area=14,720 sf 63.70% Impervious Runoff Depth=4.16"
Tc=5.0 min CN=89 Runoff=1.60 cfs 0.117 af

Subcatchment 2S: southern site Runoff Area=22,300 sf 65.02% Impervious Runoff Depth=4.26"
Tc=5.0 min CN=90 Runoff=2.47 cfs 0.182 af

Pond 1P: UDSF #1 Peak Elev=179.58' Storage=2,205 cf Inflow=1.60 cfs 0.117 af
Outflow=0.97 cfs 0.115 af

Pond 2P: UDSF #2 Peak Elev=178.64' Storage=2,825 cf Inflow=2.47 cfs 0.182 af
Outflow=2.10 cfs 0.181 af

Total Runoff Area = 0.850 ac Runoff Volume = 0.299 af Average Runoff Depth = 4.22"
35.50% Pervious = 0.302 ac 64.50% Impervious = 0.548 ac

Summary for Subcatchment 1S: southern site

Runoff = 1.60 cfs @ 12.07 hrs, Volume= 0.117 af, Depth= 4.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.40"

	Area (sf)	CN	Description
	5,343	74	>75% Grass cover, Good, HSG C
*	9,377	98	paved
	14,720	89	Weighted Average
	5,343		36.30% Pervious Area
	9,377		63.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment 2S: southern site

Runoff = 2.47 cfs @ 12.07 hrs, Volume= 0.182 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.40"

	Area (sf)	CN	Description
	7,800	74	>75% Grass cover, Good, HSG C
*	14,500	98	paved
	22,300	90	Weighted Average
	7,800		34.98% Pervious Area
	14,500		65.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Pond 1P: UDSF #1

Inflow Area = 0.338 ac, 63.70% Impervious, Inflow Depth = 4.16" for 25-yr event
Inflow = 1.60 cfs @ 12.07 hrs, Volume= 0.117 af
Outflow = 0.97 cfs @ 12.22 hrs, Volume= 0.115 af, Atten= 40%, Lag= 8.7 min
Primary = 0.97 cfs @ 12.22 hrs, Volume= 0.115 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 179.58' @ 12.22 hrs Surf.Area= 1,293 sf Storage= 2,205 cf
Flood Elev= 181.00' Surf.Area= 2,050 sf Storage= 4,614 cf

Plug-Flow detention time= 514.7 min calculated for 0.115 af (99% of inflow)
Center-of-Mass det. time= 506.3 min (1,297.1 - 790.8)

Volume	Invert	Avail.Storage	Storage Description
#1	175.50'	5,877 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
175.50	674	0.0	0	0
175.51	674	40.0	3	3
177.99	674	40.0	669	671
178.00	674	100.0	7	678
179.00	1,036	100.0	855	1,533
179.50	1,239	100.0	569	2,102
180.00	1,570	100.0	702	2,804
181.00	2,050	100.0	1,810	4,614
181.50	3,000	100.0	1,263	5,877

Device	Routing	Invert	Outlet Devices
#1	Primary	175.74'	**1.5" Round Culvert** L= 77.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 175.74' / 175.30' S= 0.0057 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.01 sf
#2	Primary	175.47'	**24.0" Round Culvert** L= 34.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 175.47' / 175.30' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	179.50'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.83 cfs @ 12.22 hrs HW=179.57' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.03 cfs @ 2.58 fps)
└─**2=Culvert** (Passes 0.79 cfs of 21.03 cfs potential flow)
└─**3=Orifice/Grate** (Weir Controls 0.79 cfs @ 0.88 fps)

Summary for Pond 2P: UDSF #2

Inflow Area = 0.512 ac, 65.02% Impervious, Inflow Depth = 4.26" for 25-yr event
Inflow = 2.47 cfs @ 12.07 hrs, Volume= 0.182 af
Outflow = 2.10 cfs @ 12.15 hrs, Volume= 0.181 af, Atten= 15%, Lag= 4.7 min
Primary = 2.10 cfs @ 12.15 hrs, Volume= 0.181 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 178.64' @ 12.15 hrs Surf.Area= 1,539 sf Storage= 2,825 cf
Flood Elev= 180.00' Surf.Area= 2,277 sf Storage= 5,458 cf

Plug-Flow detention time= 456.9 min calculated for 0.181 af (99% of inflow)
Center-of-Mass det. time= 453.5 min (1,240.7 - 787.2)

Volume	Invert	Avail.Storage	Storage Description
#1	174.50'	6,778 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
174.50	881	0.0	0	0
174.51	881	40.0	4	4
176.99	881	40.0	874	877
177.00	881	100.0	9	886
178.00	1,245	100.0	1,063	1,949
178.50	1,450	100.0	674	2,623
179.00	1,779	100.0	807	3,430
180.00	2,277	100.0	2,028	5,458
180.50	3,000	100.0	1,319	6,778

Device	Routing	Invert	Outlet Devices
#1	Primary	174.16'	**1.5" Round Culvert** L= 70.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 174.16' / 173.50' S= 0.0094 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.01 sf
#2	Primary	173.83'	**24.0" Round Culvert** L= 33.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 173.83' / 173.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	178.50'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.08 cfs @ 12.15 hrs HW=178.64' (Free Discharge)
- **1=Culvert** (Barrel Controls 0.04 cfs @ 2.97 fps)
- **2=Culvert** (Passes 2.05 cfs of 23.30 cfs potential flow)
  - **3=Orifice/Grate** (Weir Controls 2.05 cfs @ 1.20 fps)

ATTACHMENT 6

BMP Sizing Calculations

ROOF DRIPEDGE FILTER SYSTEM SIZING
(IDENTICAL FOR DRIPEDGE #1, #2 AND #3)

DRIPEDGE SYSTEMS #1, #2 and #3

UNIT STORAGE VOLUME CALCULATION:	
[A] TRIBUTARY ROOF AREA (SF)	4495
[D] RAINFALL DEPTH (IN) *	1
[US] REQUIRED RUNOFF STORAGE (CF) = [A]x[D/12]	375
STONE RESERVOIR DEPTH CALCULATION	
[P] STONE POROSITY	40%
[W] DRIPEDGE WIDTH (FT)	4
[L] DRIPEDGE LENGTH (FT)	158
STONE RESERVOIR DEPTH (FT) = [US]/([P]x[W]x[L])	1.5

UNDERDRAINED SOIL FILTER #1

UDSF #1

Tributary Area	SF	Acres
Landscaped Area	5,343	0.12
Impervious Area	9,377	0.22
Total Area	14,720	0.34

Minimum Surface Area = 2% x landscaped + 5% x impervoius

Required Min. SA	576
Maximum SA	3000
Provided SA	**674**

Channel Protection Volume = 0.4" x landscaped + 1.0" x impervious

Required CPV	960
Provided CPV	**1424**

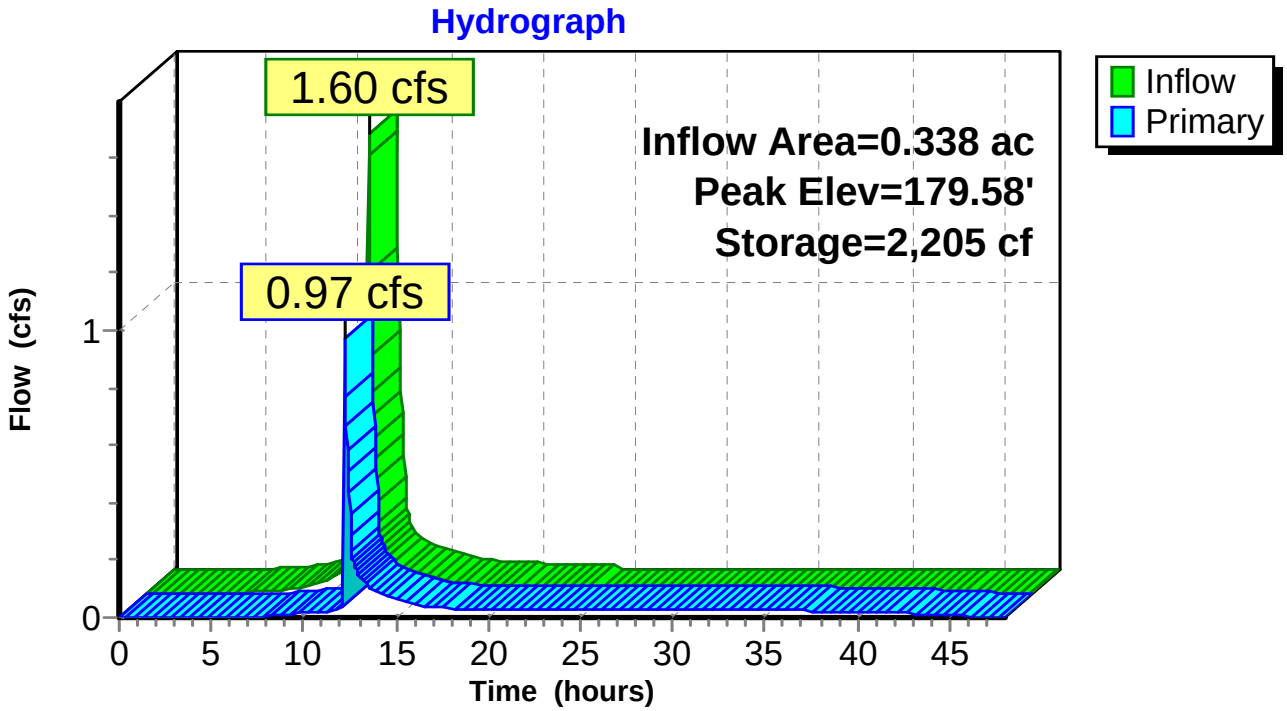
Stage Storage

Elevation	Area (sf)	Incremental Volume (CF)	Total Volume (CF)	
178	674	0	0	<-- Surface of Filter
179	1036	855	855	
179.5	1239	569	**1424**	<-- Channel Protection Volume

Pretreatment

Sediment Load	50 cf / acre of sanded area / year	
Area to be sanded	0.22	acres
Sediment Volume	10.76	CF
Pretreament SA	40.00	sf
Pretreatment Depth	0.50	ft
Provided Volume	20	CF

Pond 2P: UDSF #1



Summary for Pond 2P: UDSF #1

Inflow Area = 0.338 ac, 63.70% Impervious, Inflow Depth = 4.16" for 25-yr event
Inflow = 1.60 cfs @ 12.07 hrs, Volume= 0.117 af
Outflow = 0.97 cfs @ 12.22 hrs, Volume= 0.115 af, Atten= 40%, Lag= 8.7 min
Primary = 0.97 cfs @ 12.22 hrs, Volume= 0.115 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 179.58' @ 12.22 hrs Surf.Area= 1,293 sf Storage= 2,205 cf
Flood Elev= 181.00' Surf.Area= 2,050 sf Storage= 4,614 cf

Plug-Flow detention time= 514.7 min calculated for 0.115 af (99% of inflow)
Center-of-Mass det. time= 506.3 min (1,297.1 - 790.8)

Volume	Invert	Avail.Storage	Storage Description
#1	175.50'	5,877 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
175.50	674	0.0	0	0
175.51	674	40.0	3	3
177.99	674	40.0	669	671
178.00	674	100.0	7	678
179.00	1,036	100.0	855	1,533
179.50	1,239	100.0	569	2,102
180.00	1,570	100.0	702	2,804
181.00	2,050	100.0	1,810	4,614
181.50	3,000	100.0	1,263	5,877

Device	Routing	Invert	Outlet Devices
#1	Primary	175.74'	**1.5" Round Culvert** L= 77.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 175.74' / 175.30' S= 0.0057 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.01 sf
#2	Primary	175.47'	**24.0" Round Culvert** L= 34.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 175.47' / 175.30' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	179.50'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.83 cfs @ 12.22 hrs HW=179.57' (Free Discharge)
- **1=Culvert** (Barrel Controls 0.03 cfs @ 2.58 fps)
- **2=Culvert** (Passes 0.79 cfs of 21.03 cfs potential flow)
  - **3=Orifice/Grate** (Weir Controls 0.79 cfs @ 0.88 fps)

Hydrograph for Pond 2P: UDSF #1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	175.50	0.00
1.00	0.00	0	175.50	0.00
2.00	0.00	0	175.50	0.00
3.00	0.00	0	175.50	0.00
4.00	0.00	0	175.50	0.00
5.00	0.00	3	175.51	0.00
6.00	0.01	16	175.56	0.00
7.00	0.01	45	175.67	0.00
8.00	0.02	92	175.84	0.01
9.00	0.03	147	176.05	0.01
10.00	0.05	255	176.45	0.02
11.00	0.09	452	177.18	0.02
12.00	**1.10**	**1,373**	**178.84**	**0.03**
13.00	**0.14**	**2,126**	**179.52**	**0.14**
14.00	0.09	2,115	179.51	0.09
15.00	0.07	2,110	179.51	0.07
16.00	0.05	2,105	179.50	0.05
17.00	0.04	2,103	179.50	0.04
18.00	0.03	2,101	179.50	0.03
19.00	0.03	2,085	179.49	0.03
20.00	0.02	2,061	179.47	0.03
21.00	0.02	2,028	179.44	0.03
22.00	0.02	1,989	179.41	0.03
23.00	0.02	1,943	179.37	0.03
24.00	0.02	1,890	179.32	0.03
25.00	0.00	1,785	179.23	0.03
26.00	0.00	1,676	179.13	0.03
27.00	0.00	1,569	179.03	0.03
28.00	0.00	1,464	178.93	0.03
29.00	0.00	1,360	178.83	0.03
30.00	0.00	1,257	178.72	0.03
31.00	0.00	1,157	178.61	0.03
32.00	0.00	1,058	178.50	0.03
33.00	0.00	961	178.38	0.03
34.00	0.00	865	178.26	0.03
35.00	0.00	772	178.13	0.03
36.00	0.00	681	178.00	0.02
37.00	0.00	594	177.70	0.02
38.00	0.00	512	177.40	0.02
39.00	0.00	437	177.12	0.02
40.00	0.00	367	176.86	0.02
41.00	0.00	303	176.62	0.02
42.00	0.00	244	176.41	0.02
43.00	0.00	192	176.21	0.01
44.00	0.00	145	176.04	0.01
45.00	0.00	104	175.89	0.01
46.00	0.00	81	175.80	0.00
47.00	0.00	73	175.77	0.00
48.00	0.00	69	175.76	0.00

Summary for Pond 2P: UDSF #1

Inflow Area = 0.338 ac, 63.70% Impervious, Inflow Depth = 6.29" for 100-yr event
Inflow = 2.37 cfs @ 12.07 hrs, Volume= 0.177 af
Outflow = 2.33 cfs @ 12.09 hrs, Volume= 0.168 af, Atten= 2%, Lag= 1.3 min
Primary = 2.33 cfs @ 12.09 hrs, Volume= 0.168 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 179.65' @ 12.09 hrs Surf.Area= 1,336 sf Storage= 2,290 cf
Flood Elev= 181.00' Surf.Area= 2,050 sf Storage= 4,614 cf

Plug-Flow detention time= 371.3 min calculated for 0.168 af (94% of inflow)
Center-of-Mass det. time= 342.5 min (1,122.2 - 779.7)

Volume	Invert	Avail.Storage	Storage Description
#1	175.50'	5,877 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
175.50	674	0.0	0	0
175.51	674	40.0	3	3
177.99	674	40.0	669	671
178.00	674	100.0	7	678
179.00	1,036	100.0	855	1,533
179.50	1,239	100.0	569	2,102
180.00	1,570	100.0	702	2,804
181.00	2,050	100.0	1,810	4,614
181.50	3,000	100.0	1,263	5,877

Device	Routing	Invert	Outlet Devices
#1	Primary	175.74'	**1.5" Round Culvert** L= 77.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 175.74' / 175.30' S= 0.0057 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.01 sf
#2	Primary	175.47'	**24.0" Round Culvert** L= 34.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 175.47' / 175.30' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	179.50'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.28 cfs @ 12.09 hrs HW=179.64' TW=176.80' (Fixed TW Elev= 176.80')
- **1=Culvert** (Outlet Controls 0.03 cfs @ 2.14 fps)
- **2=Culvert** (Passes 2.25 cfs of 20.14 cfs potential flow)
  - **3=Orifice/Grate** (Weir Controls 2.25 cfs @ 1.24 fps)

UNDERDRAINED SOIL FILTER #2

UDSF #2

Tributary Area	SF	Acres
Landscaped Area	7,800	0.18
Impervious Area	14,500	0.33
Total Area	22,300	0.51

Minimum Surface Area = 2% x landscaped + 5% x impervoius

Required Min. SA	881
Maximum SA	3000
Provided SA	**881**

Channel Protection Volume = 0.4" x landscaped + 1.0" x impervious

Required CPV	1468
Provided CPV	**1737**

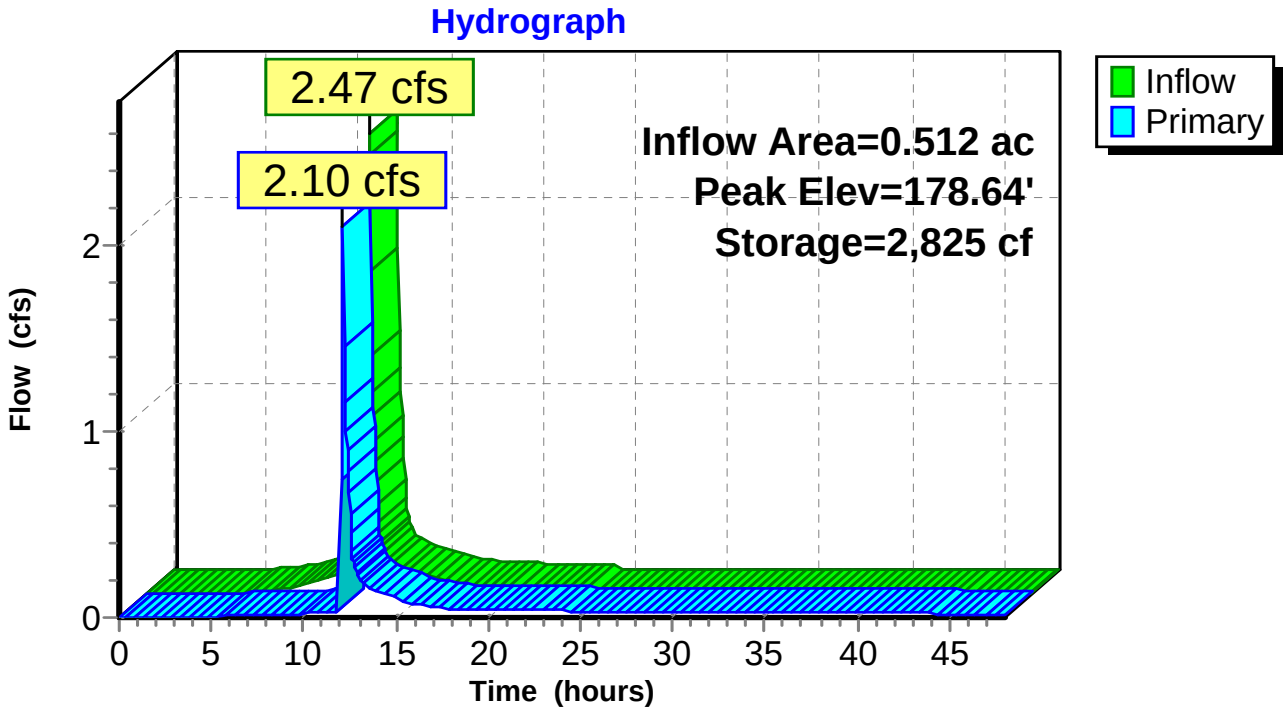
Stage Storage

Elevation	Area (sf)	Incremental Volume (CF)	Total Volume (CF)	
177	881	0	0	<-- Surface of Filter
178	1245	1063	1063	
178.5	1450	674	**1737**	<-- Channel Protection Volume

Pretreatment

Sediment Load	50 cf / acre of sanded area / year	
Area to be sanded	0.33	acres
Sediment Volume	16.64	CF
Pretreament SA	37.00	sf
Pretreatment Depth	0.50	ft
Provided Volume	18.5	CF

Pond 3P: UDSF #2



Summary for Pond 3P: UDSF #2

Inflow Area = 0.512 ac, 65.02% Impervious, Inflow Depth = 4.26" for 25-yr event
Inflow = 2.47 cfs @ 12.07 hrs, Volume= 0.182 af
Outflow = 2.10 cfs @ 12.15 hrs, Volume= 0.181 af, Atten= 15%, Lag= 4.7 min
Primary = 2.10 cfs @ 12.15 hrs, Volume= 0.181 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 178.64' @ 12.15 hrs Surf.Area= 1,539 sf Storage= 2,825 cf
Flood Elev= 180.00' Surf.Area= 2,277 sf Storage= 5,458 cf

Plug-Flow detention time= 456.9 min calculated for 0.181 af (99% of inflow)
Center-of-Mass det. time= 453.5 min (1,240.7 - 787.2)

Volume	Invert	Avail.Storage	Storage Description
#1	174.50'	6,778 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
174.50	881	0.0	0	0
174.51	881	40.0	4	4
176.99	881	40.0	874	877
177.00	881	100.0	9	886
178.00	1,245	100.0	1,063	1,949
178.50	1,450	100.0	674	2,623
179.00	1,779	100.0	807	3,430
180.00	2,277	100.0	2,028	5,458
180.50	3,000	100.0	1,319	6,778

Device	Routing	Invert	Outlet Devices
#1	Primary	174.16'	**1.5" Round Culvert** L= 70.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 174.16' / 173.50' S= 0.0094 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.01 sf
#2	Primary	173.83'	**24.0" Round Culvert** L= 33.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 173.83' / 173.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	178.50'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.08 cfs @ 12.15 hrs HW=178.64' (Free Discharge)
- **1=Culvert** (Barrel Controls 0.04 cfs @ 2.97 fps)
- **2=Culvert** (Passes 2.05 cfs of 23.30 cfs potential flow)
  - **3=Orifice/Grate** (Weir Controls 2.05 cfs @ 1.20 fps)

Hydrograph for Pond 2P: UDSF #2

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	174.50	0.00
1.00	0.00	0	174.50	0.00
2.00	0.00	0	174.50	0.00
3.00	0.00	0	174.50	0.00
4.00	0.00	0	174.50	0.00
5.00	0.01	1	174.50	0.00
6.00	0.01	2	174.51	0.01
7.00	0.02	7	174.52	0.02
8.00	0.03	42	174.62	0.02
9.00	0.06	136	174.89	0.02
10.00	0.09	322	175.41	0.02
11.00	0.15	654	176.35	0.03
12.00	**1.70**	**2,120**	**178.13**	**0.03**
13.00	**0.21**	**2,659**	**178.52**	**0.22**
14.00	0.14	2,649	178.52	0.14
15.00	0.10	2,640	178.51	0.10
16.00	0.07	2,633	178.51	0.07
17.00	0.06	2,629	178.50	0.06
18.00	0.04	2,625	178.50	0.04
19.00	0.04	2,624	178.50	0.04
20.00	0.04	2,623	178.50	0.04
21.00	0.03	2,615	178.49	0.04
22.00	0.03	2,597	178.48	0.04
23.00	0.03	2,567	178.46	0.04
24.00	0.02	2,528	178.43	0.04
25.00	0.00	2,406	178.35	0.04
26.00	0.00	2,280	178.25	0.04
27.00	0.00	2,154	178.16	0.03
28.00	0.00	2,030	178.06	0.03
29.00	0.00	1,907	177.97	0.03
30.00	0.00	1,786	177.87	0.03
31.00	0.00	1,666	177.76	0.03
32.00	0.00	1,548	177.66	0.03
33.00	0.00	1,431	177.55	0.03
34.00	0.00	1,316	177.45	0.03
35.00	0.00	1,202	177.34	0.03
36.00	0.00	1,090	177.22	0.03
37.00	0.00	980	177.10	0.03
38.00	0.00	872	176.97	0.03
39.00	0.00	767	176.68	0.03
40.00	0.00	667	176.39	0.03
41.00	0.00	572	176.12	0.03
42.00	0.00	482	175.87	0.02
43.00	0.00	397	175.63	0.02
44.00	0.00	316	175.40	0.02
45.00	0.00	241	175.18	0.02
46.00	0.00	170	174.98	0.02
47.00	0.00	104	174.80	0.02
48.00	0.00	43	174.62	0.02

Summary for Pond 2P: UDSF #2

Inflow Area = 0.512 ac, 65.02% Impervious, Inflow Depth = 6.41" for 100-yr event
Inflow = 3.63 cfs @ 12.07 hrs, Volume= 0.274 af
Outflow = 3.56 cfs @ 12.09 hrs, Volume= 0.246 af, Atten= 2%, Lag= 1.3 min
Primary = 3.56 cfs @ 12.09 hrs, Volume= 0.246 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 178.69' @ 12.09 hrs Surf.Area= 1,578 sf Storage= 2,918 cf
Flood Elev= 180.00' Surf.Area= 2,277 sf Storage= 5,458 cf

Plug-Flow detention time= 273.4 min calculated for 0.246 af (90% of inflow)
Center-of-Mass det. time= 225.0 min (1,001.5 - 776.5)

Volume	Invert	Avail.Storage	Storage Description
#1	174.50'	6,778 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
174.50	881	0.0	0	0
174.51	881	40.0	4	4
176.99	881	40.0	874	877
177.00	881	100.0	9	886
178.00	1,245	100.0	1,063	1,949
178.50	1,450	100.0	674	2,623
179.00	1,779	100.0	807	3,430
180.00	2,277	100.0	2,028	5,458
180.50	3,000	100.0	1,319	6,778

Device	Routing	Invert	Outlet Devices
#1	Primary	174.16'	**1.5" Round Culvert** L= 70.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 174.16' / 173.50' S= 0.0094 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.01 sf
#2	Primary	173.83'	**24.0" Round Culvert** L= 33.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 173.83' / 173.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	178.50'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.48 cfs @ 12.09 hrs HW=178.69' TW=176.80' (Fixed TW Elev= 176.80')
- **1=Culvert** (Outlet Controls 0.02 cfs @ 1.82 fps)
- **2=Culvert** (Passes 3.46 cfs of 16.43 cfs potential flow)
  - **3=Orifice/Grate** (Weir Controls 3.46 cfs @ 1.43 fps)

ATTACHMENT 7

Inspection & Maintenance Plan of Stormwater Management Facilities

INSPECTION & MAINTENANCE PLAN OF STORMWATER MANAGEMENT FACILITIES

FOR:

RIVER'S EDGE APARTMENTS
AUBURN, MAINE

Project Owner/Developer: River's Edge Apartments, LLC
155 Center Street, Bldg G, Box 6
Auburn, ME 04210

Responsible Party: River's Edge Apartments, LLC
155 Center Street, Bldg G, Box 6
Auburn, ME 04210

Prepared By: Terradyn Consultants, LLC
565 Congress Street, Suite 201
Portland, ME 04101
(207) 926-5111

List of Stormwater Measures:
Stormwater Channels & Culverts
Roadways & Parking Surfaces
Underdrained Soil Filter
Roof Dripedge Filter

Introduction:
Regular inspection and maintenance of the entire stormwater management system is crucial to the long-term effectiveness of the system. The owner is responsible for regular inspection and maintenance of all stormwater management structures, the establishment of any contract services required to implement the program, and keeping records and a maintenance log book of inspection and maintenance activities. At a minimum, the inspection and maintenance activities outlined herein should be performed at the recommended intervals.

Inspection & Maintenance Tasks:
Inspections should be performed by qualified erosion control professional. NOTE: The following are excerpts from the Maine Department of Environmental Protection's *Stormwater Management for Maine, Volume III BMPs Technical Design Manual*, dated January 2006.

STORMWATER CHANNELS & CULVERTS:

1. Mowing: Grass should not be trimmed extremely short, as this will reduce the filtering effect of the swale (MPCA, 1989). The cut vegetation should be removed to prevent the decaying organic litter from adding pollutants to the discharge from the swale. The mowed height of the grass should be 2-4 inches taller than the maximum flow depth of the design water quality storm. A minimum mow height of 6 inches is generally recommended (Galli, 1993).

2. Routine Maintenance and Inspection: The vegetated areas and stormwater channels for failures following heavy rainfall and repair as necessary for newly formed channels or gullies, reseeding/ sodding of bare spots, removal of trash, leaves and/or accumulated sediments, the control of woody or other

undesirable vegetation and to check the condition and integrity of the check dams. Inspect culverts in the spring, in late fall, and after heavy rains to remove any obstructions to flow; remove accumulated sediments and debris at the inlet, at the outlet, and within the conduit; and repair any erosion damage at the culvert's inlet and outlet.

4. Erosion: It is important to install erosion and sediment control measures to stabilize this area as soon as possible and to retain any organic matter in the bottom of the trench.

5. Fertilization: Routine fertilization and/or use of pesticides is strongly discouraged. If complete re-seeding is necessary, half the original recommended rate of fertilizer should be applied with a full rate of seed.

6. Sediment Removal: The level of sediment deposition in the channel should be monitored regularly, and removed from grassed channels before permanent damage is done to the grassed vegetation, or if infiltration times are longer than 12 hours. Sediment should be removed from riprap channels when it reduces the capacity of the channel.

ROADWAYS & PARKING SURFACES:

Paved surfaces shall be swept or vacuumed at least twice annually in the spring to remove all winter sand and periodically during the year on an as-needed basis to minimize the transport of sediment during rainfall events.

UNDERDRAINED SOIL FILTER

1. The basin should be inspected semi-annually and following major storm events. Debris and sediment buildup should be removed from the forebay and basin as needed. Any bare area or erosion rills should be repaired with new filter media, seeded and mulched.
2. Maintenance Agreement: A legal entity should be established with responsibility for inspecting and maintaining any underdrained filter. The legal agreement establishing the entity should list specific maintenance responsibilities (including timetables) and provide for the funding to cover long-term inspection and maintenance.
3. Drainage: The filter should drain within 24 to 48 hours following a one-inch storm or greater. If the system drains too fast, an orifice may need to be added on the underdrain outlet or may need to be modified if already present.
4. Sediment Removal: Sediment and plant debris should be removed from the pretreatment structure at least annually.
5. Mowing: If mowing is desired, only hand held trimmers or push mowers are allowed on the filter (no tractor) and the grass should be mowed no more than 2 times per growing season to maintain grass heights of no less than 6 inches.
6. Fertilization: Fertilization of the underdrained filter area should be avoided unless absolutely necessary to establish vegetation.
7. Harvesting and Weeding: Harvesting and pruning of excessive growth should be done occasionally. Weeding to control unwanted or invasive plants may also be necessary.
8. Grass cover: Maintaining a healthy cover of grass will minimize clogging with fine sediments. If ponding exceeds 48 hours, the top of the filter bed should be rototilled to reestablish the soil's filtration capacity.

9. Soil Filter Replacement: The top several inches of the filter can be replaced with fresh material if water is ponding for more than 72 hours, or the basin can be rototilled, seeded and mulched. Once the filter is mature, adding new material (a 1-inch to 2-inch cover of mature compost) can compensate for subsidence.

ROOF DRIPLINE FILTERS

A dripline filter bed needs to be maintained like any other filter basin. The maintenance activities for filtration BMPs listed in Chapter 7.2 of the BMP manual apply equally to this type of structure. Any debris must be removed from the reservoir course. The roof dripline filters cannot be paved over or altered in anyway. No gutter may be installed on the roof line.

Stormwater Management Facilities Inspection & Maintenance Log

Bridgton Hotel, Bridgton, ME

BMP	Date Inspected	Repairs Needed?	Date Repaired
Example	5/11/14	Y	5/15/14
1. Stormwater Channels & Culverts			
2. Roadways and Parking Surfaces			
3. UDSF			
4. Roof Dripline Filter			

Detailed Repair Notes:

BMP Type	Date	Description of Repair Made
2	4/15/14	Swept and Vacuumed (Example)