CITY OF LEWISTON
PLANNING BOARD MEETING
Monday, October 22 2018 – 5:30 P.M.
City Council Chambers – First Floor
Lewiston City Building
27 Pine Street, Lewiston, ME

AGENDA

1. **ROLL CALL**

2. **ADJUSTMENTS TO THE AGENDA**

3. **CORRESPONDENCE**

4. **PUBLIC HEARINGS:**

   a. Lewiston- Auburn 9-1-1 Communication Building, Conditional Use application at 420 River Road.

   b. Bates College Science and Technology Building, Development Review of a new 65,000 s.f. building at 45 Campus Avenue.

   c. New Roots Cooperative, Development Review of Greenhouses with ground coverage over 5,000 s.f. at 952 College Street.

5. **OTHER BUSINESS:**

   a. Continued discussion of text amendment to the NCA District.

   b. Any other business Planning Board Members may have relating to the duties of the Lewiston Planning Board.

6. **READING OF THE MINUTES**: Motion to adopt the September 24, 2018 draft minutes

7. **ADJOURNMENT**

The next scheduled Planning Board meeting is November 26, 2018

The City of Lewiston is an EOE. For more information please visit our website @ www.lewistonmaine.gov and click on the Non-Discrimination Policy.

CITY OF LEWISTON

Department of Planning & Code Enforcement

TO: Lewiston Planning Board

FROM: Douglas Greene, AICP, RLA, City Planner

DATE: October 22, 2018

RE: Lewiston Auburn 911 Conditional Use Application at 420 River Road; Agenda Item 4 a

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A Conditional Use application submitted by Lewiston Auburn 911 to construct a 10' x 10' concrete communications equipment building located at 420 River Road.

PROJECT DESCRIPTION
Lewiston Auburn 911 is looking to construct a 10 foot by 10 foot Concrete Communications Equipment Shelter at 420 River Road, the location of the Lewiston Landfill. The proposed structure will house radio equipment. The property at 420 River Road is owned by the City of Lewiston and is also the location of the city's landfill. The 186 acre property is zoned Industrial (I).

LIST TYPES OF APPROVALS
Pursuant to Article X, District Regulations, Section 22 Land Use Requirements, the proposed LA 911 communication building is considered a communications use within the Public and Utility land use category. That use is a conditional use in the Industrial zone and thus requires approval by the Planning Board. Conditional Uses also require the approval by the Planning Board of Article XIII, Development Review and Standards, Section 4, Criteria.

STAFF REVIEW and COMMENTS
There were no comments from Public Works, the Police and Fire Departments. The Planning and Code Enforcement Department did not have any comments. The applicant adequately addressed the approval criteria for a Conditional Use (1 through 5) and the approval criterial for Development Review a through w (as applicable).

STAFF RECOMMENDATION
The Staff considers this to be a necessary and appropriate improvement to the City's public safety 911 system. In addition, Lewiston Auburn 911 has submitted a complete application and given its location, the project will not impact any adjacent properties

City staff has no additional comments at this time. Staff recommends **APPROVAL** of the proposed project, with the following conditions:

1. No conditions are recommended by staff.

ACTION NECESSARY

Make a motion that the conditional use application, submitted by Lewiston Auburn to construct a 10 foot by 10 foot communication structure to be located at 420 River Road meets all of the necessary criteria contained in the Zoning and Land Use Code, including, but not limited to Article X, District Regulations, Section 22, Land Use Requirements, Article X, Conditional Use, Section 3, Standards and Article XIII, Development Review and Standards, Section 4, Criteria and that approval be granted (including, if any, specific conditions raised by the Planning Board or staff).

Lewiston-Auburn 9-1-1
Emergency Communications System
Paul LeClair, Director
552 Minot Avenue, Auburn, Maine 04210
207.786.5380 ~~ 207.795.0743 *fax*

September 14, 2018

Mr. David Hediger,
Planning Department
City of Lewiston
27 Pine St.
Lewiston, ME 04240

RE: Landfill Shelter Building Permit Application

Mr. Hediger,
Per the City of Lewiston Zoning and Land Use Code, Article X, Conditional Uses, the Lewiston Auburn 911 Communications System respectfully requests the City of Lewiston Planning Board approval of a conditional use permit for 10 X 10 Concrete Communications Equipment Shelter to be located at 420 River RD, the Lewiston Landfill, the current site of LA911's Public Safety Radio Antenna Tower, at the City of Lewiston Landfill. The Communications Equipment Shelter will house Lewiston Public Safety Radio Equipment that will support the 100' Radio Antenna Tower. Currently, the radio equipment is housed in a vehicle equipment garage building shared with the City of Lewiston Public Services Division.

1. Neither the proposed use nor the proposed site upon which the **Concrete Equipment Shelter** will be located is of such a character that the use will **Not** have significant adverse impact upon the value or quiet possession of surrounding properties greater than would normally occur from such a use in the zoning district.

    a. The size of the proposed use is comparable to surrounding uses; **There is currently one wood constructed vehicle equipment garage adjacent to the radio tower.**

    b. The amount and type of traffic to be generated, hours of operation, expanse of pavement, and the number of parking spaces are comparable to surrounding uses; **Traffic and access will**

Lewiston-Auburn 9-1-1
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continue in the same manner.

c. The generation of noise, dust, odor, vibration, glare, smoke, litter and other nuisances is comparable to surrounding uses; **This application to allow an additional concrete shelter shall not create any noise, dust, odor, vibration, glare, smoke, liter or other nuisances.**

d. The impact of the use on the quality and quantity of groundwater available to abutting properties is comparable to surrounding uses; **This application for a concrete shelter shall not impact groundwater available for abutting properties.**

e. Unusual physical characteristics of the site, including size of the lot, shape of the lot, topography, and soils, do not aggravate adverse impacts upon surrounding properties. **The proposed concrete shelter shall be an improved building type for the environment required for sensitive Public Safety Emergency Equipment.**

(2) Vehicular and pedestrian access to, into and within the site will be safe and will not be overburdened or create hazards because they are inadequate. **The proposed concrete shelter shall not increase or change the current access for vehicles, pedestrians or City of Lewiston Employees.**

a. Vehicular access to the site will be on roads which have adequate capacity to accommodate the additional traffic generated by the development. **This project will not change the current vehicular access provided.**

b. The topography of the site shall permit the construction of all driveways, entrances or proposed streets to meet the standards of the City of Lewiston's Policy for the Design and Construction of Streets and Sidewalks: **This project shall not impact the existing entrance to the City of Lewiston Landfill site.**

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(3) Municipal or other facilities serving the proposed use will not be overburdened or create hazards because they are inadequate. **The proposed project will not require sewerage or water supply systems. There will not be any impact to the storm drainage system. The project will not impact the fire department's ability to provide protection.**

a. The capacity of sewerage and water supply systems is adequate to accommodate the proposed use;

b. The capacity of the storm drainage system is adequate to accommodate the proposed use; and

c. The ability of the fire department to provide necessary protection services to the site and development is adequate.

(4) The soils on the proposed site shall have adequate capacity and stability to support all loadings, including fill, developed by the proposed use and the use will not cause unreasonable soil erosion or reduction in the capacity of the land to hold water to the extent that a dangerous or unhealthy condition may result on the site or upon the land of abutters or the environment. In considering whether this standard is satisfied, the board shall take into account the elevation above sea level of the site and surrounding properties, its relation to flood plains, the slope and vegetation of the land and their effects on drainage. **This project shall not impact the soils of this site.**

(5) The scale and design of the proposed structures with respect to materials, scale and massing shall be compatible with existing structures within 500 feet of the site in areas where the existing structures are of a similar scale and architectural treatment. **The scale and design of the proposed concrete shelter is similar to other equipment shelters on the landfill site.**

Development Review and Standards:

(a) Utilization of the site: **The proposed Concrete Shelter shall be placed adjacent to the existing Communications Tower. There shall be no environmental impacts as described in sub section (a).**

(b) Traffic movement into and out of the development area: **N/A.**

Lewiston-Auburn 9-1-1
Emergency Communications System
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(c) Access to the site: **Existing access to the site shall not be altered and is adequate for all agencies.**

(d) Internal Vehicular circulation: **N/A.**

(e) Pedestrian circulation: **N/A.**

(f) Storm water management: **N/A.**

(g) Erosion Control: **Contractors shall be required to install and maintain erosion control measures during construction of the concrete pad which will support the concrete communications shelter.**

(h) Water supply: **N/A.**

(i) Sewage disposal: **N/A.**

(j) Utilities: **Required utilities shall be limited to Electricity which will be provided via underground electrical protected by cconduit.**

(k) Natural features: **N/A.**

(l) Groundwater protection: **This project shall not adversely impact available groundwater. This project shall not require water or sewer service.**

(m) Water and air pollution: **This project shall not result in water or air pollution.**

(n) Exterior Lighting: **Exterior lighting to the concrete shelter shall be installed as required. All other site and facility lighting shall remain as is currently provided.**

(o) Waste disposal: **N/A.**

(p) Lot layout: **Attached**

(q) Landscaping: **N/A.**

(r) Shore land Relationship: N/A.

(s) Open space: **N/A.**

(t) Technical and financial capacity: **This project is funded by the LA911 Committee's Capital Project and the inter-local agreement between the City of Lewiston and Auburn.**

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(u) Buffering: **N/A.**

(v) Compliance with district regulations: **N/A.**

(w) Design consistent with performance standards: **N/A.**

Thank you for your consideration.

Sincerely,

Paul M. LeClair

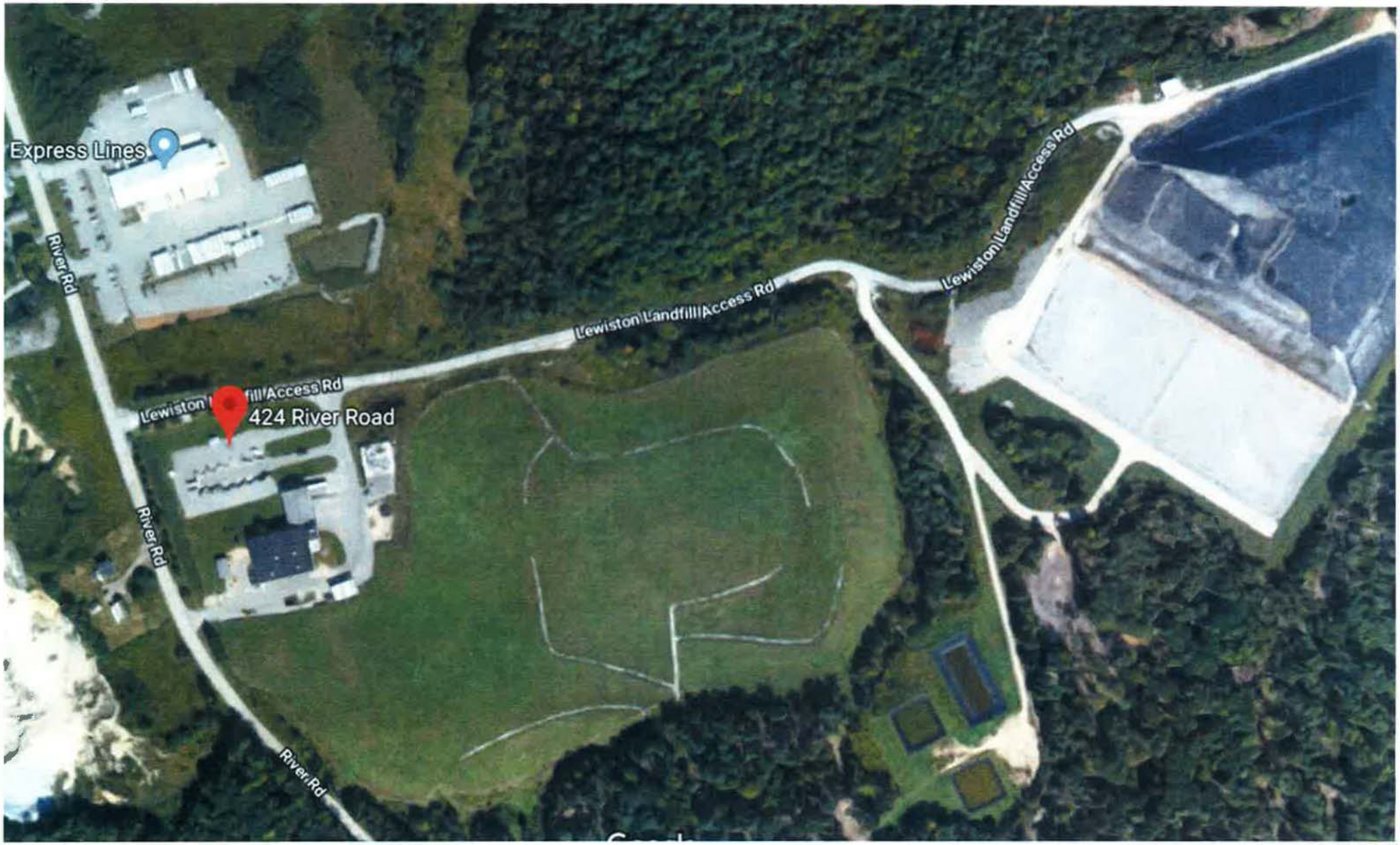
auburnmaine.gov

60 Court Street
Auburn, Maine
207.333.6600

N

0 25 50 Feet

424 River Road, Lewiston, Maine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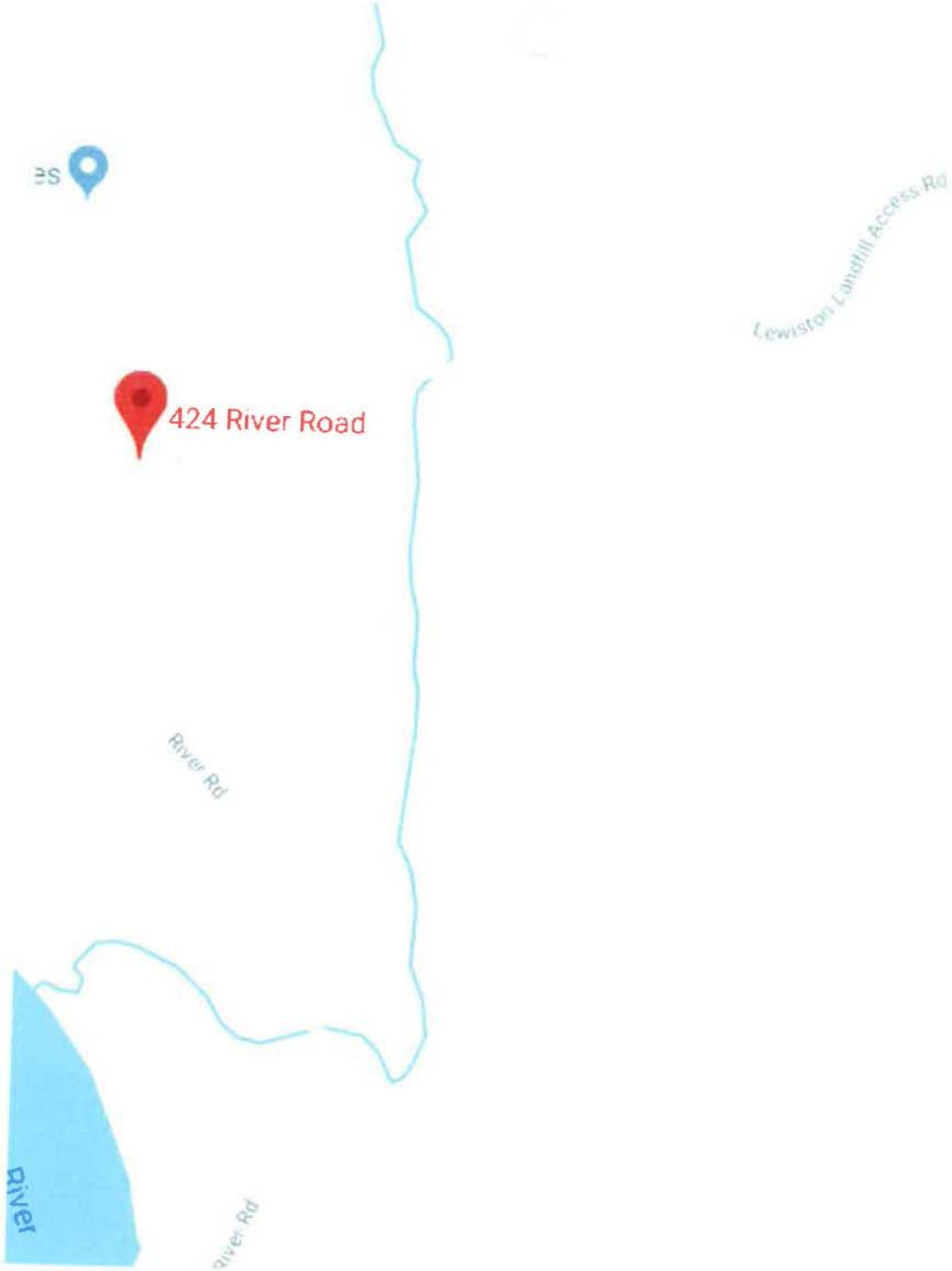
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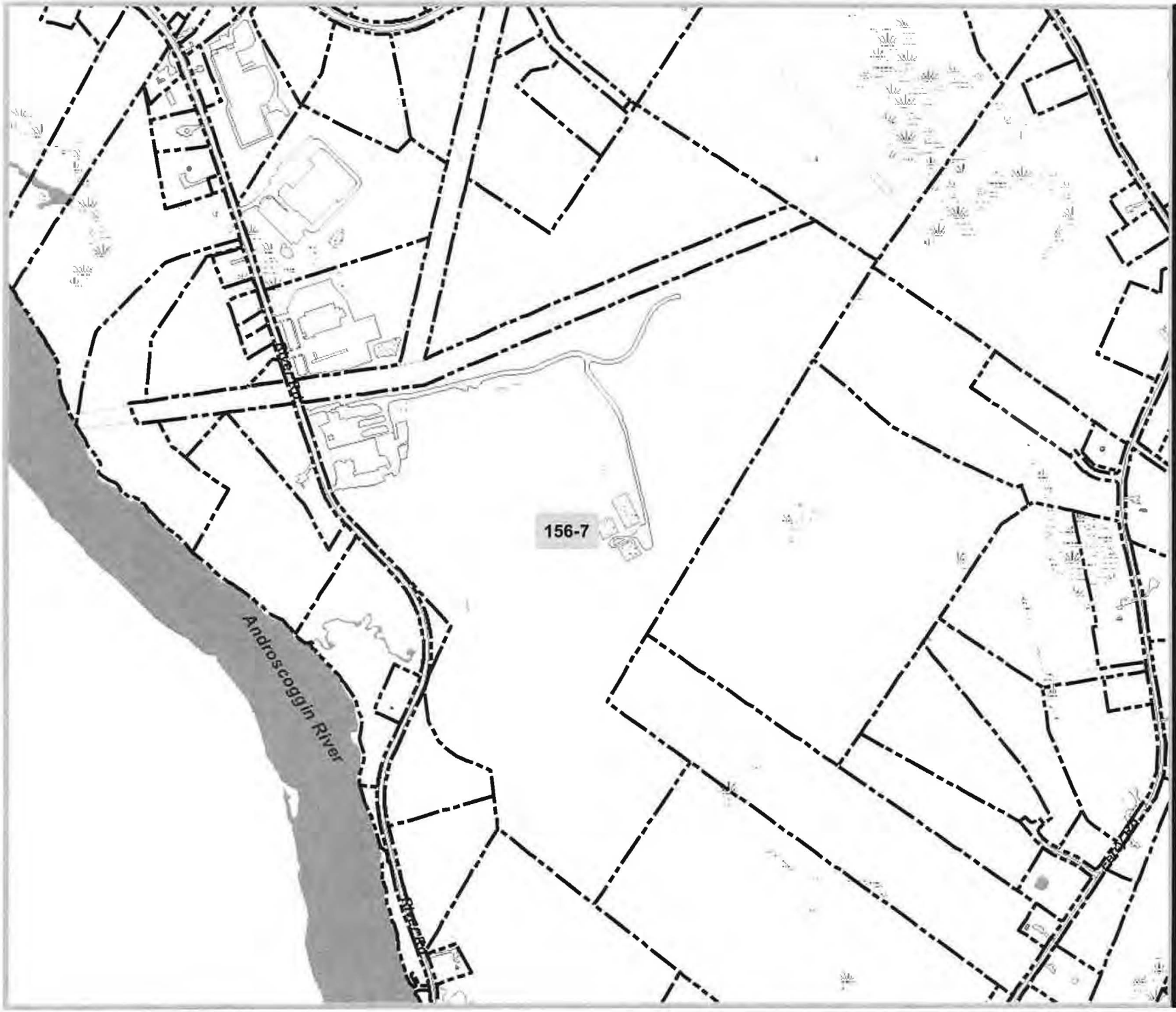

This Map is provided by the City of Lewiston, ME Mapping shown on is for general reference. The City of Lewiston shall not be held liable for damages due to discrepancies, and makes no warranty of accuracy of map. Field verification is required. This map is not printed to scale.

Aproximate Map Scale:
1 in = 834 ft

Legend

Parcel Line
ROW
Easement
Mobile Home Park
22 Street Address
120-45 Subparcel Map and Lot
100-25 Sub D Parcel
Utility ROW

Planimetric Legend

Building Footprint
Mobile Home
Foundation
Deck
Patio
Railroad
Fence
Roads Parking Walks
Athletic Courts Fields
Swimming Pool
Lake or Pond River Canal
Swamp or Apparent Wetland
Stormwater Detention Pond
Bridge Grades

Cadastral mapping displayed is intended for assessment purposes only, and shall not be used in place of a boundary survey. Do not use for description delineation, or transfer of property.

Map-Lot
156-7

420 RIVER RD

Parcel ID
RE00006211

Tax Mapping
Effective April 1, 2017
to March 31, 2018

PARID: RE00006211

420 RIVER RD

Parcel

Parcel ID	RE00006211
Map/Lot	156/000/007
Property Location	420 RIVER RD
Property Class	Municipalities
Land Area (acreage)	186.64

Owners

Owner	LEWISTON CITY OF (LANDFILL)
Address	27 PINE ST
City	LEWISTON
State	ME
Zip	04240
Book	1006
Page	258

OBY

Description	Area/Quantity
AP4-ONE SIDE OPEN WD POLE BLDG	720
PA2-PAVING ASPHALT/CONCRETE	110,700
FN1-FENCE CHAIN	480
SH1-FRAME MACHINERY SHED	96
SH1-FRAME MACHINERY SHED	60

Development Review Application

City of Auburn Planning and Permitting Department
City of Lewiston Department of Planning and Code Enforcement

PROJECT NAME: Landfill Concrete Shelter – LA911 Radio Equipment

PROPOSED DEVELOPMENT ADDRESS: 420 River RD

PARCEL ID#: _____

REVIEW TYPE: Site Plan/Special Exception □ Site Plan Amendment □
Subdivision □ Subdivision Amendment □

PROJECT DESCRIPTION: Install a 10 X 10 concrete shelter to house LA911 Public Safety Radio Equipment. Shelter also available to house radio equipment for all City of Lewiston support agencies.-

CONTACT INFORMATION:

Applicant	Property Owner
Name: LA911 Communications System	Name: City of Lewiston
Address: 522 Minot Ave Auburn Me	Address: 27 Pine St Lewiston Maine
Zip Code 04210	Zip Code 04240
Work #: 207-786-5380	Work #:
Cell #: 207-576-0624	Cell #:
Fax #: 207-795-0743	Fax #:
Home #: N/A	Home #:
Email: 911director@auburnmaine.gov	Email: rstalford@lewistonmaine.gov
Project Representative	**Other professional representatives for the project (surveyors, engineers, etc.),**
Name: Paul LeClair	Name:
Address: 522 Minot Ave Auburn Maine	Address:
Zip Code 04210	Zip Code
Work #: 207-786-5380	Work #:
Cell #: 207-576-0624	Cell #:
Fax #: 207-795-0743	Fax #:
Home #: N/A	Home #:
Email: 911director@auburnmaine.gov	Email:

PROJECT DATA

The following information is required where applicable, in order to complete the application

IMPERVIOUS SURFACE AREA/RATIO

Existing Total Impervious Area	8,130,000	sq. ft.
Proposed Total Paved Area	N/A	sq. ft.
Proposed Total Impervious Area	8,130,000	sq. ft.
Proposed Impervious Net Change	100	sq. ft.
Impervious surface ratio existing	<1%	% of lot area
Impervious surface ratio proposed	<1%	% of lot area

BUILDING AREA/LOT COVERAGE

Existing Building Footprint	600	sq. ft.
Proposed Building Footprint	100	sq. ft.
Proposed Building Footprint Net change	100	sq. ft.
Existing Total Building Floor Area	600	sq. ft.
Proposed Total Building Floor Area	100	sq. ft.
Proposed Building Floor Area Net Change	100	sq. ft
New Building	YES	(yes or no)
Building Area/Lot coverage existing	<1%	% of lot area
Building Area/Lot coverage proposed	<1%	% of lot area

ZONING

Existing	NCA
Proposed, if applicable	NCA

LAND USE

Existing	Utility/Landfill
Proposed	Utility/Landfill

RESIDENTIAL, IF APPLICABLE

Existing Number of Residential Units	
Proposed Number of Residential Units	
Subdivision, Proposed Number of Lots	

PARKING SPACES

Existing Number of Parking Spaces	
Proposed Number of Parking Spaces	
Required Number of Parking Spaces	
Number of Handicapped Parking Spaces	

ESTIMATED COST OF PROJECT **$125,000.00**

DELEGATED REVIEW AUTHORITY CHECKLIST

SITE LOCATION OF DEVELOPMENT AND STORMWATER MANAGEMENT

Existing Impervious Area	200 +/-	sq. ft.
Proposed Disturbed Area	200 +/-	sq. ft.
Proposed Impervious Area	200 +/-	sq. ft.

1. ***If the proposed disturbance is greater than one acre, then the applicant shall apply for a Maine Construction General Permit (MCGP) with MDEP.***
2. ***If the proposed impervious area is greater than one acre including any impervious area crated since 11/16/05, then the applicant shall apply for a MDEP Stormwater Management Permit, Chapter 500, with the City.***
3. ***If total impervious area (including structures, pavement, etc) is greater than 3 acres since 1971 but less than 7 acres, then the applicant shall apply for a Site Location of Development Permit with the City. If more than 7 acres then the application shall be made to MDEP unless determined otherwise.***
4. ***If the development is a subdivision of more than 20 acres but less than 100 acres then the applicant shall apply for a Site Location of Development Permit with the City. If more than 100 acres then the application shall be made to MDEP unless determined otherwise.***

TRAFFIC ESTIMATE

Total traffic estimated in the peak hour-existing (Since July 1, 1997) N/A passenger car equivalents (PCE)

Total traffic estimated in the peak hour-proposed (Since July 1, 1997) N/A passenger car equivalents (PCE)

If the proposed increase in traffic exceeds 100 one-way trips in the peak hour then a traffic movement permit will be required.

Zoning Summary

1. Property is located in the NCA zoning district.
2. Parcel Area: 186.64 acres / 8,130,038 square feet(sf).

Regulations	Required/Allowed	Provided
Min Lot Area	20,000	8,130,000
Street Frontage	125	
Min Front Yard	20	
Min Rear Yard	30	
Min Side Yard	30	
Max. Building Height	35	12 ft
Use Designation	utility communication BLDG.	
Parking Requirement	1 space/ per square feet of floor area	
Total Parking:	N/A	
Overlay zoning districts (if any):	N/A	
Urban impaired stream watershed?	YES/NO If yes, watershed name	

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DEVELOPMENT REVIEW APPLICATION SUBMISSION

Submission shall include payment of fee and fifteen (15) complete packets containing the following materials:

1. Full size plans containing the information found in the attached sample plan checklist.
2. Application form that is completed and signed.
3. Cover letter stating the nature of the project.
4. All written submittals including evidence of right, title and interest.
5. Copy of the checklist completed for the proposal listing the material contained in the submitted application.

Refer to the application checklist for a detailed list of submittal requirements.

L/A's development review process and requirements have been made similar for convenience and to encourage development. Each Citys ordinances are available online at their prospective websites:
Auburn: www.auburnmaine.org under City Departments/ Planning and Permitting/Land Use Division/Zoning Ordinance
Lewiston: http://www.ci.lewiston.me.us/clerk/ordinances.htm Refer to Appendix A of the Code of Ordinances

I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, I certify that the City's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

This application is for development review only; a Performance Guarantee, Inspection Fee, Building Permit Application and other associated fees and permits will be required prior to construction.

Signature of Applicant:	Date:
[signature]	09-14-18

Development Review Checklist

City of Auburn Planning and Permitting Department
City of Lewiston Department of Planning and Code Enforcement

THE FOLLOWING INFORMATION IS REQUIRED WHERE APPLICABLE TO BE SUBMITTED FOR AN APPLICATION TO BE COMPLETE

PROJECT NAME: 420 River RD Landfill Concrete Shelter – LA911 Radio Equipment

PROPOSED DEVELOPMENT ADDRESS and PARCEL #: 420 River RD_RE00006211

Required Information		Check Submitted		Applicable Ordinance	
Site Plan		**Applicant**	**Staff**	**Lewiston**	**Auburn**
	Owner's Names/Address	X			
	Names of Development	X			
	Professionally Prepared Plan	N/A			
	Tax Map or Street/Parcel Number	X			
	Zoning of Property	X			
	Distance to Property Lines	X			
	Boundaries of Abutting land	X			
	Show Setbacks, Yards and Buffers	X			
	Airport Area of Influence (Auburn only)	N/A			
	Parking Space Calcs	N/A			
	Drive Openings/Locations	N/A			
	Subdivision Restrictions	N/A			
	Proposed Use	N/A			
	PB/BOA/Other Restrictions	N/A			
	Fire Department Review	X			
	Open Space/Lot Coverage	X			
	Lot Layout (Lewiston only)	X			
	Existing Building (s)	X			
	Existing Streets, etc.	X			
	Existing Driveways, etc.	X			
	Proposed Building(s)	X			
	Proposed Driveways	N/A			
Landscape Plan					
	Greenspace Requirements	X			
	Setbacks to Parking	N/A			
	Buffer Requirements	N/A			
	Street Tree Requirements	N/A			
	Screened Dumpsters	N/A			
	Additional Design Guidelines	N/A			
	Planting Schedule	N/A			

Stormwater & Erosion Control Plan					
	Compliance w/ chapter 500	N/A			
	Show Existing Surface Drainage	N/A			
	Direction of Flow	N/A			
	Location of Catch Basins, etc.	N/A			
	Drainage Calculations	N/A			
	Erosion Control Measures	X			
	Maine Construction General Permit	N/A			
	Bonding and Inspection Fees	N/A			
	Post-Construction Stormwater Plan	N/A			
	Inspection/monitoring requirements	N/A			
	Third Party Inspections (Lewiston only)	N/A			
Lighting Plan		N/A			
	Full cut-off fixtures	N/A			
	Meets Parking Lot Requirements	N/A			
Traffic Information		N/A			
	Access Management	N/A			
	Signage	N/A			
	PCE - Trips in Peak Hour	N/A			
	Vehicular Movements	N/A			
	Safety Concerns	N/A			
	Pedestrian Circulation	N/A			
	Police Traffic	N/A			
	Engineering Traffic	N/A			
Utility Plan		N/A			
	Water	N/A			
	Adequacy of Water Supply	N/A			
	Water main extension agreement	N/A			
	Sewer	N/A			
	Available city capacity	N/A			

	Electric	N/A			
	Natural Gas	N/A			
	Cable/Phone	N/A			
Natural Resources		N/A			
	Shoreland Zone	N/A			
	Flood Plain	N/A			
	Wetlands or Streams	N/A			
	Urban Impaired Stream	N/A			
	Phosphorus Check	N/A			
	Aquifer/Groundwater Protection	N/A			
		N/A			
	Applicable State Permits	N/A			
	No Name Pond Watershed (Lewiston only)	N/A			
	Lake Auburn Watershed (Auburn only)	N/A			
	Taylor Pond Watershed (Auburn only)	N/A			
Right Title or Interest					
	Verify	X			
	Document Existing Easements, Covenants, etc.	X			
Technical & Financial Capacity					
	Cost Est./Financial Capacity	X			
	Performance Guarantee	N/A			
State Subdivision Law		N/A			
	Verify/Check	N/A			
	Covenants/Deed Restrictions	N/A			
	Offers of Conveyance to City	N/A			
	Association Documents	N/A			
	Location of Proposed Streets & Sidewalks	N/A			
	Proposed Lot Lines, etc.	N/A			

	Data to Determine Lots, etc.	N/A			
	Subdivision Lots/Blocks	N/A			
	Specified Dedication of Land	N/A			
		N/A			
Additional Subdivision Standards					
	Single-Family Cluster (Lewiston only)	N/A			
	Multi-Unit Residential Development (Lewiston only)	N/A			
	Mobile Home Parks	N/A			
	Private Commercial or Industrial Subdivisions (Lewiston only)	N/A			
	PUD (Auburn only)	N/A			
A jpeg or pdf of the proposed site plan		N/A			
Final sets of the approved plans shall be submitted digitally to the City, on a CD or DVD, in AutoCAD format R 14 or greater, along with PDF images of the plans for archiving		N/A			

PARID: RE00006211 420 RIVER RD

Parcel

Parcel ID	RE00006211
Map/Lot	156/000/007
Property Location	420 RIVER RD
Property Class	Municipalities
Land Area (acreage)	186.64

Owners

Owner	LEWISTON CITY OF (LANDFILL)
Address	27 PINE ST
City	LEWISTON
State	ME
Zip	04240
Book	1006
Page	258

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SPECIFICATIONS - SECTION OP-1
10' X 10' CONCRETE SHELTER
(CITY OF LEWISTON LANDFILL SITE)

DESCRIPTION: Work shall include providing and furnishing all materials, labor and equipment necessary to install a concrete shelter building as manufactured by VFP Industries. The proposed installation will be to furnish equipment to provide service at the existing tower on the site. The installation of the manufacturer's recommended foundation for the shelter shall be considered incidental to the required installation.

SHELTER REQUIREMENTS:

The shelter shall be constructed of concrete.

- Size nominal 9'6" wide (10' wide with roof overhang) exterior x nominal 10' long exterior x nominal 9'2" high interior, one room concrete shelter.
- Standard construction in accordance with VFP product specifications. The structural loads of the proposed concrete shelter are as follows:
    - 200 pounds per square foot distributed floor loading while on foundation
    - 125 pounds per square foot distributed floor loading while lifting
    - 100 pounds per square foot distributed roofload
    - 150 mph wind load
    - Seismic zone 4
- Exposed aggregate exterior.
- The proposed shelter walls are capable of stopping 30.06 rifle fire per UL752 requirements. Unless otherwise specified, the shelter door is not bullet resistant.
- The proposed shelter walls will provide a two-hour fire rating.
- The walls will be insulated to R-11 with hardboard insulation.
- The ceiling will be insulated to R-19 with hardboard insulation.
- The interior walls and ceiling will be sheathed with white NuPoly board.
- Light colored industrial grade vinyl tile floor covering.
- One (1) 42" wide x 84" high insulated steel exterior door, with aluminum continuous tamper-proof hinge, passage style lever handle, deadbolt lockset and fiberglass weather hood.
- One (1) hydraulic door closer.

POWER DISTRIBUTION:

- One (1) MOY only lightning arrestor; General Electric Model TLE120S050WM.
- One (1) 60 Amp, 240 V unfused safety switch for lightning arrestor isolator during maintenance.

- One (1) 200 Amp, 10,000 AIC, 120/240 VAC, single phase, 60 Hz, 40 space main breaker, snap-in utility power distribution panel, in a NEMA 1 surface mount enclosure (Cutler Hammer).

- Two (2) 200 Amp, 10,000 AIC, 120/240 VAC, single phase, 60 Hz, 40 space main breaker, snap-in technical power distribution panels, in a NEMA 1 surface mount enclosure (Cutler Hammer).

- Circuit breakers for all VFP installed equipment and customer loads as specified.

- One (1) shelter wall penetration to serve as utility power service entry.

- One (1) 200 Amp, 240 Volt, fused, double pole, single throw safety switch.

- Four (4) 20 Amp specification grade duplex receptacles.

- One (1) 20 Amp specification grade exterior duplex receptacle on a ground fault interrupter circuit.

- Two (2) equipment AC circuit drops up to 30 Amps routed in conduit or wire way to customer specified locations on the ceiling above customer equipment racks. Flexible conduit including circuit conductors will be coiled and tagged for identification with enough length to reach the floor and an additional four feet (4') of circuit conductors to be cut to length and terminated by the customer.

- Installation of one (1) customer furnished automatic transfer switch.

LIGHTING:

- Three (3) four foot, two tube surface mounted fluorescent light fixtures.

- One (1) LED exterior door light with vandal resistant lens and photo cell.

- One (1) emergency light.

HVAC:

- Two (2) two ton, 240 volts, single phase wall mount air conditioning units, with low ambient and compressor anti cycle controls, integral 5 kW resistance heat strips and washable dust filters.

- Redundant lead/lag controls allowing approximately equal operating time on each air conditioning unit.

ALARM DEVICE CONTACTS:

The following alarm device contacts will be wired and brought to a location specified by the customer. The alarm wires will be coiled and tagged for identification per VFP standards. Unless otherwise stated in this proposal, termination at the customer's equipment is assumed to be provided by others.

There are no provisions for audible, visual or remote alarm monitoring offered, except where it is integral to the device offered or stated otherwise in this proposal.

- One (1) line voltage smoke detector
- One (1) intrusion alarm switch with form "C" contacts rated .1 Amps at 28 VDC
- One (1) high temperature alarm
- One (1) low temperature alarm

GROUNDING:

- Provisions for the connection of a grounding electrode conductor at the shelter service equipment
- INTERIOR PERIMETER GROUND: #2 Bare stranded copper with each end lugged to the master ground bar
- GROUND BUSS BAR: (1) kit includes 2 connected ground bars with insulators and copper straps with vinyl covers. Harger ground kit model EPK-12
- FNE GROUND BUSS: #2 stranded green copper cable jacketed mounted to the cable ladder
- ALL GROUNDING MEETS OR EXCEEDS MOTOROLA's R56 SPECIFICATIONS.

ACCESSORIES:

- One (1) twelve - port/waveguide entry panel with 4" sleeves and protective blank covers
- Eighteen feet (18') of 12" wide cable ladder/tray
- One (1) 4' x 8' x 3/4" equipment mounting board
- One (1) portable 10-pound CO2 fire extinguisher
- One (1) hand held emergency eye wash station
- One (1) first aid kit
- One (1) wall pocket folder holder
- One (1) service manual

If requested, VFP will provide three (3) sets of shelter drawings with each shelter unit order. Typical foundation drawings based upon normal soil conditions are available to support calculations for recommended shelter tie down locations. No other foundation drawings are offered in the proposed shelter price. Additional foundation drawings can be provided and will be negotiated separately.

All wiring will be installed in surface mounted conduit or wire ways if specified and will be in full compliance with ANSI/NFPA-70 - The National Electrical Code, latest revision.

METHOD OF MEASUREMENT:

Installation of the shelter will be measured based upon the percentage complete and in-place.

BASIS OF PAYMENT:

The accepted quantity will be paid for at the contract price based upon the percentage complete. Payment shall be full compensation for furnishing all labor, materials and equipment necessary for all worked as described in this section. The percentage complete will be determined by the Engineer or City.

Payment will be made under:

Pay Item		Pay Unit
OP-I	Provide and install VFP 1O' x 1O' Shelter	Lump Sum

CITY OF LEWISTON

Department of Planning & Code Enforcement

TO: Lewiston Planning Board

FROM: Douglas Greene, AICP, RLA, City Planner

DATE: October 22, 2018

RE: Bates College Science and Technology Building, 45 Campus Street
Agenda Item 4 b

A development review application submitted by Wright-Pierce Engineering on behalf of Bates College seeking approval of a new 65,000 s.f. Science and Technology Building at 45 Campus Avenue.

PROJECT DESCRIPTION
A new Science and Technology Building is proposed at 45 Campus Avenue and includes these additional properties owned by Bates College; 141 Nichols St., 145 Nichols St, 151 Nichols St., 96 Bardwell St. and 104 Bardwell St. The total area of the properties is 1.54 acres and is zoned Institutional Office (IO). The project area is currently a parking area and administrative buildings.

The proposed building has a ground footprint of approximately 15,000 s.f. with a total building size of 65,000 s.f. A new parking lot will provide 33 parking spaces and 14 off street spaces will also be provided with an overall net increase of 9 spaces from the current parking numbers in this location.

Previous projects in this area of Bates College have resulted in storm water management improvements. This project is tying into those improvements.

REQUIRED APPROVALS
The proposed Science and Technology Building is an academic use in the IO zone, which is a permitted use. The size of the proposed building (65,000 s.f.) requires the Planning Board to review the project with Article XIII, Development Review Standards, Section 4, Approval Criterial.

STAFF REVIEW and COMMENTS
Review comments from City Departments have since been addressed to staffs satisfaction with revisions provided by the applicant. Staff notes the following with respect to the application:

1. There is a slight increase in net parking in the project area. The applicant has provided a summary of the total classroom seats (3,350) and total parking spaces (965) for the entire

Bates College campus. The total provided parking of 965 spaces exceeds the required parking (479 spaces @ 1 space per 7 classroom seats) by 486 spaces.

2. One of the items addressed was a requirement that prior to any certificate of occupancy being issued that evidence of a final inspection of the stormwater system be provided to the city by the designing engineer along with a written statement indicating that the stormwater system and all site improvements have been completed in accordance with the approved plans.
3. The development will result in approximately 32,328 s.f. of impervious area. The applicant shall submit a performance guarantee for post construction stormwater management pursuant to Article XIII, Section 15e (3). Staff recommends as a condition of approval that prior to a certificate of occupancy being issued that evidence of said documentation being recorded in the Androscoggin Registry of Deeds is provided regarding the maintenance and upkeep of the stormwater system pursuant to Lewiston MS4 stormwater requirements.

STAFF RECOMMENDATION

City staff has no additional comments at this time. Staff recommends APPROVAL of the proposed project, with the following conditions:

1. Prior to any certificate of occupancy being issued evidence of a final inspection of the storm water system shall be provided to the city by the designing engineer along with a written statement indicating that the storm water system and all site improvements have been completed in accordance with the approved plans.
2. Prior to a certificate of occupancy being issued, evidence shall be provided of a performance guarantee being recorded in the Androscoggin Registry of Deeds regarding the maintenance and upkeep of the stormwater system pursuant to Lewiston MS4 stormwater requirements.

ACTION NECESSARY

Make a motion that the application submitted by Wright-Pierce, Engineering on behalf of Bates College to construct a new Science and Technology Building (15,000 s.f. footprint, 65,000 s.f. total s.f.) located at 45 Campus Street, 141 Nichols Street, 145 Nichols Street, 151 Nichols Street, 96 Bardwell Street and 104 Bardwell Street and meets all of the necessary criteria contained in the Zoning and Land Use Code, including, but not limited to Article XIII, Section 4 of the Zoning and Land Use Code, and that approval be granted (including, if any, specific conditions raised by the Planning Board or staff).

WRIGHT-PIERCE
Engineering a Better Environment

11 Bowdoin Mill Island, Suite 140
Topsham, ME 04086
Phone: 207.725.8721 | Fax: 207.729.8414
www.wright-pierce.com

October 18, 2018
W-P Project No. 14021A

Mr. Douglas M. Greene, AICP, RLA
City Planner
Deputy Director Planning and Code Enforcement
City of Lewiston
27 Pine Street
Lewiston, ME 04240

Subject: Bates College, New Science Building at 45 Campus Avenue
Development Review Application Update

Dear David:

As you had requested, please find enclosed 12 copies of the development review application and supplemental documentation for the Bates STEM Project at 45 Campus Avenue for review and approval. The materials include the original application materials submitted to you for staff review in September, responses to comments listed below, and a separate letter to address the Article XIII, Sec. 4 Approval Criteria. For the benefit of the Planning Board and other reviewers, we have also included a diagram showing the impacts to on and off street parking in the vicinity of the project.

We received review comments from the Fire Department and the Public Works Department, dated September 21, 2018, and have prepared the following responses (staff comments are in italics with our responses below the comments):

From R. Coleman, Fire Inspector:

1. *The Fire Dept. connection should be a 4" Storz fitting that shall be located by the main entrance on the Campus & Bardwell St. corner of the structure. The area immediately adjacent to the FDC must be clear from any snow or ice accumulation. Please see attached turning performance sheet for minimum curb radius measurements.*

   The 4" Storz Connection location is been noted on the utility plan. We have added a paved path from the plaza area to the connection to allow for access.

   We have attached a figure that shows the Pierce Truck modeled in Autoturn with the travel paths around the site and through the Bardwell and Nichols Street intersections. The figure demonstrates that even with cars parked along the roadways that the fire apparatus will be able to access the site and maneuver around the building.

From R. Burnham, P.E., City Engineer:

1. *Show ADA ramps on plans and detail sheet, including; Tactile Warning Strips at all crosswalks including receiving walk on other side of Campus Avenue.*

   The site plan has been revised to show the tactile warning strips added to each sidewalk crossing of the street. We have added details on the revised detail sheet of the tactile warning strips as well.

2. *Repaint centerline after paving Campus Avenue*

   The site plan has been revised to show the double yellow centerline being repainted on the portion of Campus Avenue designated to be repaved for the project.

3. *Don't remember if maintenance of sidewalks by Bates is called out in any agreement*

   The proposed sidewalk easements on Campus Avenue grants Bates College the right to maintain the sidewalk within the City ROW. This was proposed because the plans calls for pavers to be used for the sidewalk surface within the easement area.

   The proposed sidewalk easements along Bardwell and Nichols Streets for the portion of the public sidewalk on Bates property, the City has the obligation to maintain the sidewalk.

4. *Prefer more of parking lot to drain to cb-3 rather than to the street*

   The grading plan has been revised to show an additional catch basin on the north side of the Nichols Street parking lot entrance. This catch basin will collect some additional runoff from the parking lot.

5. *Call out 8"x6" Tapping Sleeve and Valve at service connection in Bardwell Street*

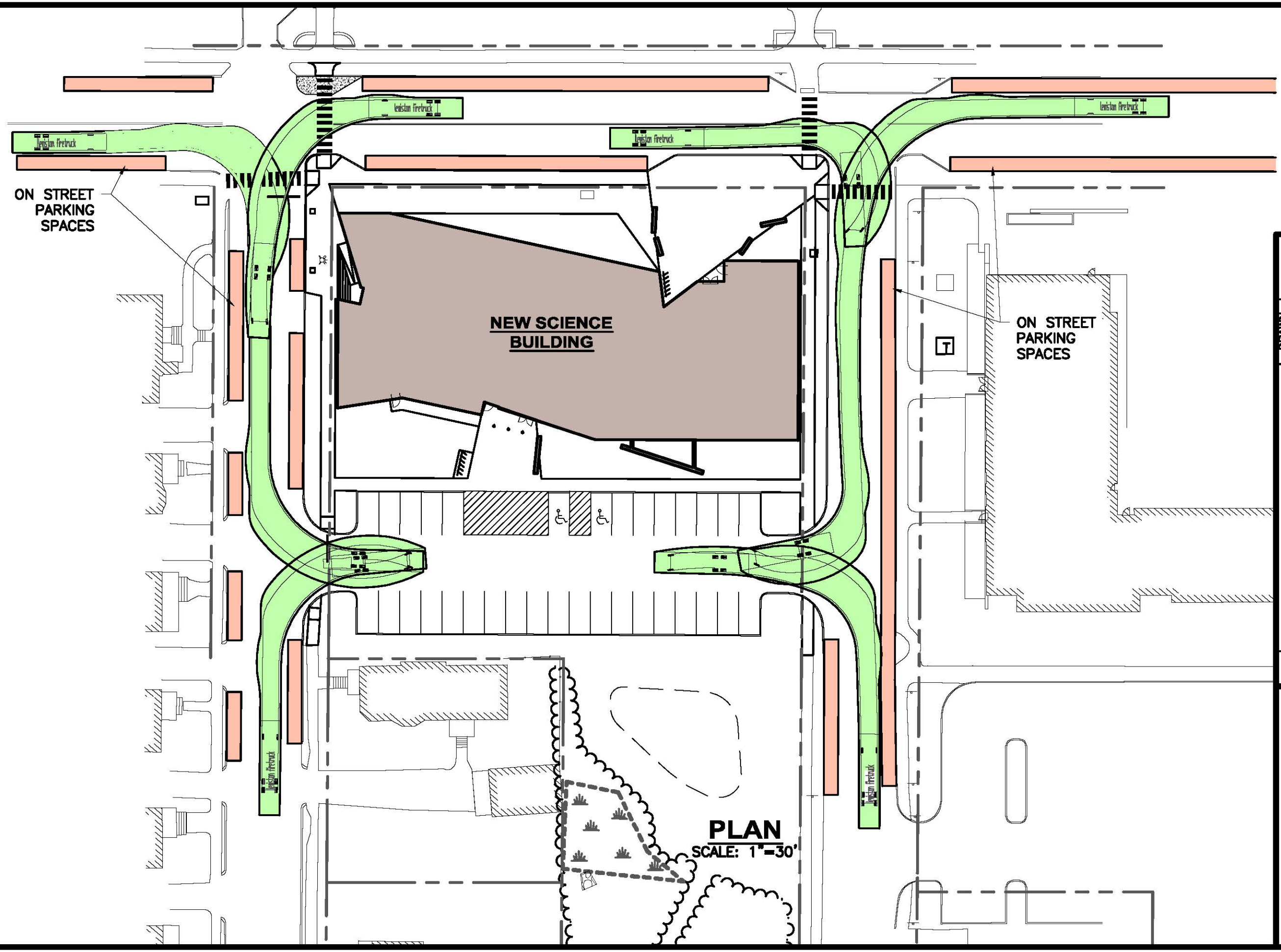
   The utility plan has been revised to call out the 8”x6” tapping sleeve at the water connection on Bardwell Street.

Please let me know if you have any further comments or require any additional information.

Sincerely,
WRIGHT-PIERCE

Jan Wiegman, PE
Project Manager
jan.wiegman@wright-pierce.com

Enclosures
cc: *Chris Streifel, Bates College*
Michael Hinchcliffe, Payette



NO.	REVISIONS	DRAWN BY	APP'D
1			
2			
3			

FIGURE: 1

FIRE TRUCK ACCESS

REFERENCE: DWG C4.0

BATES COLLEGE
STEM PROJECTS
LEWISTON, ME

PROJ NO: 14021A

DATE: OCTOBER 2018

WRIGHT-PIERCE
Engineering a Better Environment

Lewiston
All-America City
2007

Department of Public Works

David A. Jones, P.E.
Director

It's Happening Here!
LEWISTON • AUBURN

September 28, 2018

Mr. Jan Wiegman, PE
Wright-Pierce
11 Bowdoin Mill Island, Suite 140
Topsham, Me 04086

RE: Ability to serve
Proposed STEM Building
45 Campus Ave
Lewiston, Me

Dear Mr. Weigman:

You indicated in your letter dated July 10, 2018, that design a new Science, Engineering, Mathematics and Technology (STEM) building with a total of 45,000 square feet of class room, laboratory, office will be going for review by the Lewiston Development Review Committee and this project is located along Campus Avenue on the Bates Campus and requires evidence that water and sewer utility service is available and the utility has the ability to serve this use.

Based on the engineering design standards you used, as stated in your letter, to develop an average water demand for the project of 11,000 gallons per day, the City of Lewiston Water Division can meet or exceed the minimum volume and pressure required by the Maine Public Utilities Commission (PUC) to the proposed development.

Based on the same estimates of usage and discharge for the proposed development, the City of Lewiston Sewer Division can handle the expected sewer discharge and can serve this proposed development.

If you have any questions, please feel free to call me at 513-3003, Ext. 3430.

Sincerely,

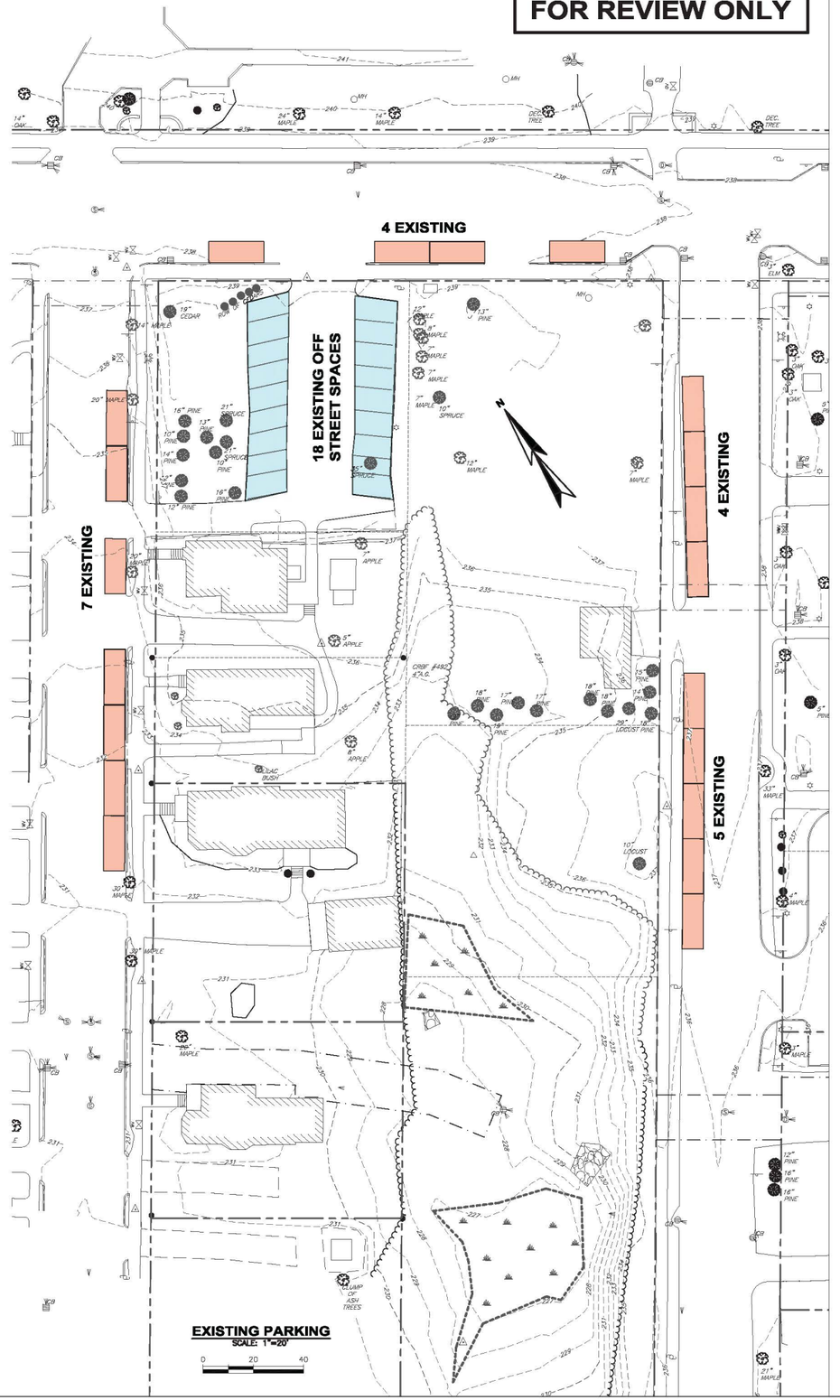
Kevin A. Gagne

Kevin A. Gagne, P.E.
Deputy Director of Public Works
Superintendent of Water & Sewer Operations

The City of Lewiston is an EOE. For more information, please visit our website @ www.lewistonmaine.gov and click on the Non-Discrimination Policy.

P.O. BOX 7250 • 101 Adams Avenue • Lewiston, ME • 04243-7250 • Tel. 207-513-3003 • Fax 207-784-5647

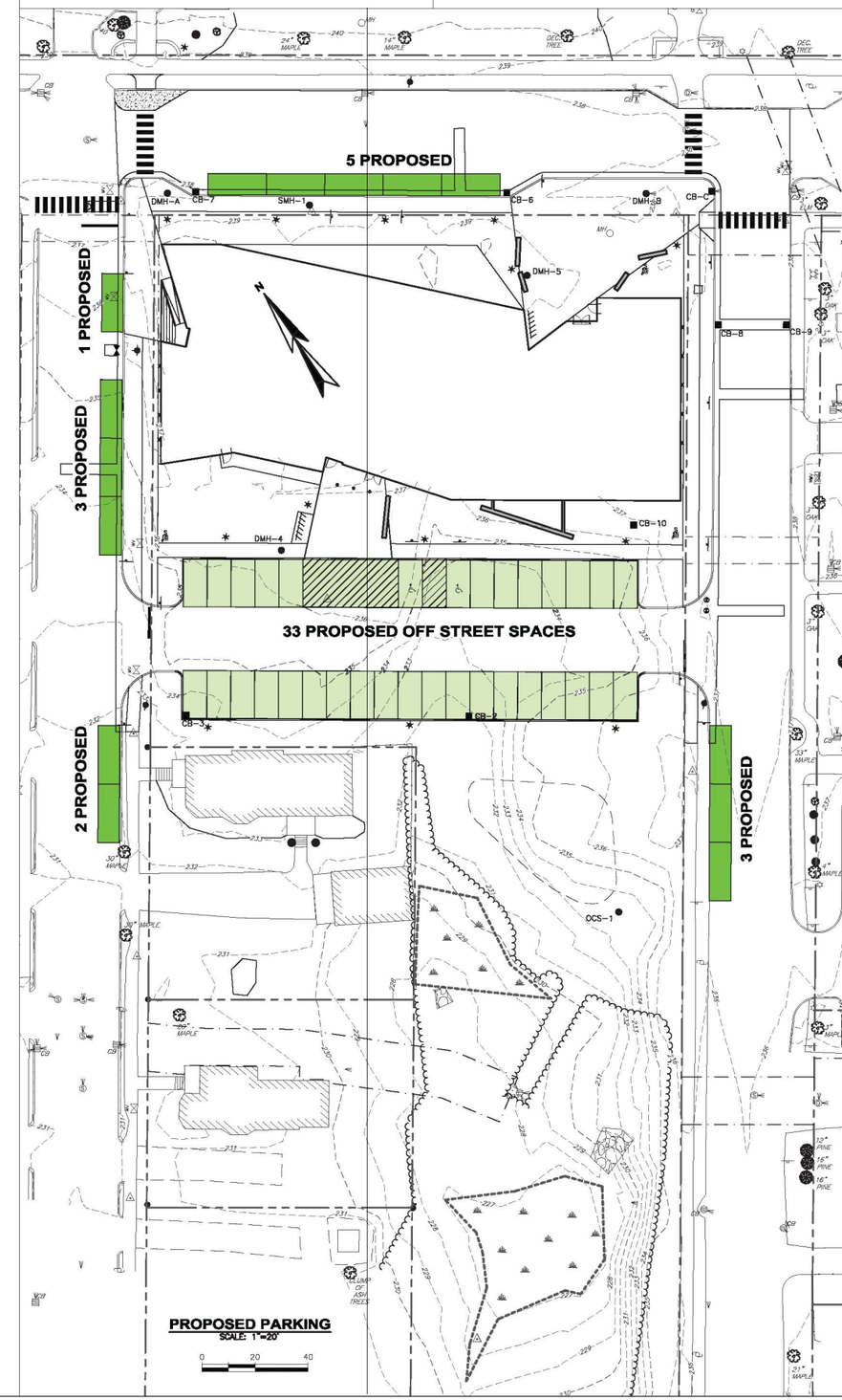
PRELIMINARY FOR REVIEW ONLY



EXISTING PARKING
SCALE: 1"=20'
0 20 40

LEGEND
- EXISTING STREET PARKING (22'-0")
- NEW STREET PARKING (22'-0")
- EXISTING ON-SITE PARKING
- NEW ON-SITE PARKING

EXISTING OFF STREET PARKING= 18 SPACES
EXISTING ON STREET PARKING= 20 SPACES
PROPOSED OFF STREET PARKING= 33 SPACES
PROPOSED ON STREET PARKING= 14 SPACES
COMBINED EXISTING PARKING= 38 SPACES
COMBINED PROPOSED PARKING= 47 SPACES
INCREASE OF 9 SPACES



PROPOSED PARKING
SCALE: 1"=20'
0 20 40

PAYETTE

Architect
Payette Associates Inc.
290 Congress Street, Fifth Floor
Boston, MA 02210-1005
Tel: 617-895-1000
Fax: 617-895-1002

Code Consultant
Howe Engineers, Inc
101 Longwater Circle, Suite 203
Norwell, MA 02061
Tel: 781 878 3500

Civil Engineer
Wright-Pierce Engineering
11 Bowdoin Mill Island Suite 140
Topsham, ME 04086
Tel: 207 725 8721

MEP / FP/ COM / SEC / Engineer
BR+A
10 Guest Street
4th Floor
Boston, MA 02135
Tel: 617-254-0016

Structural Engineer
Simpson Gumpertz & Heger
41 Seyon Street
Building 1, Suite 500
Waltham MA 02453
Tel: 781-907-9000

Landscape Architect
Payette Associates Inc.
290 Congress Street, Fifth Floor
Boston, MA
02210-1005
Tel: 617-895-1000

Exterior Envelope
Wiss, Janney, Elstner Associates, Inc.
311 Summer Street, Suite 300
Boston MA, 02210
Tel: 781-907-9000

NOT FOR CONSTRUCTION

#	DATE	DESCRIPTION
2	06/15/18	50% DESIGN DEVELOPMENT
1	03/18/18	SCHEMATIC DESIGN

BATES

Bates College STEM Projects

PARKING ANALYSIS OF DEVELOPMENT AREA

Drawing Scale
1"=20'

Project Number
14021A

Date Issued
9/5/2018

C10.1

Review Criteria Response

WRIGHT-PIERCE
Engineering a Better Environment

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October 18, 2018
W-P Project No. 14021A

Mr. Douglas M. Greene, AICP, RLA
City Planner
Deputy Director Planning and Code Enforcement
City of Lewiston
27 Pine Street
Lewiston, ME 04240

Subject: Bates College, New Science Building, 45 Campus Avenue
Supplemental Package – Review Criteria Response

Dear Doug:

We have prepared the following supplemental information that supports the approval criteria outlined in Article XIII, Sec. 4 of the ordinance.

(a) Utilization of the site.

The site plan was developed to be respective of the site topography and site conditions. The building and parking lot are located on the portion of the site that was previously developed with structures and parking. The low-lying portions of the site remain undeveloped and will continue to function as stormwater conveyance from the site. The building is also located closer to Campus Ave. to connect with the Bates Campus.

(b) Traffic movement into and out of the development area.

The project represents an update and enhancement of STEM facilities at Bates but not an expansion of the program offering. Consequently, the campus wide traffic impact resulting from the new science building will be minimal. There will be a modest adjustment to parking. The proposed site will have a total of 33 on-site parking spaces and an overall net addition of 9 spaces between the on-site and on-street parking in the vicinity of the site. The site also has provisions for bicycle access and storage with two bicycle racks.

Further information regarding traffic at the site is included in Section 5 of the application submission.

(c) Access into the site.

Vehicular access to the site will be via the parking area south of the building. The parking area is accessed from both Nichols and Bardwell Streets. The driveways will accommodate delivery vehicle and fire truck access to the rear of the building. Pedestrian access to the

building will be through three entrances which are connected to the surrounding sidewalk network.

(d) *Internal vehicular circulation.*

The parking lot is arranged as a travel through parking lot allowing for two-way travel through the lot.

(e) *Pedestrian circulation.*

Provisions for pedestrian circulation have been made for access to the three building entrances from the surrounding sidewalk network. Street crossings have been designed with bump outs to provide for the shortest distance of pedestrian vehicle conflict zones. Site lighting has been proposed for street crossing areas and sidewalks to provide for safe pedestrian conditions. The site lighting has been located on Bates property and will be maintained by Bates.

(f) Stormwater management.

Stormwater from the site will be managed in accordance with the Site Location of Development Act and the Stormwater Management Law rules from Chapter 500. Runoff from the building roof, parking lot and the rear sidewalks are collected and treated through an under-drained soil filter south of the parking lot prior to being discharged to the City separated storm drain system in Nichols Street. The rate of flow for the post development condition matches or is less than the pre-development condition. The proposed development will not have a detrimental impact on the City's storm drain infrastructure.

The applicant will regularly inspect and maintain the storm-drain system per the schedule and recommendations outlined in the application.

The project will not impact wetlands at the southern portion of the site.

A stormwater management report with calculations are included in Section 3 of the application materials.

(g) *Erosion control.*

The site work construction will follow the erosion and sedimentation control plan that is part of the application. Post-construction annual inspections will address long term erosion control of the site. A full erosion and sedimentation control plan may be found in Section 3 of the application materials.

(h) *Water supply.*

The project is projected to use up to 11,000 gal per day of water for domestic use and will require a fire service connection. The project will connect to the City's water system at an existing high pressure 8" water main in Bardwell Street. The project has received confirmation

of the ability to serve the project with water service from the Lewiston Public Works Department.

(i) Sewage disposal.

The project is projected to generate up to 11,000 gal per day of wastewater. The project will have two service laterals to connect to the City sewer system, one in Campus Ave and the other in Nichols Street. The project has received confirmation of the ability to serve the project with sewer service from the Lewiston Public Works Department.

(j) Utilities.

The project will be served by electricity from the Bates electrical system and service will come from the existing grid terminus on Bardwell Street at Chu Hall.

The proposed building will be served by Natural Gas from a main in Nichols Street. A capacity to serve letter has been requested from Unitil and will be forwarded once received.

Additional information regarding utilities is included with Section 6 of the application materials.

(k) Natural features.

The site is largely an urban site that is being redeveloped. The southern portion of the site has two areas of mapped wetlands that will remain and will not be impacted by the proposed development. No other natural resource impacts are proposed by the site development.

(l) Groundwater protection.

The project will not have an impact to groundwater. The proposed project is not proposing any groundwater withdrawals, but there will be temporary construction dewatering of the site to accommodate construction of the foundations. However, there are no drinking water wells in the vicinity of the site and the entire area is served by public water.

(m) Water and air pollution.

The proposed project will not have impacts to water pollution. The site runoff will be managed and treated through stormwater treatment measures prior to discharge to the City's stormwater system. The proposed project will not have impacts to air pollution. Emissions from the natural gas boiler and emergency generator will be regulated through the Maine DEP Air Permit.

(n) Exterior lighting.

The site lighting on the site will consist of full cut off, Dark Sky fixtures that will light the pedestrian walkways around the perimeter of the site, street crossings, and the parking lot to

promote safe access around the site. The parking lot lights adjacent to the adjoining building will have neighbor friendly fixtures to minimize light distribution in the direction of the neighborhood. A site lighting photometric plan and lighting specifications are included in Section 4 of the application materials.

(o) Waste disposal.

Solid waste generated at the STEM building will be collected within the building, picked up regularly by college staff, and transported to a central collection facility for the campus. The college disposes solid waste from the campus at the Mid-Maine Waste Action Corporation in Auburn, Maine. The college estimates that the building will generate a total of 3.5 tons per month. The project is not adding new programming or students to the campus but will be filling an existing need to improve the science facility so the solid waste from the entire campus is not expected to change with this project.

The special waste associated with the science curriculum at the proposed science building will be within the current special waste stream for the campus. Science programs will be shifted from other campus buildings to the new science building and the overall campus programs will not expand with the addition of the building.

(p) Lot layout.

The project is not proposing to create lots.

(q) Landscaping.

The plan proposes to add landscaping along new esplanades on Bardwell and Nichols Streets. The landscaping will consist of street trees (Pin Oaks) at a 30' spacing. These trees will be within the City right-of-way. On Campus Avenue the entire right of way is taken up with on-street parking and sidewalk space. The Campus Avenue frontage will feature a vertical terrain earth feature with grasses and Ginko trees in the landscape and in the entrance patio in tree wells.

The area between the new parking lot and the building will be planted with a mixture of trees and shrubs to provide screening of the building. American Ash trees will be planted along the edge of the parking lot and the residential structure south of the parking lot. The under drained soil filter will have perimeter landscaping to screen the grassed filter. Existing vegetation in the vacant lot to the south of the site will remain vegetated with a mixture of existing trees and shrubs.

The landscaping will conform with the guidelines of the City of Lewiston's Site Plan Review and Design Guidelines.

(r) Shoreland relationship.

The site is not in or adjacent to shoreland areas.

(s) Open space.

The site plan has been developed in a manner that is consistent with the Bates Campus academic functions and maintains open space within and near the site as part of the overall campus.

(t) Technical and financial capacity.

The project will be funded by Bates College with funds that have been raised and set aside for the project. A cost estimate and supporting documents regarding the funding have been provided in Section 9 of the application materials.

Bates College has engaged Payette, an architectural firm, to design the proposed new science building project. Payette has extensive experience designing academic science buildings as well as science related research facilities in the health care and health science sectors. Payette has assembled a team of consultants to assist in completing the design of the building.

Wright-Pierce, has been engaged to prepare the site design and site permitting. Wright-Pierce is a civil and environmental engineering firm based in Topsham and has extensive experience with site design and site permitting for public, private and institutional clients.

Bates College has staff who oversees capital improvement projects for the College. Bates has undertaken other large construction projects as well as other capital projects of similar scale to the current project. Bates staff involved in the project include Pamela Wichroski, AIA, Director Capital Planning and Construction and Chris Streifel, Senior Project Manager.

Additional supporting information on the technical ability of the project team is included in Section 9 of the application materials.

(u) Buffering.

The project is an academic building within the Bates Campus and is surrounded by bates owned property. The residential use to the south of the site is screened from the site with landscaping.

(v) Compliance with district regulations.

The project complies with the space and bulk standards of the Institutional/Office District, listed in Section XI of the ordinance.

Space and Bulk Standards for the Institutional Office District as it applies to this project:

Standard	**Required**	**Proposed**
Min. Lot Size	10,000 s.f.	67,073 s.f.
Minimum Frontage	100 ft	868 ft

Min Front Setback	0 ft	2.2 ft
Min Front Yard	10 ft	10.31 ft (Campus Ave)
Min Side & Rear Setback	20 ft	93 ft
Min Side & Rear Yard	10 ft	10.4 ft
Maximum Building Height	75 ft	59 ft
Max lot coverage Ratio	0.75	0.22
Max Impervious Cover	0.75	0.48

(w) Design consistent with performance standards.

The application conforms to the performance standards as required in Article XII. The pertinent standards that apply to the project are the following:

Section 15 Erosion and Sedimentation Control: A site erosion and sedimentation control plan has been prepared and included in Section 3 of the application. The erosion control plan addresses construction activities and post construction site maintenance of the site.

Section 17 Off Street Parking and Loading:
The off-street parking and loading requirements for a residential college is one space per 7 seats in class room facilities. The overall number of class room seats at Bates with the proposed project is: 3350 seats. The overall onsite parking for Bates as proposed with the additional 15 on-site parking spaces at the new science building is 965 spaces. The overall campus parking requirements are met with this proposed site plan.

Section 18 Improvement Standard:
The project will undertake limited improvements within the public Right of Way for Campus Avenue, Nichols Street and Bardwell Street and the improvements will be in conformance with City standards.

Section 19 Environmental Performance Standards:
1. Smoke: The project will not create smoke.
2. Noise: The project will not have significant sources of noise. There will be a generator located in a shielded area on the roof of the building that and will be in a sound attenuated enclosure. Mechanical systems for the building will be located both within the building's basement and on the roof of the building. These systems will have their sound impacts attenuated by being in an enclosed space.
3. Vibration: The mechanical equipment within the building will be mounted on vibration isolation pads and will not generate vibration beyond the property lines.

4. Odors: The building ventilation system, with a discharge above the roof line, will mitigate odors leaving the building.
5. Air Pollution: The project will not have any sources of air pollution beyond the natural gas fired boiler and emergency generator emissions which will be regulated through the Bates' Campus air permit.
6. Electrical disturbance or interference: The project is not proposing electrical infrastructure that would cause electrical disturbance or interference beyond the project limits.

Please let me know if you have any further comments or require any additional information.

Sincerely,
WRIGHT-PIERCE

Jan Wiegman, PE
Project Manager
jan.wiegman@wright-pierce.com

cc: Chris Streifel, Bates College
Michael Hinchcliffe, Payette

September 2018 Application

WRIGHT-PIERCE
Engineering a Better Environment

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Topsham, ME 04086
Phone: 207.725.8721 | Fax: 207.729.8414
www.wright-pierce.com

September 19, 2018
W-P Project No. 14021B

Mr. David Hediger
Director Planning and Code Enforcement
City of Lewiston
27 Pine Street
Lewiston, ME 04240

Subject: Bates College, New Science Building, 45 Campus Avenue
Site Plan Review Application

Dear Mr. Hediger:

Wright-Pierce has worked with Bates College and Payette Architects to prepare the attached Development Review application for a new science building at 45 Campus Avenue on the Bates College campus. The project consists of a new 65,000 s.f. science educational building. The project will enable the much needed decompression of existing science facilities and the renewal of aging infrastructure within existing facilities. It will also provide the modern teaching spaces that keep Bates competitive for the top student and teaching talent.

The project location is on Campus Avenue on the block between Nichols and Bardwell Streets. The site currently has a parking lot, two administration buildings and a storage garage that occupy the site. The three existing structures will be removed to allow for the construction of the new building. The project will also alter the existing curb cuts and consolidate into a single curb cut on Bardwell and Nichols Streets.

The proposed site will have 33 parking spaces and a loading area on the site. The on street parking will be reduced primarily because of the proposed curbing on Bardwell Street that will limit the width available to accommodate on street parking on the west side of the street. The area as a whole will gain 9 parking spaces with the increase in onsite parking.

The project will utilize public sewer, water and natural gas located in the surrounding streets. Electric service will be from Bates' primary campus electrical service across Bardwell Street near Chu Hall. The communication service will be from the campus communication infrastructure on the property along Campus Avenue.

Stormwater runoff from the site will be treated and conveyed to the City's separated stormwater system in Campus Avenue and Nichols Street. The runoff from the roof and parking lots will be treated for quality and quantity attenuation in an underdrained soil filter at the southern portion of the site along Bardwell Street which discharges to a City line connected to the Nichols Street storm drain. The stormwater runoff model for the pre-development and post development conditions is included with the application and demonstrates that the runoff rates from the developed site will be at or below the runoff rates for the existing conditions.

The site will be landscaped with street trees planted in new esplanades along Bardwell and Nichols Streets. The landscaping along Campus Avenue will consist of landscaped a feature mound and several trees interspersed in the area between the building and sidewalk. Behind the building more trees and shrubs will be planted between the parking lot and the building as well as around the perimeter of the parking lot.

Site lighting will carry forward the pattern of lighting and fixtures that was established at the recent Chu and Kalperis Hall project adjacent to the site. The lighting will be dark sky, full cut off type fixtures.

The site plans have been submitted to Maine Department of Environmental Protection for an amendment to the Bates site location permit.

We look forward to the opportunity to further review this application with you and the City staff. Should you have any questions, please do not hesitate to contact me at (207) 319-1520.

Sincerely,
WRIGHT-PIERCE

Jan Wiegman, PE
Project Manager
Jan.wiegman@wright-pierce.com

Enclosures

cc: Chris Streifel
Michael Hinchcliffe

Development Review Application

City of Auburn Planning and Permitting Department
City of Lewiston Department of Planning and Code Enforcement

PROJECT NAME: Proposed New Science Building

PROPOSED DEVELOPMENT ADDRESS: 45 Campus Avenue

PARCEL ID#: Tax Map 194, Parcels 165, 166, 167, 168, 169, 170

REVIEW TYPE: Site Plan/Special Exception □ Site Plan Amendment X
Subdivision □ Subdivision Amendment □

PROJECT DESCRIPTION: See Attached Description

CONTACT INFORMATION:

Applicant	Property Owner
Name: Bates College	Name: The President and Trustees of Bates College
Address: 147 Russell Street, Lewiston, ME	Address: 2 Andrews Road, Lewiston, ME
Zip Code 04240	Zip Code 04240
Work #:	Work #: XXX
Cell #:	Cell #: XXX
Fax #:	Fax #: XXX
Home #:	Home #: XXX
Email: CStreife@Bates.edu	Email: XXX

Project Representative	Other professional representatives for the project (surveyors, engineers, etc.),
Name: Chris Streifel, Facility Services	Name: Jan Wiegman, Wright-Pierce
Address: 65 Campus Avenue	Address: 11 Bowdoin Mill, Suite 140, Topsham, ME
Zip Code 04240	Zip Code 04086
Work #: (207)786-6207	Work #: (207)319-1520
Cell #:	Cell #:
Fax #:	Fax #:
Home #:	Home
Email:CStreife@Bates.edu	Email: jan.wiegman@wright-pierce.com

PROJECT DATA

The following information is required where applicable, in order to complete the application

IMPERVIOUS SURFACE AREA/RATIO

Existing Total Impervious Area	10,518	sq. ft.
Proposed Total Paved Area	17,506	sq. ft.
Proposed Total Impervious Area	32,328	sq. ft.
Proposed Impervious Net Change	21,810	sq. ft.
Impervious surface ratio existing	15.65%	% of lot area
Impervious surface ratio proposed	48%	% of lot area

BUILDING AREA/LOT COVERAGE

Existing Building Footprint	3,348	sq. ft.
Proposed Building Footprint	14,822	sq. ft.
Proposed Building Footprint Net change	11,474	sq. ft.
Existing Total Building Floor Area	4,902	sq. ft.
Proposed Total Building Floor Area	44,466	sq. ft.
Proposed Building Floor Area Net Change	39,564	sq. ft
New Building	yes	(yes or no)
Building Area/Lot coverage existing	4.9%	% of lot area
Building Area/Lot coverage proposed	22%	% of lot area

ZONING

Existing	Institutional Office (IO)
Proposed, if applicable	Same

LAND USE

Existing	Academic/Institutional
Proposed	Academic/Instituional

RESIDENTIAL, IF APPLICABLE

Existing Number of Residential Units	Not Applicable
Proposed Number of Residential Units	
Subdivision, Proposed Number of Lots	

PARKING SPACES

Existing Number of Parking Spaces	18 on site, 20 off site
Proposed Number of Parking Spaces	33 on site, 14 off site
Required Number of Parking Spaces	maintain existing parking number
Number of Handicapped Parking Spaces	2

ESTIMATED COST OF PROJECT

$ 38,558,209.00

DELEGATED REVIEW AUTHORITY CHECKLIST

SITE LOCATION OF DEVELOPMENT AND STORMWATER MANAGEMENT

Existing Impervious Area	10,518	sq. ft.
Proposed Disturbed Area	48,434	sq. ft.
Proposed Impervious Area	32,328	sq. ft.

1. ***If the proposed disturbance is greater than one acre, then the applicant shall apply for a Maine Construction General Permit (MCGP) with MDEP.***
2. ***If the proposed impervious area is greater than one acre including any impervious area crated since 11/16/05, then the applicant shall apply for a MDEP Stormwater Management Permit, Chapter 500, with the City.***
3. ***If total impervious area (including structures, pavement, etc) is greater than 3 acres since 1971 but less than 7 acres, then the applicant shall apply for a Site Location of Development Permit with the City. If more than 7 acres then the application shall be made to MDEP unless determined otherwise.***
4. ***If the development is a subdivision of more than 20 acres but less than 100 acres then the applicant shall apply for a Site Location of Development Permit with the City. If more than 100 acres then the application shall be made to MDEP unless determined otherwise.***

TRAFFIC ESTIMATE

Total traffic estimated in the peak hour-existing (Since July 1, 1997) N/A passenger car equivalents (PCE)

Total traffic estimated in the peak hour-proposed (Since July 1, 1997) N/A passenger car equivalents (PCE)

If the proposed increase in traffic exceeds 100 one-way trips in the peak hour then a traffic movement permit will be required.

Zoning Summary

1. Property is located in the Institutional/Office (IO) zoning district.
2. Parcel Area: 1.54 acres / 67,220 square feet(sf).

Regulations	Required/Allowed	Provided
Min Lot Area	10,000	67,220
Street Frontage	100'	868.67'
Min Front Yard	0	11' Campus, 3' Bardwell, Nichols
Min Rear Yard	0	N/A
Min Side Yard	0	96'
Max. Building Height	75'	59'-8"
Use Designation	Institution	Institutional
Parking Requirement	1 space/ per 7 classroom seats	
Total Parking:	18 on site/ 20 off site	33 on site/14 off site
Overlay zoning districts (if any):	None	
Urban impaired stream watershed?	YES/NO If yes, watershed name No	

DEVELOPMENT REVIEW APPLICATION SUBMISSION

Submission shall include payment of fee and fifteen (15) complete packets containing the following materials:

1. Full size plans containing the information found in the attached sample plan checklist.
2. Application form that is completed and signed.
3. Cover letter stating the nature of the project.
4. All written submittals including evidence of right, title and interest.
5. Copy of the checklist completed for the proposal listing the material contained in the submitted application.

Refer to the application checklist for a detailed list of submittal requirements.

L/A's development review process and requirements have been made similar for convenience and to encourage development. Each Citys ordinances are available online at their prospective websites:
Auburn: www.auburnmaine.org under City Departments/ Planning and Permitting/Land Use Division/Zoning Ordinance
Lewiston: http://www.ci.lewiston.me.us/clerk/ordinances.htm. Refer to Appendix A of the Code of Ordinances

I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, I certify that the City's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

This application is for development review only; a Performance Guarantee, Inspection Fee, Building Permit Application and other associated fees and permits will be required prior to construction.

Signature of Applicant:	Date:
Chris Streifel	September 19, 2018

Development Review Checklist

City of Auburn Planning and Permitting Department
City of Lewiston Department of Planning and Code Enforcement

THE FOLLOWING INFORMATION IS REQUIRED WHERE APPLICABLE TO BE SUBMITTED FOR AN APPLICATION TO BE COMPLETE

PROJECT NAME: NEW SCIENCE BUILDING

PROPOSED DEVELOPMENT ADDRESS and PARCEL #: 45 Campus Avenue

Required Information		Check Submitted		Applicable Ordinance	
Site Plan		**Applicant**	**Staff**	**Lewiston**	**Auburn**
	Owner's Names/Address	X			
	Names of Development	X			
	Professionally Prepared Plan	X			
	Tax Map or Street/Parcel Number	X			
	Zoning of Property	X			
	Distance to Property Lines				
	Boundaries of Abutting land	X			
	Show Setbacks, Yards and Buffers	X			
	Airport Area of Influence (Auburn only)				
	Parking Space Calcs	X			
	Drive Openings/Locations	X			
	Subdivision Restrictions				
	Proposed Use	X			
	PB/BOA/Other Restrictions				
	Fire Department Review	X			
	Open Space/Lot Coverage	X			
	Lot Layout (Lewiston only)				
	Existing Building (s)	X			
	Existing Streets, etc.	X			
	Existing Driveways, etc.	X			
	Proposed Building(s)	X			
	Proposed Driveways	X			
Landscape Plan					
	Greenspace Requirements	X			
	Setbacks to Parking	X			
	Buffer Requirements	X			
	Street Tree Requirements	X			
	Screened Dumpsters				
	Additional Design Guidelines	X			

	Planting Schedule	X			
Stormwater & Erosion Control Plan					
	Compliance w/ chapter 500	X			
	Show Existing Surface Drainage	X			
	Direction of Flow				
	Location of Catch Basins, etc.	X			
	Drainage Calculations	X			
	Erosion Control Measures	X			
	Maine Construction General Permit	X			
	Bonding and Inspection Fees				
	Post-Construction Stormwater Plan	X			
	Inspection/monitoring requirements	X			
	Third Party Inspections (Lewiston only)	X			
Lighting Plan					
	Full cut-off fixtures	X			
	Meets Parking Lot Requirements	X			
Traffic Information					
	Access Management	X			
	Signage	X			
	PCE - Trips in Peak Hour				
	Vehicular Movements				
	Safety Concerns				
	Pedestrian Circulation	X			
	Police Traffic				
	Engineering Traffic				
Utility Plan					
	Water				
	Adequacy of Water Supply	X			
	Water main extension agreement				
	Sewer				
	Available city capacity	X			
	Electric	X			
	Natural Gas	X			
	Cable/Phone				
Natural Resources					
	Shoreland Zone	X			
	Flood Plain	X			
	Wetlands or Streams	X			
	Urban Impaired Stream	X			
	Phosphorus Check	X			
	Aquifer/Groundwater Protection	X			
	Applicable State Permits	Pending			
	No Name Pond Watershed (Lewiston only)	N/A			

	Lake Auburn Watershed (Auburn only)				
	Taylor Pond Watershed (Auburn only)				
Right Title or Interest					
	Verify	X			
	Document Existing Easements, Covenants, etc.	X			
Technical & Financial Capacity					
	Cost Est./Financial Capacity	X			
	Performance Guarantee	X			
State Subdivision Law					
	Verify/Check	N/A			
	Covenants/Deed Restrictions				
	Offers of Conveyance to City				
	Association Documents				
	Location of Proposed Streets & Sidewalks				
	Proposed Lot Lines, etc.				
	Data to Determine Lots, etc.				
	Subdivision Lots/Blocks				
	Specified Dedication of Land				
Additional Subdivision Standards					
	Single-Family Cluster (Lewiston only)	N/A			
	Multi-Unit Residential Development (Lewiston only)				
	Mobile Home Parks				
	Private Commercial or Industrial Subdivisions (Lewiston only)				
	PUD (Auburn only)				
A jpeg or pdf of the proposed site plan		X			
Final sets of the approved plans shall be submitted digitally to the City, on a CD or DVD, in AutoCAD format R 14 or greater, along with PDF images of the plans for archiving					

ATTACHMENT 1

Site Plan

SECTION 1

Site Plan

1.0 Project Description

The proposed project will construct a new Science, Technology, Engineering, and Mathematics (STEM) building to provide a state of the art educational space for some of the College's science programs. The new science building is not intended to expand the student population or faculty at the campus but is proposed to adequately address the changing needs of the science programs offered at the college. The building will contain offices for staff, educational classrooms, student spaces, common spaces, laboratories, a vivarium, and other needs to support the STEM uses. A parking area and appurtenant stormwater treatment will be placed in the south of the proposed building.

2.0 Zoning and Use:

The project site is in the Institutional/Office District and is an allowed use. The site is adjacent to similar uses within the Bates College campus and is currently occupied by two administrative buildings, an empty lot with a garage, and a parking lot. The site is bounded by three public streets, Nichols and Bardwell Streets to the west and east sides, and Campus Avenue on the north. Opposite Campus Avenue from the site are several academic and student activities buildings as well as the main body of the campus.

3.0 Existing Site

The existing site is currently developed and is part of an older residential neighborhood with 1/8 to ½ acre lots. Many of the properties in the neighborhood are owned by Bates and are used for a variety of functions related to the college. The site includes an existing parking lot that will be relocated to accommodate the building program. The parcels that make up the site are all owned by Bates College and include the following:

Table 1 Property Summary

Tax Map/Lot Number	Address	Deed References - Book/Page
194/169	145 Nichols Street	4040/282
194/170	141 Nichols Street	2141/233
194/167	45 Campus Avenue	1681/202
194/168	151 Nichols Street	903/58
194/166	104 Bardwell Street	3497/29
195/165	96 Bardwell Street	2859/238

(Tax Map/Lot Numbers are City of Lewiston Tax Maps/Lot Numbers)
(Deed References are Book and Page, Androscoggin County Registry of Deeds)

4.0 Proposed Site Plan

The proposed building will be a three-story institutional academic building with a footprint of approximately 15,000 s.f. and will also include a basement. The building will have a main entrance facing Campus Avenue and a side entrance near the corner of Campus Avenue and Nichols Street. A rear entrance will face the proposed parking area and will also be used for deliveries to the building with an at grade loading area. The proposed site will include off street parking with 33 spaces. The project will also maintain 14 on street parking spaces in the direct vicinity of the project along Campus Avenue, Nichols Street and Bardwell Street. The project will result in a net increase of 9 parking spaces to the site and vicinity as summarized in Table 2. There is a loading space for box truck deliveries to the rear of the building within the parking lot with a striped out loading space and at grade access to the building entrance.

Table 2: Parking Summary

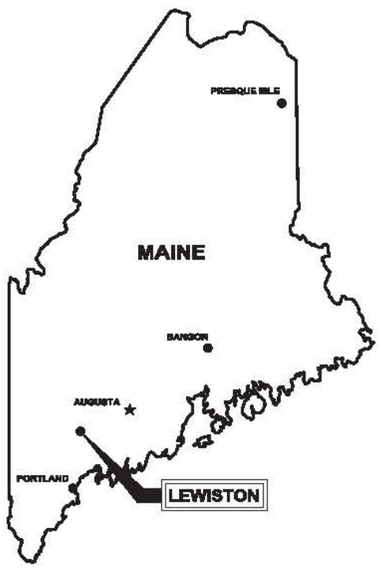
	On-Street				Onsite	Overall
	Bardwell	Campus	Nichols	SubTotal		
Existing	10	3	7	20	18	38
Proposed	3	5	6	14	33	47
Net	(7)	2	(1)	(6)	14	9

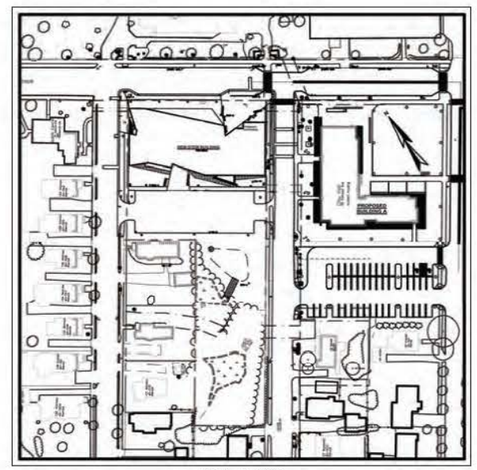
The project will rebuild sidewalks along site frontage on the three streets. The Campus Avenue sidewalk will be widened and the pedestrian crossings enhanced with additional sidewalk bump outs, lighting and curbing. The building's entrance plaza materials will be carried out into the sidewalks to integrate the project into the campus. New sidewalks are proposed for both Nichols and Bardwell Streets. The new sidewalks will be adjacent to the building with a planted esplanade between the sidewalk and the street. Behind the building a sidewalk will run adjacent to the parking between Nichols and Barwell Streets and will also have access to the rear building entrance.

The rear parking lot will be accessed from both Bardwell and Nichols Street allowing for circulation through the parking lot. Fire department access to the building will be from Campus Avenue where the fire panel and Fire Department connection will be located.

The site will have open space at the front of the building along Campus Avenue that will be planted with trees and grass and at the rear of the building there will be open space between the building and parking lot and beyond the parking lot where the stormwater management area is located.

SITE PLAN REVIEW
FOR
BATES COLLEGE
STEM PROJECTS
AUGUST 2018





SITE PLAN
SCALE: 1"=80'

LOCATION PLAN
SCALE: 1"=1,000'

STATE OF MAINE
JAN
S. S.
WIEGMAN
No. 5852
LICENSED
PROFESSIONAL ENGINEER

DRAWING INDEX

GENERAL

-------	COVER SHEET

CIVIL

C1.0	GENERAL NOTES, LEGEND AND ABBREVIATIONS
C2.0	SITE OVERVIEW PLAN
C3.0	EXISTING CONDITIONS AND DEMOLITION PLAN
C4.0	PROPOSED SITE LAYOUT PLAN
C5.0	PROPOSED GRADING AND DRAINAGE PLAN
C6.0	PROPOSED SITE UTILITIES PLAN
C7.0	EROSION CONTROL PLAN
C7.1	EROSION CONTROL NOTES AND DETAILS
C8.0	DETAILS I
C8.1	DETAILS II
C8.2	DETAILS III
L1.0	MATERIALS MANAGEMENT PLAN
L2.0	PLANTING PLAN
L3.0	SITE SECTIONS
L4.0	SITE DETAILS

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APPROVED BY
CITY OF LEWISTON PLANNING BOARD

CHAIRPERSON DATE

WP PROJECT No. 14021A

GENERAL NOTES

1. BELOW GRADE UTILITY INFORMATION IS BASED ON INFORMATION PROVIDED BY EACH UTILITY. LOCATION OF PUBLIC UTILITIES SHOWN IS ONLY APPROXIMATE AND MAY NOT BE COMPLETE. PRIVATE UNDERGROUND UTILITIES SUCH AS, BUT NOT LIMITED TO, SEWER LINES, WATER LINES AND BURIED ELECTRICAL SERVICE ENTRANCES ARE NOT SHOWN. THE CONTRACTOR SHALL ASCERTAIN THE LOCATION AND SIZE OF EXISTING UTILITIES IN THE FIELD WITH THE RESPECTIVE UTILITY REPRESENTATIVE PRIOR TO COMMENCING WORK. UTILITY CONTACTS ARE AS FOLLOWS.

   ELECTRIC:
   CENTRAL MAINE POWER
   57 OLD WINTHROP ROAD
   AUGUSTA, MAINE 04330
   207-626-9445

   CABLE TELEVISION:
   TIME WARNER CABLE
   37 ALFRED PLOURDE PARK WAY
   LEWISTON, ME 04240
   207-783-9902

   WATER/SEWER/DRAIN:
   CITY OF LEWISTON PUBLIC WORKS
   103 ADAMS AVE
   LEWISTON ME 04240
   207-513-3003

   TELEPHONE:
   FAIRPOINT
   5 DAVIS FARM ROAD
   PORTLAND, ME 04103
   207-878-0854

   DIG SAFE:
   TEL. 1-800-DIGSAFE

   TELEPHONE:
   OXFORD NETWORKS
   491 LISBON STREET
   LEWISTON, ME 04240
   207-333-3471

   GAS:
   UNITIL
   376 RIVERSIDE INDUSTRIAL PARKWAY
   PORTLAND, ME 04103
   207-541-2566

   ALL UTILITY COVERS OR SIMILAR STRUCTURES TO MATCH THE NEW PAVEMENT GRADE AND THE RELOCATION OF UTILITY POLES WILL BE PERFORMED BY THE APPROPRIATE UTILITY OR ITS AUTHORIZED REPRESENTATIVE. THE CONTRACTOR SHALL COOPERATE WITH THE UTILITY IN EVERY WAY TO EXPEDITE SUCH ADJUSTMENTS. CONTRACTOR TO COORDINATE ALL UTILITY RELOCATION AND INSTALLATION WITH THE APPROPRIATE UTILITY COMPANY.

2. ALL TEST PITS SHALL BE EXCAVATED PRIOR TO CONSTRUCTION LAYOUT AT THE APPROXIMATE LOCATIONS NOTED ON THE PLANS AND AT UTILITY CROSSING MARKED IN THE FIELD BY UTILITY COMPANIES, AND ACTUAL LOCATIONS OF SUBSURFACE UTILITIES SHALL BE REPORTED TO THE ENGINEER. WHERE APPROPRIATE, MINOR ADJUSTMENTS TO THE ALIGNMENTS OF PROPOSED LINES SHALL BE MADE TO ACCOMMODATE EXISTING UTILITIES. ALL ADJUSTMENTS (NORTHINGS, EASTINGS AND ELEVATIONS) MUST BE DEPICTED IN THE RECORD AS-BUILT DRAWING DATA SUBMITTED TO THE ENGINEER FOR INCLUSION IN THE RECORD AS-BUILT DRAWINGS.
3. COMPACTION TESTS SHALL BE PERFORMED IN ACCORDANCE WITH MDOT SPECIFICATIONS. ANY SETTLEMENT OCCURRING WITHIN ONE YEAR OF SUBSTANTIAL COMPLETION OF THE PROJECT WILL BE CORRECTED BY THE CONTRACTOR IN A MANNER ACCEPTABLE TO THE ENGINEER AT NO ADDITIONAL EXPENSE TO THE OWNER.
4. BORING LOGS, PROBE LOGS AND THE GEOTECHNICAL REPORT ARE INCLUDED AS AN ATTACHMENT TO THE SPECIFICATIONS.
5. ALL EXISTING SEWER AND STORM DRAIN LINES ENCOUNTERED DURING CONSTRUCTION ARE TO REMAIN IN SERVICE EXCEPT AS OTHERWISE INDICATED. ANY EXISTING SEWERS, STORM DRAIN LINES OR CULVERTS DAMAGED DURING CONSTRUCTION AND NOT TO BE REPLACED SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
6. DO NOT SCALE DRAWINGS UNLESS OTHERWISE NOTED. WRITTEN DIMENSIONS AND STATIONING SHALL PREVAIL. REPORT ANY DISCREPANCIES IMMEDIATELY TO THE ENGINEER.
7. ALL STRUCTURES AND PIPELINES LOCATED ADJACENT TO THE TRENCH EXCAVATION SHALL BE PROTECTED AND FIRMLY SUPPORTED BY THE CONTRACTOR UNTIL THE TRENCH IS BACKFILLED. INJURY TO ANY SUCH STRUCTURES CAUSED BY, OR RESULTING FROM, THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. ALL UTILITIES REQUIRING REPAIR, RELOCATION OR ADJUSTMENT AS A RESULT OF THE PROJECT SHALL BE COORDINATED THROUGH THE RESPECTIVE UTILITY.
8. IN THOSE INSTANCES WHERE POWER OR TELEPHONE POLE SUPPORT IS REQUIRED, THE CONTRACTOR SHALL PROVIDE A MINIMUM 48-HOUR NOTIFICATION TO CENTRAL MAINE POWER, TIME WARNER, OR FAIR POINT RESPECTIVELY. NO ADDITIONAL PAYMENT WILL BE PROVIDED FOR TEMPORARY BRACING OF UTILITIES. THE CONTRACTOR SHALL COORDINATE RELOCATION OF TELEPHONE POLES WITH CENTRAL MAINE POWER.
9. CONTRACTOR SHALL INSTALL AND MAINTAIN PERMANENT AND TEMPORARY TRAFFIC CONTROL DEVICES AS NECESSARY AND IN A MANNER CONSISTENT WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.).
10. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING TRAFFIC FLOW AT ALL TIMES. THE CONTRACTOR IS REQUIRED TO SUBMIT A TRAFFIC CONTROL PLAN TO THE OWNER AND ENGINEER PRIOR TO COMMENCING CONSTRUCTION. THE POLICE DEPARTMENT AND FIRE DEPARTMENT ARE TO BE NOTIFIED AT LEAST 24 HOURS IN ADVANCE OF ANY STREET CLOSING OR DETOUR.
11. THE OWNER SHALL BE RESPONSIBLE FOR OBTAINING ANY NECESSARY RIGHTS-OF-WAY AND EASEMENTS. THE CONTRACTOR SHALL VERIFY THAT THE NECESSARY EASEMENTS HAVE BEEN SECURED BY THE OWNER. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO BE FAMILIAR WITH THE APPLICABLE PROVISIONS OF EACH EASEMENT AS THEY APPLY TO THE WORK PRIOR TO BIDDING AND ABIDE BY THOSE PROVISIONS DURING CONSTRUCTION. COPIES OF ANY SUCH RIGHTS-OF-WAY AND EASEMENTS ARE AVAILABLE FOR REVIEW FROM BATES COLLEGE.
12. OPEN TRENCHES IN THE ROADWAY MUST BE BACK FILLED AT THE END OF THE WORKDAY, UNLESS PERMISSION TO LEAVE THEM OPEN IS GIVEN IN WRITING BY THE CITY OF LEWISTON. ALL STREETS MUST BE PAVED PRIOR TO THE WINTER SHUTDOWN. TEMPORARY PAVEMENT SHALL BE CONSIDERED INCIDENTAL.
13. CONTRACTOR SHALL CONTROL DUST TO A TOLERABLE LIMIT. CONTRACTOR SHALL NOT TRACK OR SPILL EARTH AND DEBRIS ON PUBLIC STREETS OUTSIDE THE PROJECT AREA. STREETS OPENED TO THE PUBLIC SHALL BE KEPT SWEPT AND FREE OF DEBRIS.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESETTING ALL EXISTING PROPERTY MONUMENTATION THAT IS DISTURBED BY HIS OPERATIONS AT NO EXPENSE TO THE OWNER. THIS WORK IS TO BE DONE BY A LAND SURVEYOR LICENSED IN THE STATE OF MAINE. PROPERTY BOUNDS FOUND ARE SHOWN ON LAYOUT PLANS, THIS MAY NOT BE INCLUSIVE OF ALL BOUNDS THAT EXIST IN THE PROJECT AREA. IF ANY ADDITIONAL BOUNDS ARE FOUND, THE CONTRACTOR SHALL DOCUMENT THE LOCATION AND NOTIFY THE ENGINEER.
15. SUITABLE EXCAVATED MATERIAL MAY BE INCORPORATED IN THE PROJECT. EXCESS MATERIAL WILL BECOME PROPERTY OF THE CONTRACTOR. SILT FENCE AND STABILIZATION OF EXCESS SOIL IS ALSO REQUIRED. THE CONTRACTOR SHALL DISPOSE OF UNSUITABLE AND EXCESS MATERIAL IN ACCORDANCE WITH THE APPLICABLE SECTIONS OF THE CONTRACT DOCUMENTS AND ALL STATE, FEDERAL AND LOCAL REGULATIONS.
16. CONSTRUCT HANDICAP RAMPS AT ENDS OF ALL SIDEWALKS, FOR DRIVEWAYS OR ROADWAYS AND AS OTHERWISE SHOWN ON THE PLANS. SIDEWALKS AND HANDICAP RAMPS SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT (ADA).
17. THE CONTRACTOR IS TO TAKE SPECIAL CARE NOT TO DAMAGE TREES WITHIN THE CONSTRUCTION AREA UNLESS THEY ARE NOTED TO BE REMOVED.
18. APPROXIMATE LIMIT OF WORK ON PLANS IS INTENDED TO SHOW GENERAL SCOPE OF THE WORK. ACTUAL LIMITS OF THE WORK ARE TO BE DETERMINED IN THE FIELD TO MEET PROJECT NEEDS AS DETERMINED BY THE OWNER AND THE ENGINEER.
19. PAVEMENT IS TO BE SAWCUT AT ALL SIDE ROADS, PAVED DRIVES, PAVED SIDEWALKS, AS WELL AS THE BEGINNING AND END OF THE PROJECT LIMITS. PAVEMENT GRINDING BEYOND THE SAW CUT WILL BE REQUIRED AT ALL LOCATIONS.
20. SAW CUT LINES FOR PAVED DRIVEWAY & SIDEWALK MATCHES ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY SAW CUT LOCATION FOR DRIVEWAY & WALKWAY MATCHES.
21. CURB CUT LOCATIONS FOR DRIVEWAYS SHALL BE FIELD VERIFIED. ADJUST CURB CUTS IF APPROPRIATE.
22. THE CONTRACTOR SHALL NOTIFY RESIDENTS 48 HOURS IN ADVANCE OF WHEN CONSTRUCTION WILL DISRUPT ACCESS TO THE RESIDENTS PROPERTY, INCLUDING DRIVEWAYS, WALKWAYS, ETC. DURING NOTIFICATION, CONTRACTOR SHALL VERIFY WITH OWNER ANY KNOW BOUNDARY MARKER LOCATIONS.
23. EXISTING SIGNS THAT ARE IMPACTED BY THIS PROJECT SHALL BE RESET PER CITY STANDARDS AND IN ACCORDANCE WITH MDOT AND M.U.T.C.D. ADDITIONAL SIGNS MY BE REQUIRED AS DIRECTED BY THE ENGINEER.
24. THE INVERTS INDICATED ARE THE INVERTS AT THE INSIDE FACE OF THE MANHOLE.
25. FLOWS FROM DEWATERING EFFORTS SHALL NOT BE DISCHARGED TO SANITARY SEWERS.

EXISTING SITE NOTES:

1. THE LOCATIONS OF UNDERGROUND UTILITIES AND STRUCTURES, AS SHOWN ON THE DRAWINGS, ARE APPROXIMATE AND MAY NOT BE COMPLETE. NO GUARANTEE IS MADE THAT UTILITIES OR STRUCTURES WILL BE ENCOUNTERED WHERE SHOWN OR THAT ALL UNDERGROUND UTILITIES AND STRUCTURES ARE SHOWN. ALL LOCATIONS AND SIZES OF EXISTING UTILITIES AND STRUCTURES SHALL BE VERIFIED IN THE FIELD WITH TEST PITS AS REQUIRED PRIOR TO BEGINNING CONSTRUCTION OF NEW FACILITIES OR PIPING THAT MAY BE AFFECTED. THE CONTRACTOR WILL REALIGN NEW PIPE LOCATIONS AS REQUIRED TO CONFORM TO EXISTING LINES AND AS APPROVED BY THE ENGINEER.
2. CONTRACTOR TO NOTE THAT, IN GENERAL, ALL EXISTING CONDITION INFORMATION ON THE DRAWINGS ARE SHOWN WITH A LIGHTER LINE WEIGHT AND WITH A SLANTED TYPE TEXT.
3. UNLESS OTHERWISE NOTED, THERE IS NO KNOWN ASBESTOS WITHIN THE AREA OF WORK. IF THE PRESENCE OF ASBESTOS IS DISCOVERED, THE CONTRACTOR SHALL NOTIFY THE OWNER AND THE ENGINEER IMMEDIATELY. DISPOSAL OF ASBESTOS SHALL BE IN ACCORDANCE WITH STATE OF MAINE REGULATIONS.

DEMOLITION NOTES:

1. REFER TO THE EXISTING SITE PLAN, DWG C3.0, FOR ADDITIONAL INFORMATION REGARDING EXISTING FACILITIES. REFER TO DWG C4.0 FOR LIMITS OF WORK.
2. ALL PIPING, EQUIPMENT AND MATERIALS TO BE DEMOLISHED AND/OR REMOVED FROM SERVICE SHALL BE COORDINATED WITH THE OWNER AND ENGINEER BEFORE COMMENCING THAT WORK. EXISTING PIPES AND CONDUIT DESIGNATED AS "ABANDONED" MAY BE REMOVED IF THE CONTRACTOR SO CHOOSES. IF ABANDONED PIPE CONFLICTS WITH PROPOSED YARD PIPING, THEN A PORTION OF THE ABANDONED PIPE SHALL BE REMOVED AND THE NEW ENDS OF ABANDONED PIPE CAPPED, OR PLUGGED WITH CONCRETE.
3. ALL EXISTING PIPING AND UTILITIES WHICH ARE BENEATH PROPOSED STRUCTURES, AND ARE TO BE ABANDONED, SHALL BE REMOVED TO A MINIMUM OF 5 FEET OUTSIDE OF THE STRUCTURE. PIPE AND UTILITIES BENEATH PROPOSED STRUCTURES THAT ARE TO REMAIN SHALL BE CONCRETE ENCASED, UNLESS OTHERWISE INDICATED.
4. SEVERING OF EXISTING UTILITIES FOR ABANDONMENT, OR REMOVAL OF A SEGMENT FROM SERVICE, SHALL BE PERFORMED IN SUCH A MANNER AS TO ALLOW THE REMAINING ACTIVE SEGMENT TO CONTINUE IN ITS INTENDED SERVICE. CAP ACTIVE SEGMENTS WITH APPROPRIATE FITTINGS, JOINT RESTRAINT, ETC. TO ENSURE THEIR INTEGRITY. PLUG ENDS OF ABANDONED PIPE SEGMENTS WITH CONCRETE UNLESS SPECIAL CIRCUMSTANCES DICTATE PLUGGING ABANDONED PIPES WITH BLIND FLANGES, RESTRAINED MECHANICAL JOINT PLUGS, ETC. AS APPROPRIATE.

DEMOLITION NOTES (CONTINUED):

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING AND DISPOSING OF ALL DEMOLISHED PIPING, EQUIPMENT AND MATERIALS. DISPOSAL SHALL BE IN ACCORDANCE WITH ALL STATE AND LOCAL REGULATIONS. THE OWNER RESERVES THE RIGHT TO RETAIN ANY SUCH PIPING, EQUIPMENT AND MATERIALS DESIGNATED FOR DEMOLITION FOR HIS USE. SUCH MATERIALS TO BE RETAINED SHALL BE PROPERLY STORED IN AN ON-SITE LOCATION. COORDINATE LOCATION AND MATERIALS TO BE SALVAGED WITH THE OWNER/ENGINEER.
7. THE CONTRACTOR SHALL KEEP A RECORD OF DEMOLITION AS PART OF THE PROJECT RECORD DOCUMENTS.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE APPROPRIATE DISPOSAL OF FLOWS RESULTING FROM PRECIPITATION AND HIS DEWATERING OPERATIONS.

SITE GRADING NOTES:

1. STRIPPING OF TOPSOIL (LOAM) SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION 311100. REFER TO DWG C3.0, FOR LIMIT OF WORK AND STRIPPING.
2. CONTRACTOR SHALL MINIMIZE CLEARING OPERATIONS. CLEARING AND GRUBBING SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION 311100. CLEARING LIMITS SHALL BE AS INDICATED ON THE DRAWINGS, BUT AT ALL TIMES WITHIN PROPERTY LINES OR EASEMENTS. ALL GRUBBINGS AND EXCESS EXCAVATED MATERIAL ARE THE PROPERTY OF THE CONTRACTOR AND WILL BE DISPOSED OF AT A SITE PROVIDED BY THE CONTRACTOR IN COMPLIANCE WITH ALL STATE AND LOCAL LAWS.
3. ALL AREAS THAT ARE EXCAVATED, FILLED OR OTHERWISE DISTURBED BY THE CONTRACTOR AND ARE NOT TO BE PAVED OR FILLED WITH GRAVEL OR RIPRAP SHALL BE LOAMED, GRADED, LIMED, FERTILIZED, SEEDED AND MULCHED. ALL AREAS TO RECEIVE 4" OF TOPSOIL EXCEPT AREAS ADJACENT TO STREAMS, WHICH WILL REQUIRE 6" OF TOPSOIL.
4. THE CONTRACTOR SHALL NOT HAVE ANY RIGHT OF PROPERTY IN ANY MATERIALS TAKEN FROM ANY EXCAVATION. SUITABLE EXCAVATED MATERIAL MAY BE INCORPORATED IN THE PROJECT, WITH EXCESS MATERIAL DISPOSED OF AT A LOCATION PROVIDED BY THE CONTRACTOR. THESE PROVISIONS SHALL IN NO WAY RELIEVE THE CONTRACTOR OF HIS OBLIGATIONS TO PROPERLY DISPOSE OF AND REPLACE ANY MATERIAL DETERMINED BY THE ENGINEER TO BE UNSUITABLE FOR BACKFILLING. THE CONTRACTOR SHALL DISPOSE OF UNSUITABLE AND EXCESS MATERIAL IN ACCORDANCE WITH THE APPLICABLE SECTIONS OF THE CONTRACT DOCUMENTS.
5. THE CONTRACTOR SHALL PROVIDE PROPER EROSION CONTROL AND DRAINAGE MEASURES IN ALL AREAS OF WORK, AND CONFINE SOIL SEDIMENT TO WITHIN THE LIMITS OF EXCAVATION AND GRADING. PRIOR TO BEGINNING EXCAVATION WORK, EROSION CONTROL FENCE OR BERM SHALL BE INSTALLED AT THE DOWN GRADIENT PERIMETER OF THE ACTUAL LIMITS OF GRUBBING AND/OR GRADING, AND AS SHOWN ON THE DRAWINGS. EROSION CONTROL MEASURES SHOWN ON THE DRAWINGS ARE A MINIMUM, CONTRACTOR SHALL TAKE ALL OTHER NECESSARY MEASURES. EROSION CONTROL FENCE SHALL ALSO BE INSTALLED AT THE DOWN GRADIENT PERIMETER OF THE TOPSOIL STOCKPILES. ALL DISTURBED EARTH SURFACES SHALL BE STABILIZED IN THE SHORTEST PRACTICAL TIME AND TEMPORARY EROSION CONTROL DEVICES SHALL BE EMPLOYED UNTIL SUCH TIME AS ADEQUATE SOIL STABILIZATION HAS BEEN ACHIEVED. TEMPORARY STORAGE OF EXCAVATED MATERIAL SHALL BE STABILIZED IN A MANNER THAT WILL MINIMIZE EROSION. ALL INSTALLED EROSION CONTROL FACILITIES SHALL BE REMOVED AT THE END OF THE PROJECT. REFER TO SPECIFICATION SECTION 312500.
6. ALL STORM DRAINAGE INLETS SHALL BE PROTECTED BY HAY BALE FILTERS TO PREVENT ENTRY OF SEDIMENT FROM RUNOFF WATERS DURING CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND DISPOSAL OF ALL COLLECTED SEDIMENT, AND THAT WHICH COLLECTS IN THE STORM DRAIN SYSTEM.
7. TEST PIT AND/OR BORING LOGS FOR THE PROJECT SITE ARE INCLUDED IN THE GEOTECHNICAL REPORT.
8. ALL ELEVATIONS REFER TO THE NATIONAL GEODETIC VERTICAL DATUM. ORIENTATION IS GRID NORTH MAINE STATE PLANE COORDINATE SYSTEM. PROJECT BENCH MARK WILL BE PROVIDED BY THE ENGINEER.
9. CONTRACTOR SHALL NOT TRACK OR SPILL EARTH, DEBRIS OR OTHER CONSTRUCTION MATERIAL ON PUBLIC OR PRIVATE STREETS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE IMMEDIATE ASSOCIATED CLEAN UP.
10. ALL CATCH BASINS, MANHOLES, VALVE PITS, VALVE BOXES AND OTHER BURIED FACILITIES WITH SURFACE ACCESS SHALL BE ADJUSTED TO MATCH FINAL GRADES, UNLESS OTHERWISE INDICATED.
11. WHEREVER PROPOSED STRUCTURES ARE LOCATED PARTLY WITHIN A PAVED AREA AND PARTLY IN A NON-PAVED AREA, A BITUMINOUS CONCRETE PAVED APRON 2 FT WIDE SHALL BE SUPPLIED AROUND THE PROPOSED COVER. PAVEMENT SHALL SLOPE AWAY FROM THE COVER
12. CONTRACTOR SHALL REMOVE AND REPLACE, OR REPAIR, ALL CURBS, SIDEWALKS, PAVEMENT AND OTHER ITEMS DAMAGED BY HIS CONSTRUCTION ACTIVITIES TO AT LEAST THEIR ORIGINAL CONDITION, TO THE SATISFACTION OF THE OWNER AND ENGINEER.
13. WHERE EXISTING PAVEMENT IS REMOVED AND REPLACED, MATCH EXISTING GRADES TO THE EXTENT POSSIBLE. COORDINATE FINE GRADING WITH THE ENGINEER.
14. ALL ROAD AND PARKING AREA SURFACES SHALL PITCH 1/4 INCH PER FOOT MINIMUM UNLESS OTHERWISE NOTED. ALL VEGETATED AREAS ABOVE MEAN HIGH WATER ELEVATION THAT ARE EXCAVATED, FILLED OR OTHERWISE DISTURBED BY THE CONTRACTOR AND ARE NOT TO BE PAVED OR FILLED WITH RIPRAP SHALL BE LOAMED, GRADED, LIMED, FERTILIZED, SEEDED AND MULCHED AT NO ADDITIONAL EXPENSE TO THE OWNER.
15. INITIAL PAVING SHALL BE CONDUCTED WITHIN TWO WEEKS OF COMPLETION OF PLACEMENT OF FINAL BACKFILL UNLESS OTHERWISE AUTHORIZED BY ENGINEER. INITIAL PAVEMENT SHALL BE INSTALLED AND MAINTAINED BY CONTRACTOR FOR A MINIMUM PERIOD OF 2 MONTHS BEFORE FINAL PAVEMENT IS PLACED. FINAL PAVEMENT MAY BE PLACED OVER THE INITIAL PAVING PROVIDED INITIAL PAVING COURSE IS IN GOOD REPAIR. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING AND SHIMMING THE INITIAL PAVEMENT AS NECESSARY TO ACCEPT THE FINAL PAVING COURSE. IF CONDITIONS WARRANT, THE CONTRACTOR MAY BE REQUIRED TO REMOVE AND REPLACE INITIAL PAVING PRIOR TO FINAL PAVING.
16. TREES TO REMAIN SHALL BE PROTECTED TO THE DRIP LINE USING FIXED BARRIERS SUCH AS JERSEY BARRIERS OR DRIVEN FENCE.

SITE LAYOUT NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LAYOUT OF ALL PROPOSED WORK AS SHOWN ON THE DRAWINGS. THE ENGINEER WILL PROVIDE TWO POINTS THAT DEFINE THE HORIZONTAL CONTROL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THIS PROVIDED LAYOUT INFORMATION THROUGHOUT THE COURSE OF CONSTRUCTION. REPORT ANY LAYOUT DISCREPANCIES IMMEDIATELY TO THE ENGINEER.
2. ENGINEER WILL PROVIDE HORIZONTAL CONTROL POINTS TO ESTABLISH THE CONSTRUCTION BASELINE. THE POINTS TO BE PROVIDED ARE SHOWN ON THE LAYOUT PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING AND REESTABLISHING THESE POINTS FOR THE DURATION OF THE PROJECT. CONTRACTOR SHALL LAYOUT ALL CONSTRUCTION AS SHOWN ON THE DRAWINGS USING THE CONSTRUCTION BASELINE. THE LAYOUT SHALL BE REVIEWED BY THE ENGINEER PRIOR TO CONSTRUCTION. ANY DEVIATIONS FROM THE ROADWAY OR UTILITY LAYOUTS MUST BE APPROVED BY THE ENGINEER/OWNER.
3. IN GENERAL, THE GIVEN STRUCTURE LOCATIONS ARE TO THE OUTSIDE FACE OF THE STRUCTURE FOUNDATION WALL, NOT FOOTINGS. REFER TO THE ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR BUILDING AND STRUCTURE DIMENSIONS. RADII SHOWN FOR ROADS ARE TO EDGE OF PAVEMENT.
4. THE LOCATION AND LIMITS OF ALL ON-SITE WORK AND STORAGE AREAS SHALL BE REVIEWED/COORDINATED WITH, AND ACCEPTABLE TO, THE OWNER AND ENGINEER. THE CONTRACTOR SHALL LIMIT HIS ACTIVITIES TO THESE AREAS.
5. BOLLARD LOCATIONS SHOWN ARE APPROXIMATE. REFER TO THE ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR THE PRECISE LOCATION OF BOLLARDS NEAR NEW STRUCTURES. COORDINATE BOLLARD LOCATION WITH THE ENGINEER. SEE DWG C4.0 FOR DETAIL.

PROJECT OWNER

PRESIDENT AND TRUSTEES OF BATES COLLEGE
2 ANDREWS WAY
LEWISTON, ME 04240

PROPERTY INCLUDED IN DEVELOPMENT

TAX MAP	PARCEL #
MAP 194	LOT 165
MAP 194	LOT 166
MAP 194	LOT 167
MAP 194	LOT 168
MAP 194	LOT 169
MAP 194	LOT 170

ENTIRE SITE IS IN THE INSTITUTIONAL – OFFICE DISTRICT

	ALLOWED	PROPOSED 45 CAMPUS
MAX. IMPERVIOUS COVER	75%	48%
MAX. LOT COVERAGE	75%	22%

PROPOSED USE: INSTITUTIONAL: ACADEMIC BUILDING/ CLASSROOMS

NOTE:

1. IF DEVELOPMENT HAS NOT OCCURRED, AS DEFINED WITHIN THE SCOPE OF THE ZONING AND LAND USE CODE WITHIN TWO YEARS, DEVELOPMENT REVIEW APPROVAL SHALL EXPIRE, PURSUANT TO ARTICLE XIII. SECTION II.
2. PRIOR TO A CERTIFICATE OF OCCUPANCY BEING ISSUED A PROFESSIONAL ENGINEER MUST PROVIDE A STAMPED STATEMENT INDICATING THAT THE STORMWATER IMPROVEMENTS HAVE BEEN COMPLETED IN ACCORDANCE WITH THE APPROVED PLANS.

SITE PIPING NOTES:

1. ALL PIPE LINES SHALL SLOPE UNIFORMLY BETWEEN ELEVATIONS INDICATED ON THE DRAWINGS. NO CRESTS IN PIPING WILL BE PERMITTED. ALL HORIZONTAL AND VERTICAL BENDS IN PRESSURIZED LINES SHALL BE SUITABLY RESTRAINED WITH THRUST BLOCKS OR RETAINER GLANDS (RETAINER GLANDS ALLOWED FOR DUCTILE IRON PIPE ONLY). PROVIDE ALL BENDS (HORIZONTAL AND VERTICAL) AS REQUIRED TO MEET THE GRADES AND ALIGNMENT INDICATED ON THE DRAWINGS.
2. THE CONTRACTOR SHALL ASCERTAIN THE LOCATION AND SIZE OF EXISTING PIPING AND UTILITIES IN THE FIELD BY TEST PIT EXCAVATION PRIOR TO COMMENCING INSTALLATION OF ANY OF THE NEW PIPING AFFECTED. WHERE NEW PIPE CONNECTS TO EXISTING PIPING OR STRUCTURAL PENETRATION, CONTRACTOR SHALL VERIFY ELEVATION BY TEST PIT, AS REQUIRED, PRIOR TO INSTALLATION OF ANY OF THE ASSOCIATED/AFFECTED NEW PIPING. IDENTIFIED CONFLICTS WITH EXISTING PIPING AND UTILITIES WILL BE REVIEWED WITH THE ENGINEER PRIOR TO COMMENCING INSTALLATION. THE HORIZONTAL ALIGNMENT OF NEW PIPING MAY BE ADJUSTED IN THE FIELD SUBJECT TO PRIOR REVIEW AND ACCEPTANCE OF THE ENGINEER. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY LAYOUT OF ALL PROPOSED WORK AS SHOWN ON THE DRAWINGS AND REPORT ANY LAYOUT DISCREPANCIES IMMEDIATELY TO THE ENGINEER.
3. TRENCH INSULATION SHALL BE USED WHERE DEPTH OF COVER IS LESS THAN 5 FEET.
4. MANHOLES AND CATCH BASINS ARE 4 FEET IN DIAMETER UNLESS OTHERWISE NOTED. THE TOP OF FRAMES SHALL BE SET FLUSH WITH FINISH GRADE, UNLESS OTHERWISE NOTED ON DRAWINGS.
5. REFER TO SPECIFICATION SECTION 310000 FOR PIPE AND STRUCTURE BEDDING AND BACKFILL REQUIREMENTS.
6. COMPACTION TESTS WILL BE PERFORMED IN ACCORDANCE WITH SPECIFICATION SECTION 310000. ANY SETTLEMENT OCCURRING WITHIN ONE YEAR OF FINAL COMPLETION OF THE WORK SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
7. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE REGULATIONS OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA).
8. WHERE NEW PIPING IS TO BE CONNECTED TO EXISTING PIPING, THE CONTRACTOR SHALL FURNISH AND INSTALL ALL ADAPTERS, FITTINGS, AND ADDITIONAL PIPE AS REQUIRED TO COMPLETE THE CONNECTION. CONTRACTOR SHALL VERIFY LOCATION, ELEVATION, ORIENTATION AND MATERIAL OF CONSTRUCTION. TEST PITS SHALL BE USED AS REQUIRED.
9. ALL EXISTING UTILITIES ENCOUNTERED DURING CONSTRUCTION ARE TO REMAIN IN SERVICE UNLESS OTHERWISE NOTED ON THE DEMOLITION PLAN, DWG C3.0 CONTRACTOR SHALL RE-SHAPE INVERTS AS REQUIRED WHEN CONNECTING INTO EXISTING MANHOLES.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL AND DISPOSAL OF ALL DEMOLITION MATERIALS.
11. ALL STRUCTURES AND PIPELINES LOCATED ADJACENT TO ANY TRENCH EXCAVATION SHALL BE PROTECTED AND FIRMLY SUPPORTED BY THE CONTRACTOR UNTIL THE TRENCH IS BACKFILLED. DAMAGE TO ANY SUCH STRUCTURES CAUSED BY OR RESULTING FROM THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. ALL UTILITIES REQUIRING REPAIR, RELOCATION OR ADJUSTMENT AS A RESULT OF THE PROJECT SHALL BE COORDINATED THROUGH THE OWNER.
12. PIPING ON THE SITE PIPING PLAN HAS BEEN SHOWN BROKEN FOR CLARITY ONLY. PIPE BREAKS DO NOT INDICATE RELATIVE ELEVATIONS OF PIPING.
13. ELECTRICAL CONDUIT RUNS ARE INDICATED ON THE UTILITY DRAWING.
14. FORCE MAINS SHALL SLOPE UNIFORMLY BETWEEN ELEVATIONS INDICATED ON THE DRAWINGS. NO CRESTS IN NEW PIPING WILL BE PERMITTED UNLESS OTHERWISE NOTED ON THE DRAWINGS. ALL BENDS SHALL BE SUITABLY RESTRAINED BY CAST-IN-PLACE CONCRETE THRUST BLOCKS. DUCTILE IRON RETAINER GLANDS MAY BE USED IN LIEU OF THRUST BLOCKS ON DUCTILE IRON FORCE MAINS ONLY. THE NUMBER OF JOINTS ON EACH SIDE OF THE BENDS REQUIRING RETAINER GLANDS SHALL BE DETERMINED BY STANDARDS SET FORTH BY THE DUCTILE IRON PIPE RESEARCH ASSOCIATION. TEST PRESSURE FOR THE PRESSURE AND LEAKAGE TEST SHALL BE 100 PSI.
15. ALL UNDERGROUND UTILITIES ENCOUNTERED DURING CONSTRUCTION WILL BE IN SERVICE OR OUT OF SERVICE. IF OUT OF SERVICE WHEN ENCOUNTERED, THE CONTRACTOR SHALL REMOVE COMPLETELY AND DISPOSE OF DEBRIS. IF A UTILITY IS TO BE TAKEN OUT OF SERVICE AS A RESULT OF THIS PROJECT, THAT UTILITY WILL ALSO BE REMOVED COMPLETELY AFTER THE UTILITY IS DISCONTINUED. ALL WORK COVERED BY THIS NOTE WILL BE INCIDENTAL TO THE COST OF THE PIPE INSTALLATION AND SHALL BE PERFORMED AT NO ADDITIONAL COST TO THE OWNER.
16. WHERE SEWER MAINS AND HOUSE SERVICE CONNECTIONS CROSS WATER MAINS THEY SHALL BE INSTALLED UNDER THE WATER MAIN WHENEVER POSSIBLE. A MINIMUM SEPARATION OF 18 INCHES BETWEEN THE BOTTOM OF THE WATER LINE AND TOP OF THE SEWER SHALL BE MAINTAINED. WHERE SITE CONDITIONS DICTATE LESS THAN THE ABOVE REFERENCED 18 INCH SEPARATION THE FOLLOWING CONSTRUCTION METHODS ARE REQUIRED: THE WATER MAIN SHALL BE RELOCATED TO PROVIDE THE 18" SEPARATION, AND ONE FULL LENGTH OF PIPE SHALL BE CENTERED AT THE POINT OF CROSSING TO LOCATE JOINTS AS FAR AS POSSIBLE FROM THE WATER MAIN. THE CONTRACTOR SHALL RELOCATE THE WATER MAIN TO THE SATISFACTION OF THE LEWISTON DEPARTMENT OF PUBLIC WORKS.
17. PROVIDE 2" RIGID INSULATION OVER WATER AND SEWER MAINS AND SERVICES WHEN COVER IS LESS THAN 5.5 FEET AND WHERE DIRECTED BY THE ENGINEER (SEE DETAILS).
18. WHERE APPROPRIATE, MINOR ADJUSTMENTS TO THE ALIGNMENT OF PROPOSED UTILITIES SHALL BE MADE TO ACCOMMODATE EXISTING UTILITIES. COORDINATE ADJUSTMENTS WITH ENGINEER.
19. CONTRACTOR SHALL COORDINATE LOCATION OF SEWER SERVICE WYES TO AVOID CONFLICT BETWEEN SEWER SERVICES, WATER LINES AND SERVICES, AND NEW STORM DRAINAGE PIPING.
20. A MINIMUM VERTICAL OR HORIZONTAL SEPARATION OF 6 INCHES BETWEEN THE WATER LINES (INCLUDING SERVICES) AND STORM DRAINAGE PIPES AND STRUCTURES, SHALL BE MAINTAINED. 2" RIGID INSULATION SHALL BE INSTALLED WHEN THE SEPARATION IS LESS THAN 4 FEET. 4" RIGID INSULATION SHALL BE INSTALLED FOR UNDER 18" SEPARATION.
21. PIPE RESTRAINT FOR WATER MAINS: ALL BENDS, TEES, REDUCERS, HYDRANTS, AND PLUGS SHALL BE RESTRAINED BY USING CONCRETE THRUST BLOCKS AND "GRIP RINGS" OR OTHER METHOD AS SHOWN ON THE DRAWINGS. ANCHOR TEES SHALL BE USED FOR ALL HYDRANT BRANCHES EXCEPT IN LOCATIONS WHERE GATE VALVES CAN NOT BE CONNECTED DIRECTLY TO TEE, IN WHICH CASE "GRIP RINGS" OR TIE RODS SHALL BE USED.
22. WATER LINE AND APPURTENANCE CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF LEWISTON REGULATIONS. SEWER MANHOLE AND PIPELINE CONSTRUCTION AND TESTING SHALL BE IN ACCORDANCE WITH CITY OF LEWISTON REQUIREMENTS.
23. WATER MAIN WILL BE TESTED AT 1.5 TIMES THE WORKING PRESSURE OR 200 PSI WHICHEVER IS GREATER. TEST DURATION WILL BE TWO HOURS.
24. ALL SEWER PIPE SHALL BE PVC MEETING THE REQUIREMENTS OUTLINED IN THE SPECIFICATIONS UNLESS OTHERWISE INDICATED ON THE DRAWINGS.

LEGEND

EXISTING		PROPOSED
	PROPERTY/ROW LINE	
	SETBACK LINE	
	EASEMENT LINE	
	CENTERLINE	
	EDGE OF PAVEMENT	
	CURBING	
	EDGE OF GRAVEL	
	EDGE OF CONCRETE	
122	CONTOUR	123
	BUILDING	
	STONEWALL	
	TREELINE	
	CHAIN LINK FENCE	
	STOCKADE FENCE	
	BARB WIRE FENCE	
	RETAINING WALL	
	GUARDRAIL	
8" S	SEWER	8"S
4" FM	SEWER FORCE MAIN	4"FM
4" G	GAS	4"G
4" W	WATER	8"W
15" SD	STORM DRAIN	15"SD
6" UD	UNDERDRAIN	6"UD
12" CMP	CULVERT	12" CMP
UGE	UNDERGROUND ELECTRIC	UGE
OHE	OVERHEAD ELECTRIC	OHE
	IRON PIPE/REBAR	
	DRILLHOLE	
	MONUMENT	
	SURVEY CONTROL POINT	
124.6	SPOT ELEVATION	134.5
SMH	SEWER MANHOLE	SMH
DMH	DRAINAGE MANHOLE	DMH
CB CB	CATCH BASIN	CB CB
EMH	ELECTRIC MANHOLE	EMH
TMH	TELEPHONE MANHOLE	TMH
	GATE VALVE	
	CURB STOP	
	YARD HYDRANT	
	HYDRANT	
	UTILITY POLE	
	UTILITY POLE W/ GUY	
	UTILITY POLE W/ LIGHT	
	LIGHT POLE	
	BOLLARD	
	FLAGPOLE	
	CONIFEROUS TREE	
	DECIDUOUS TREE	
	SHRUB	
	EDGE OF WATER	
	STREAM	
	EDGE OF WETLANDS	
	FLOODPLAIN	
	WETLANDS	
	DRAINAGE FLOW	
	DRAINAGE SWALE	
	PAVEMENT MARKINGS	
	SIGN	
MB	MAILBOX	
	TEMPORARY BENCH MARK	
TP-2	TEST PIT	
B-3	TEST BORING	
P-4	TEST PROBE	
MW	MONITORING WELL	
	LIMIT OF WORK	
	SILT FENCE	
	RIPRAP	
	RAILROAD	
	MATCHLINE	
	ROCK OUTCROP	

CIVIL ABBREVIATIONS

&	AND	NGVD	NATIONAL GEODETIC VERTICAL DATUM
⌀, DIA	DIAMETER	N/A	NOT AVAILABLE/APPLICABLE
#, NO	NUMBER	NTS	NOT TO SCALE
APP'D	APPROVED	OD	OUTSIDE DIAMETER
BLDG	BUILDING	PC	PERFORATED CLAY
CB	CATCH BASIN	PSF	POUNDS PER SQUARE FOOT
CEN	CENTER	PSI	POUNDS PER SQUARE INCH
CFS	CUBIC FEET PER SECOND	PS	PRIMARY SLUDGE
CI	CAST IRON	PT	POINT OF TANGENCY
CL	CENTERLINE	PVC	POLYVINYL CHLORIDE
CMP	CORRUGATED METAL PIPE	RCP	REINFORCED CONCRETE PIPE
CO	CLEANOUT	RD	ROOF DRAIN
CONC	CONCRETE	REQ'D	REQUIRED
COR	CORNER	S	SLOPE, SEWER
CY	CUBIC YARD	SD	STORM DRAIN
DEMO	DEMOLITION	SF	SQUARE FEET
DMH	DRAIN MANHOLE	SMH	SANITARY SEWER MANHOLE
DI	DUCTILE IRON	SQ	SQUARE
DR	DRAIN	STA	STATION
DWG	DRAWING	T, XFMR	TRANSFORMER
EL	ELEVATION	TBM	TEMPORARY BENCH MARK
EMH	ELECTRIC MANHOLE	THK	THICKNESS
FM	FORCE MAIN	TOS	TOP OF STRUCTURE
FT	FEET	TYP	TYPICAL
G	GAS	UD	UNDERDRAIN
HYD	HYDRANT	UG	UNDERGROUND
IN	INCH	UGE	UNDERGROUND ELECTRIC
INF	INFLUENT	VC	VITRIFIED CLAY
INV	INVERT	W/	WITH
LBS	POUNDS	W	POTABLE WATER
MAX	MAXIMUM		
MH	MANHOLE		
MIN	MINIMUM		
MW	MONITORING WELL		
N	NORTH		

PRELIMINARY FOR REVIEW ONLY

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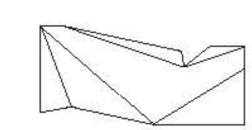
NOT FOR CONSTRUCTION

#	DATE	DESCRIPTION
4	09/03/18	ISSUED FOR LEWISTON SITE PLAN REVIEW
3	08/03/18	100% DESIGN DEVELOPMENT
2	06/15/18	50% DESIGN DEVELOPMENT
1	03/15/18	SCHEMATIC DESIGN



BATES

Bates College STEM Projects

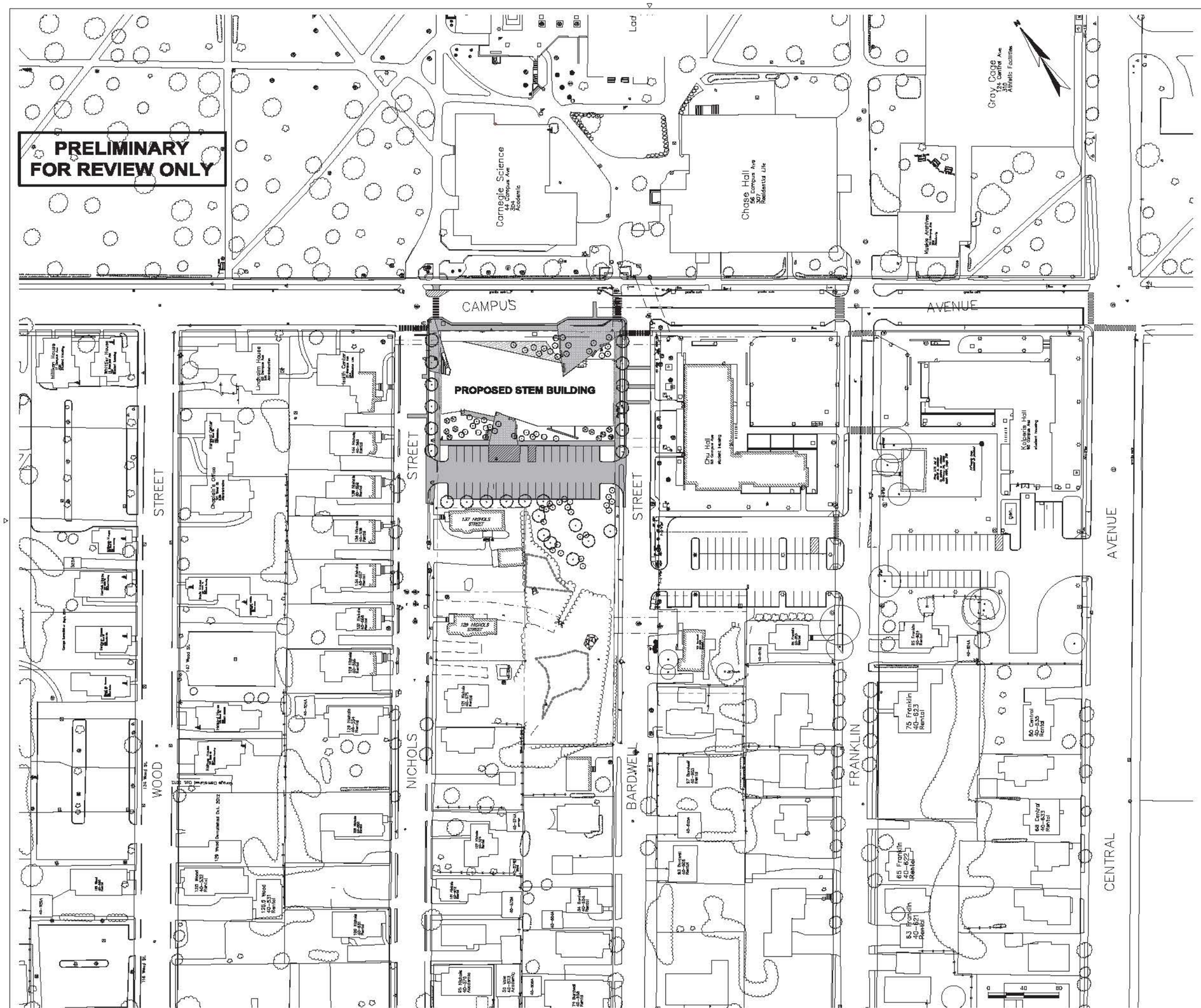
GENERAL NOTES, LEGEND AND ABBREVIATIONS

Drawing Scale
1/8" = 1'-0"

Project Number
14021A

Date Issued
7/12/2018

C1.0



SITE LOCATION PLAN
SCALE: 1"=40'

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NOT FOR CONSTRUCTION

#	DATE	DESCRIPTION
4	08/03/18	ISSUED FOR LEWISTON SITE PLAN REVIEW
3	06/03/18	100% DESIGN DEVELOPMENT
2	05/10/18	50% DESIGN DEVELOPMENT
1	02/14/18	SCHEMATIC DESIGN

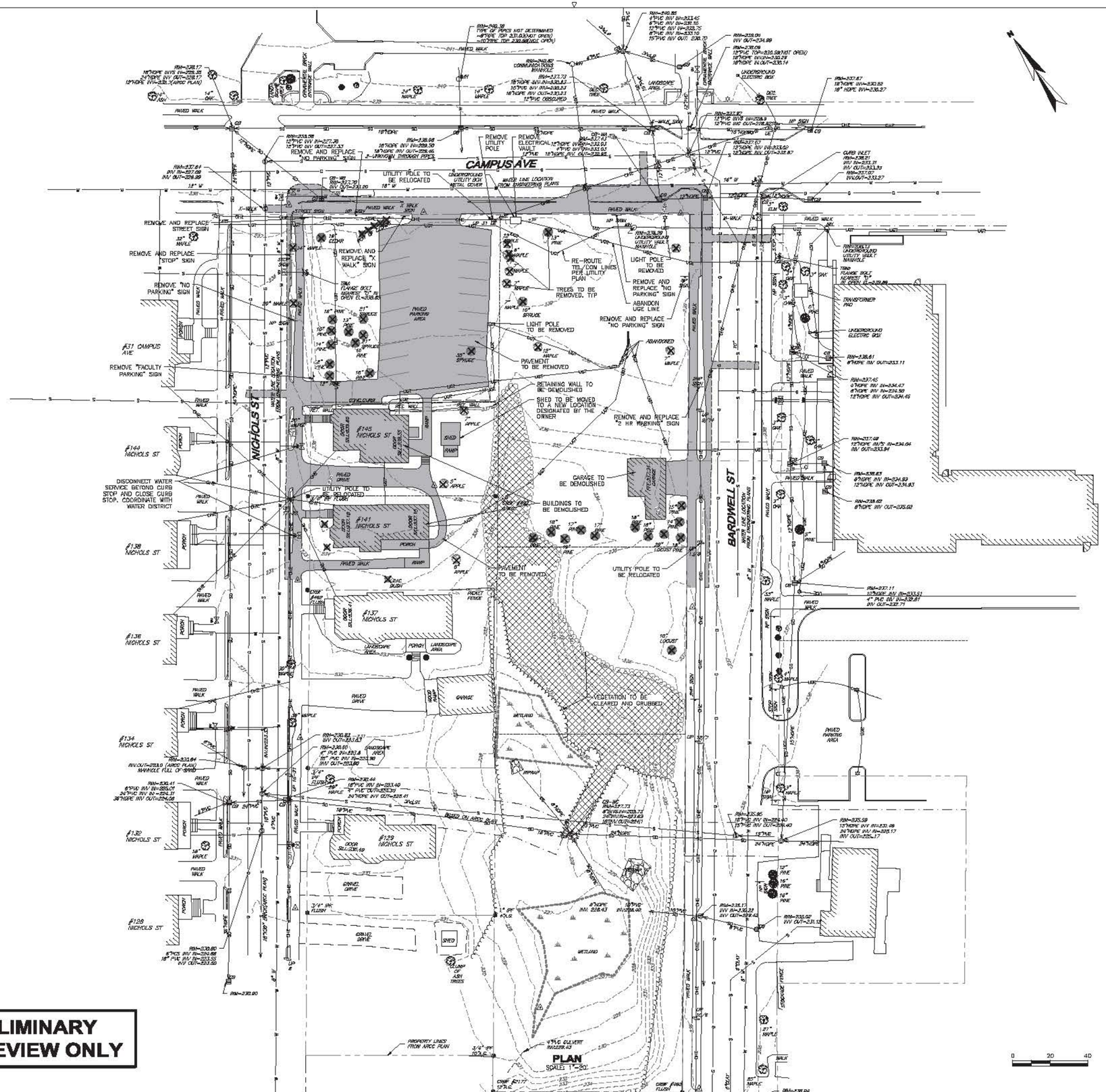
BATES

Bates College STEM Projects

SITE LOCATION PLAN

Drawing Scale	NTS
Project Number	14021A
Date Issued	7/12/2018

C2.0



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NOT FOR CONSTRUCTION

#	DATE	DESCRIPTION
4	06/03/19	ISSUED FOR LEWISTON SITE PLAN REVIEW
3	04/03/19	100% DESIGN DEVELOPMENT
2	04/12/18	50% DESIGN DEVELOPMENT
1	03/16/18	SCHEMATIC DESIGN

BATES

Bates College STEM Projects

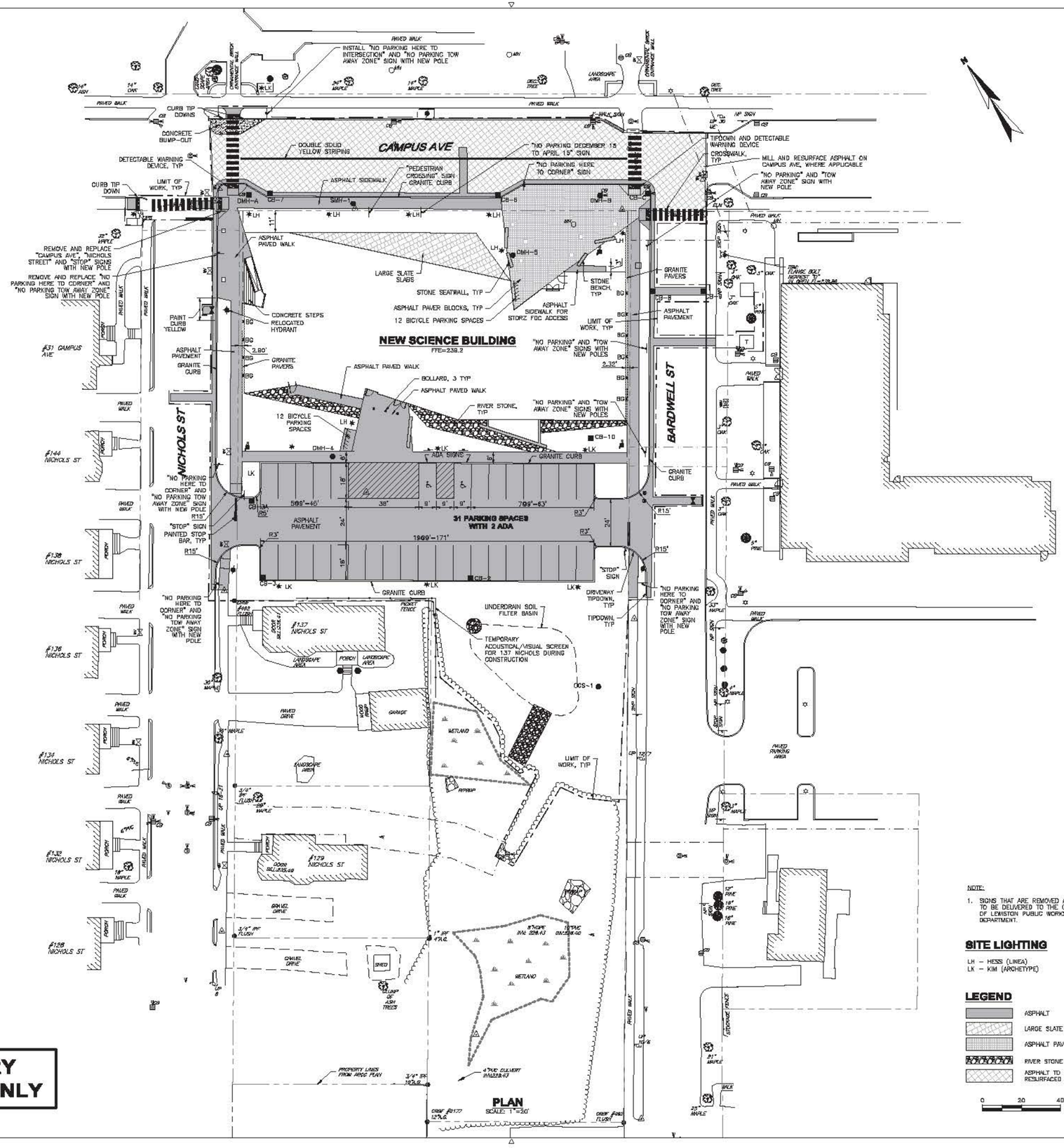
EXISTING CONDITIONS AND DEMOLITION PLAN

Drawing Scale
NTS

Project Number
14021A

Date Issued
7/15/2019

C3.0



NOTE:

1. SIGNS THAT ARE REMOVED ARE TO BE DELIVERED TO THE CITY OF LEWISTON PUBLIC WORKS DEPARTMENT.

SITE LIGHTING

LH – HESS (LINEA)
LK – KIM (ARCHETYPE)

LEGEND

- ASPHALT
- LARGE SLATE SLABS
- ASPHALT PAVER BLOCKS
- RIVER STONE
- ASPHALT TO BE RESURFACED

0 20 40

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#	DATE	DESCRIPTION
5	10/12/18	RESPONSE TO COMMENTS
4	08/13/18	ISSUED FOR LEWISTON SITE PLAN REVIEW
3	06/03/18	100% DESIGN DEVELOPMENT
2	05/15/18	50% DESIGN DEVELOPMENT
1	03/16/18	SCHEMATIC DESIGN

BATES

Bates College STEM Projects

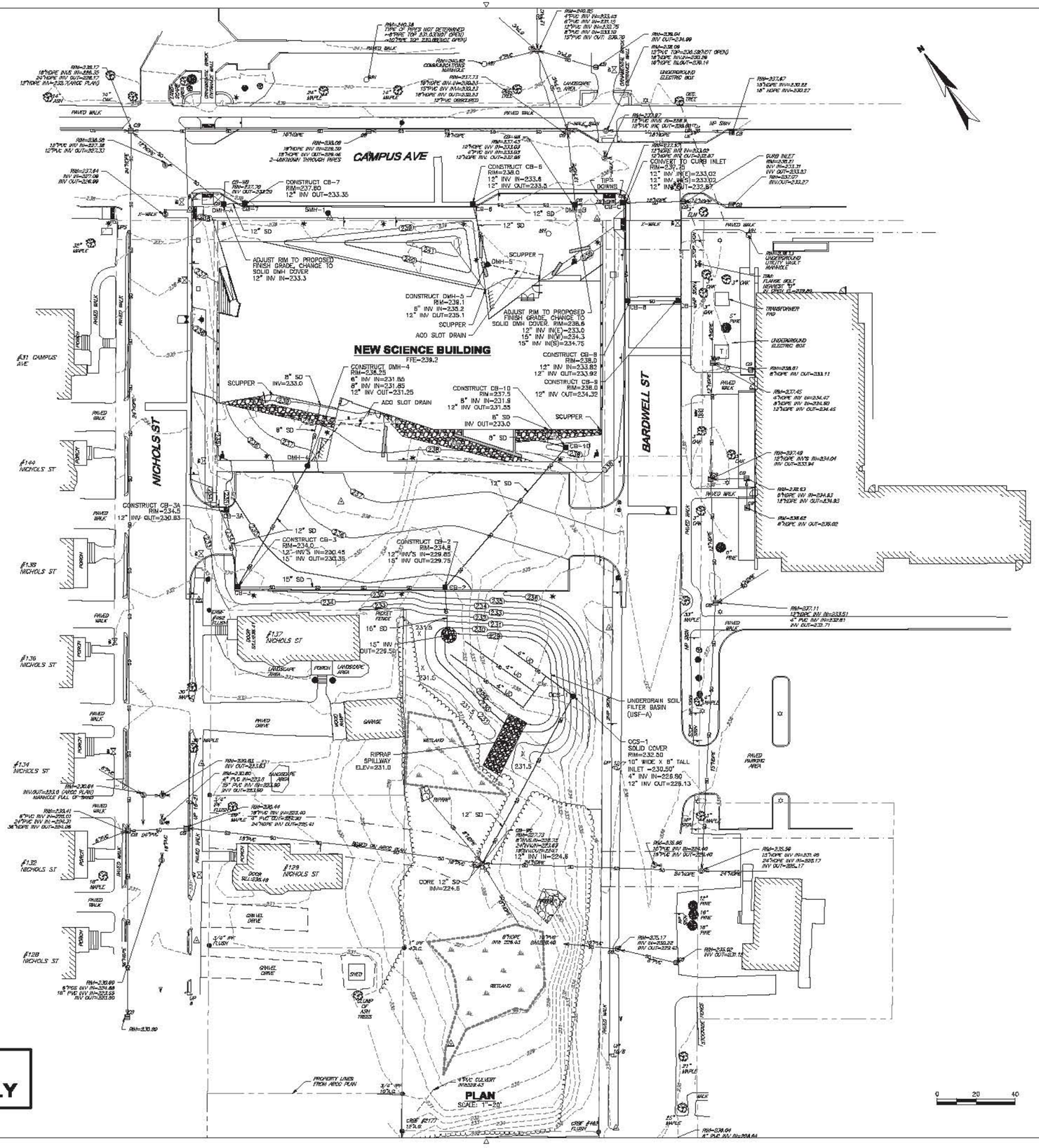
PROPOSED SITE LAYOUT PLAN

Drawing Scale
1"=20'

Project Number
14021A

Date Issued
10/12/2018

C4.0



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NOT FOR CONSTRUCTION

#	DATE	DESCRIPTION
5	10/12/18	RESPONSE TO COMMENTS
4	09/19/18	ISSUED FOR LEWISTON SITE PLAN REVIEW
3	06/22/18	100% DESIGN DEVELOPMENT
2	05/15/18	50% DESIGN DEVELOPMENT
1	03/16/18	SCHEMATIC DESIGN

BATES

Bates College STEM Projects

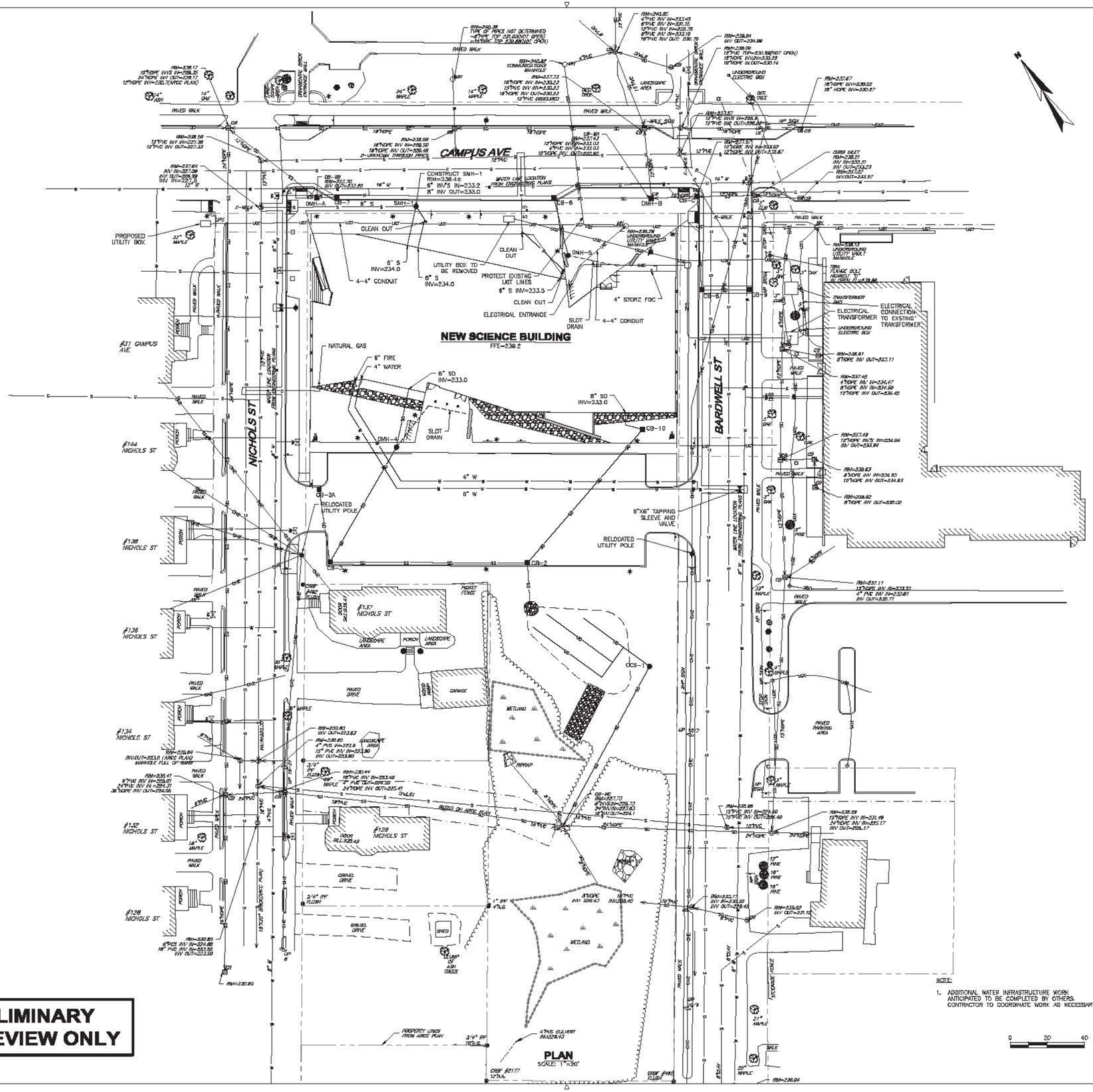
PROPOSED GRADING AND DRAINAGE PLAN

Drawing Scale
1" = 20'

Project Number
14021A

Date Issued
7/12/2018

C5.0



NOTE:

1. ADDITIONAL WATER INFRASTRUCTURE WORK ANTICIPATED TO BE COMPLETED BY OTHERS. CONTRACTOR TO COORDINATE WORK AS NECESSARY.

0 20 40

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#	DATE	DESCRIPTION
5	10/12/18	RESPONSE TO COMMENTS
4	09/18/18	ISSUED FOR LOMBTON SITE PLAN REVIEW
3	06/22/18	100% DESIGN DEVELOPMENT
2	06/12/18	50% DESIGN DEVELOPMENT
1	02/16/18	SCHEMATIC DESIGN

BATES

Bates College STEM Projects

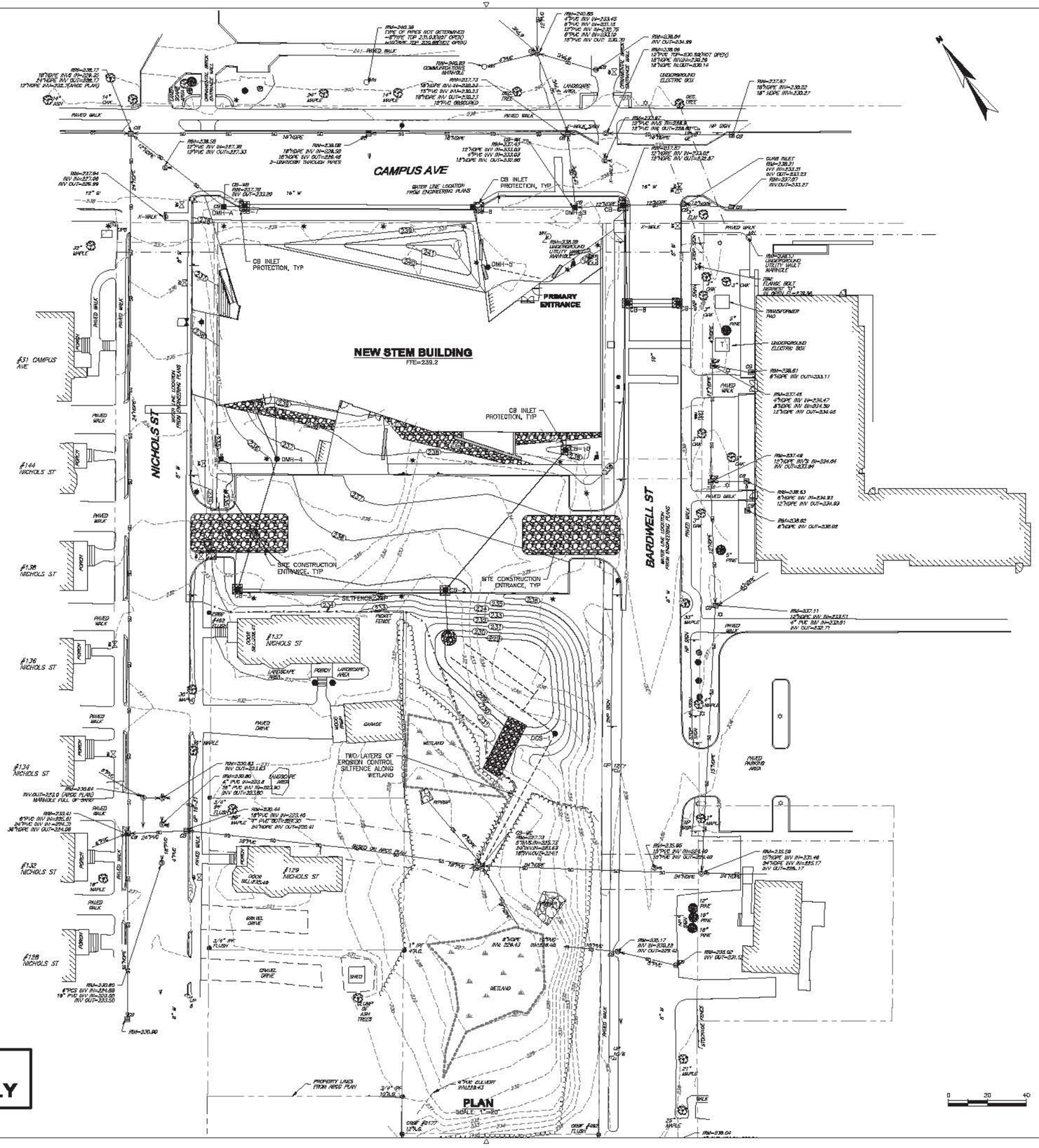
PROPOSED SITE UTILITIES PLAN

Drawing Scale
NTS

Project Number
14021A

Date Issued
7/12/2019

C6.0



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#	DATE	DESCRIPTION
4	08/03/18	ISSUED FOR LEWISTON SITE PLAN REVIEW
3	06/01/18	100% DESIGN DEVELOPMENT
2	05/15/18	90% DESIGN DEVELOPMENT
1	02/16/18	SCHEMATIC DESIGN

BATES

Bates College STEM Projects

SOIL EROSION AND SEDIMENT CONTROL PLAN

Drawing Scale
NTS

Project Number
14021A

Date Issued
7/12/2018

C7.0

THIS PLAN HAS BEEN DEVELOPED AS A STRATEGY TO CONTROL SOIL EROSION AND SEDIMENTATION DURING AND AFTER CONSTRUCTION. THIS PLAN IS BASED ON THE STANDARDS AND SPECIFICATIONS FOR EROSION PREVENTION IN DEVELOPING AREAS AS CONTAINED IN THE "MAINE EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES", MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION DATED MARCH 2003.

THE PROPOSED LOCATIONS OF SILTATION AND EROSION CONTROL STRUCTURES ARE SHOWN ON THE SITE PLAN.

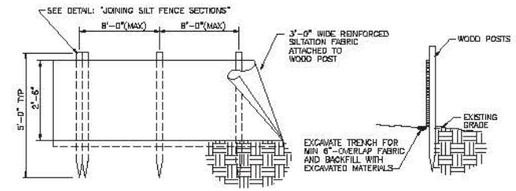
1. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE DONE IN ACCORDANCE WITH THE "MAINE EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES", MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION, DATED MARCH 2003.
2. THOSE AREAS UNDERGOING ACTUAL CONSTRUCTION WILL BE MAINTAINED IN AN UNTREATED OR UNVEGETATED CONDITION FOR THE MINIMUM TIME REQUIRED. IN GENERAL AREAS TO BE VEGETATED SHALL BE PERMANENTLY STABILIZED WITHIN 15 DAYS OF FINAL GRADING AND TEMPORARILY STABILIZED WITHIN 30 DAYS OF INITIAL DISTURBANCE OF THE SOIL
3. SEDIMENT BARRIERS (SILT FENCE, STONE CHECK DAMS, ETC.) SHOULD BE INSTALLED PRIOR TO ANY SOIL DISTURBANCE OF UPGRADIENT DRAINAGE AREAS.
4. INSTALL SILT FENCE AT TOE OF SLOPES TO FILTER SILT FROM RUNOFF. SEE SILT FENCE DETAIL FOR PROPER INSTALLATION. SILT FENCE WILL REMAIN IN PLACE PER NOTE #5.
5. ALL EROSION CONTROL STRUCTURES WILL BE INSPECTED, REPLACED AND/OR REPAIRED EVERY 7 DAYS AND IMMEDIATELY FOLLOWING ANY SIGNIFICANT RAINFALL OR SNOW MELT OR WHEN NO LONGER SERVICEABLE DUE TO SEDIMENT ACCUMULATION OR DECOMPOSURE. SEDIMENT DEPOSITS MUST BE REMOVED WHEN THEY REACH APPROXIMATELY ONE HALF THE HEIGHT OF THE BARRIER. SEDIMENT CONTROL DEVICES SHALL REMAIN IN PLACE AND BE MAINTAINED BY THE CONTRACTOR UNTIL AREAS UPSLOPE ARE PERMANENTLY STABILIZED.
6. NO SLOPES, EITHER PERMANENT OR TEMPORARY, SHALL BE STEEPER THAN TWO HORIZONTAL TO ONE VERTICAL (2 TO 1) UNLESS STABILIZED WITH RIPRAP OR OTHER STRUCTURAL MEANS.
7. IF FINAL SEEDING AND SODDING IS NOT EXPECTED PRIOR TO THE ANTICIPATED DATE OF THE FIRST KILLING FROST, USE TEMPORARY ANNUAL RYEGRASS SEEDING AND MULCHING ON ROUGH GRADED SUBSOIL TO PROTECT THE SITE AND DELAY PERMANENT LOAMING, FINE GRADING, AND SEEDING OR SODDING UNTIL SPRING.
8. WHEN FEASIBLE, TEMPORARY SEEDING OF DISTURBED AREAS THAT HAVE NOT BEEN FINISH GRADED SHALL BE COMPLETED 30 DAYS PRIOR TO THE FIRST KILLING FROST.
9. DURING THE CONSTRUCTION PHASE, INTERCEPTED SEDIMENT WILL BE RETURNED TO THE SITE AND REGRADED ONTO OPEN AREAS. POST SEEDING SEDIMENT, IF ANY, WILL BE DISPOSED OF IN AN ACCEPTABLE MANNER.
10. REVEGETATION MEASURES WILL COMMENCE UPON COMPLETION OF CONSTRUCTION EXCEPT AS NOTED ABOVE. ALL DISTURBED AREAS NOT OTHERWISE STABILIZED WILL BE GRADED, SMOOTHED, AND REVEGETATED.
11. ALL TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED ONCE THE SITE IS STABILIZED.
12. STABILIZATION SCHEDULE BEFORE WINTER:

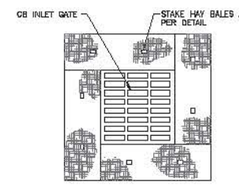
SEPTEMBER 15	ALL DISTURBED AREAS MUST BE SEEDED AND MULCHED. ALL SLOPES MUST BE STABILIZED, SEEDED AND MULCHED. SLOPES 3:1 OR GREATER TO BE STABILIZED WITH EROSION CONTROL MATTING AND SEEDED. ALL DISTURBED AREAS TO BE PROTECTED WITH AN ANNUAL GRASS MUST BE SEEDED AT A SEEDING RATE OF 3 POUNDS PER 1,000 SQUARE FEET AND MULCHED.
OCTOBER 1	ALL GRASS-LINED DITCHES AND CHANNELS MUST BE STABILIZED WITH MULCH OR EROSION CONTROL BLANKET.
NOVEMBER 15	ALL STONE-LINED DITCHES AND CHANNELS MUST BE CONSTRUCTED AND STABILIZED. SLOPES THAT ARE COVERED WITH RIPRAP MUST BE CONSTRUCTED BY THAT DATE.
DECEMBER 1	ALL DISTURBED AREAS WHERE THE GROWTH OF VEGETATION FAILS TO BE AT LEAST THREE INCHES TALL OR AT LEAST 75% OF THE DISTURBED SOIL IS COVERED BY VEGETATION, MUST BE PROTECTED FOR OVER-WINTER.

1. WINTER CONSTRUCTION PERIOD DEFINED: NOVEMBER 1 THROUGH APRIL 15
2. WINTER EXCAVATION AND EARTHWORK SHALL BE DONE SUCH THAT NO MORE THAN 1 ACRE OF THE SITE IS WITHOUT STABILIZATION AT ANY ONE TIME.
3. EXPOSED AREA SHOULD BE LIMITED SUCH THAT THE AREA CAN BE MULCHED IN ONE DAY PRIOR TO ANY SNOW EVENT.
4. CONTINUATION OF EARTHWORK OPERATIONS ON ADDITIONAL AREAS SHALL NOT BEGIN UNTIL THE EXPOSED SOIL SURFACE ON THE AREA BEING WORKED HAS BEEN STABILIZED SUCH THAT NO LARGER AREA OF THE SITE IS WITHOUT EROSION CONTROL PROTECTION AS LISTED IN ITEM 2 ABOVE.
5. AN AREA SHALL BE CONSIDERED TO HAVE BEEN STABILIZED WHEN EXPOSED SURFACES HAVE BEEN EITHER MULCHED WITH STRAW AT A RATE OF 100 LB. PER 1,000 SQUARE FEET (WITH OR WITHOUT SEEDING) OR PERMANENTLY SEEDED, MULCHED AND ADEQUATELY ANCHORED BY AN APPROVED ANCHORING TECHNIQUE. IN ALL CASES, MULCH SHALL BE APPLIED SUCH THAT SOIL SURFACE IS NOT VISIBLE THROUGH THE MULCH.
6. BETWEEN THE DATES OF OCTOBER 15 AND APRIL 15T, LOAM OR SEED WILL NOT BE REQUIRED. DURING PERIODS OF ABOVE-FREEZING TEMPERATURES, THE SLOPES SHALL BE FINE GRADED AND EITHER PROTECTED WITH MULCH OR TEMPORARILY SEEDED AND MULCHED UNTIL SUCH TIME AS THE FINAL TREATMENT CAN BE APPLIED. IF THE DATE IS AFTER NOVEMBER 15T AND IF THE EXPOSED AREA HAS BEEN LOAMED, FINAL GRADED AND IS SMOOTH, THEN THE AREA MUST BE STABILIZED WITH MULCH. IF CONSTRUCTION CONTINUES DURING FREEZING WEATHER, ALL EXPOSED AREAS SHALL BE GRADED BEFORE FREEZING AND THE SURFACE TEMPORARILY PROTECTED FROM EROSION BY THE APPLICATION OF MULCH. SLOPES SHALL NOT BE LEFT EXPOSED OVER THE WINTER OR ANY OTHER EXTENDED TIME OF WORK SUSPENSION UNLESS TREATED IN THE ABOVE MANNER. UNTIL SUCH TIME AS WEATHER CONDITIONS ALLOW DITCHES TO BE FINISHED WITH THE PERMANENT SURFACE TREATMENT. EROSION SHALL BE CONTROLLED BY THE INSTALLATION OF BALES OF HAY OR STONE CHECK DAMS IN ACCORDANCE WITH THE STANDARD DETAILS.
7. THE APPLICATION OF MULCH TO FINE GRADED AREAS WILL BE STABILIZED AS FOLLOWS:
   - A) BETWEEN THE DATES OF NOVEMBER 15T AND APRIL 15TH ALL MULCH SHALL BE ANCHORED BY EITHER PEG LINE, MULCH NETTING, ASPHALT EMULSION, CHEMICAL TACK OR WOOD CELLULOSE FIBER.
   - B) MULCH NETTING SHALL BE USED TO ANCHOR MULCH IN ALL DRAINAGE WAYS WITH A SLOPE GREATER THAN 3% FOR SLOPES EXPOSED TO DIRECT WINDS AND FOR ALL OTHER SLOPES GRATER THAN 8%.
   - C) MULCH NETTING SHALL BE USED TO ANCHOR MULCH IN ALL AREAS WITH SLOPES GREATER THAN 15%. AFTER OCTOBER 15T, THE SAME APPLIES FOR ALL SLOPES GREATER THAN 8%.
8. AFTER NOVEMBER 15T THE CONTRACTOR SHALL APPLY MULCH AND ANCHORING ON ALL BARE EARTH AT THE END OF EACH WORKING DAY.
9. DURING WINTER CONSTRUCTION PERIODS ALL SNOW SHALL BE REMOVED FROM AREAS OF MULCHING PRIOR TO PLACEMENT.

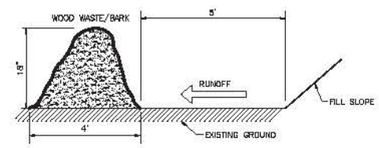
PRELIMINARY FOR REVIEW ONLY

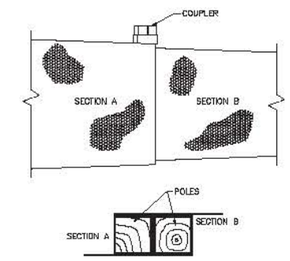
1. WETLANDS AND SURFACE WATERS (EXCEPTING THOSE WHICH ARE TO BE FILLED IN ACCORDANCE WITH STATE AND FEDERAL REGULATIONS) WILL BE PROTECTED WITH SILT FENCE INSTALLED AT THE EDGE OF THE WETLAND OR THE BOUNDARY OF WETLAND DISTURBANCE.
2. IF THE WORK INCLUDES CROSSING OF WETLANDS AND/OR STREAMS, THE CONTRACTOR SHALL TAKE SPECIAL PRECAUTIONS WORKING IN THESE AREAS
3. ANY WETLAND CROSSING WORK SHALL BE COMPLETED BETWEEN THE PERIOD OF MAY 1 AND SEPTEMBER 30
4. ALL EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO COMMENCING CONSTRUCTION WITHIN OR ADJACENT TO WETLAND AREAS.
5. WETLAND VEGETATIVE LAYERS SHALL BE REMOVED AND SALVAGED FOR RESTORATION OF THE DISTURBED AREAS.
6. STORAGE AREAS FOR WETLAND MATERIALS SHALL BE PROPERLY PROTECTED AGAINST EROSION.
7. SEEDING OF THE DISTURBED AREAS WITHIN WETLAND AREAS SHALL UTILIZE MIXTURES APPROPRIATE FOR WETLAND AREAS AS OUTLINED IN THE SPECIFICATIONS.

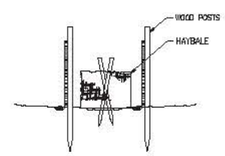


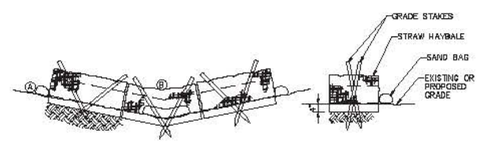


NOTE:
EMBED HAYBALES MINIMUM OF 4".

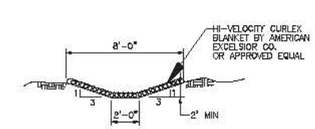


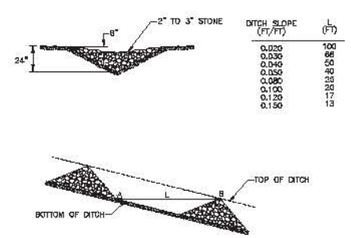




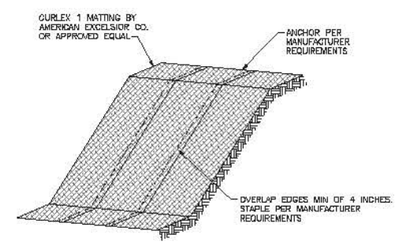


EROSION CHECK TO BE STRAW HAYBALES SECURED TO THE GROUND WITH TWO 4' LONG GRADE STAKES FOR EACH BALE. SAND BAG AS REQUIRED. PLACE SUFFICIENT BALES TO ESTABLISH ELEVATIONS AT (A) AT LEAST 6 INCHES ABOVE OVERFLOW AT (B)

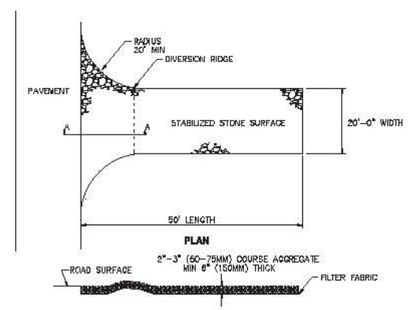




DITCH SLOPE (FT/FT)	L (FT)
0.020	100
0.030	66
0.040	50
0.050	40
0.080	25
0.100	20
0.120	17
0.150	13



INSTALL ON SLOPES 3:1 OR GREATER



SECTION A-A

(TEMPORARY, TO BE REMOVED PRIOR TO FINAL SITE PAVING)

STABILIZED CONSTRUCTION ENTRANCE

NTS

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Lighting Consultant
Available Light
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NOT FOR CONSTRUCTION

#	DATE	DESCRIPTION
4	08/03/18	ISSUED FOR LEWISTON SITE PLAN REVIEW
3	06/13/18	100% DESIGN DEVELOPMENT
2	05/18/18	90% DESIGN DEVELOPMENT
1	04/16/18	SCHEMATIC DESIGN

BATES

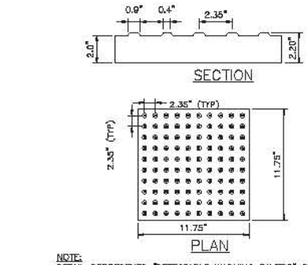
Bates College STEM Projects

EROSION CONTROL NOTES AND DETAILS

Drawing Scale	NTS
Project Number	14021A
Date Issued	7/18/2018

C7.1

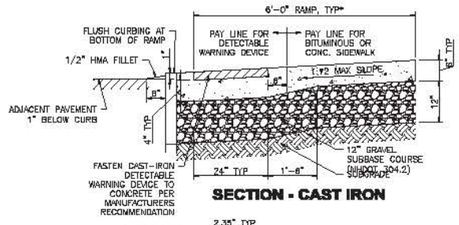
PRELIMINARY FOR REVIEW ONLY



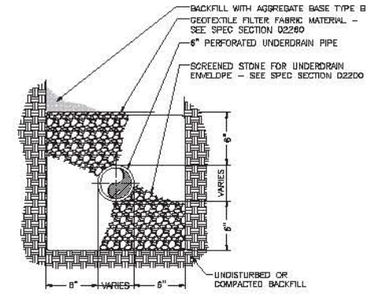
NOTE:
DETAIL REPRESENTS "DETECTABLE WARNING PAVERS" BY HANOVER. EQUIVALENT SUBSTITUTE MAY BE USED SUCH AS IT CONFORMS TO THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT (ADA).

CAST IRON HANDICAP DETECTABLE WARNING PLATE

NTS

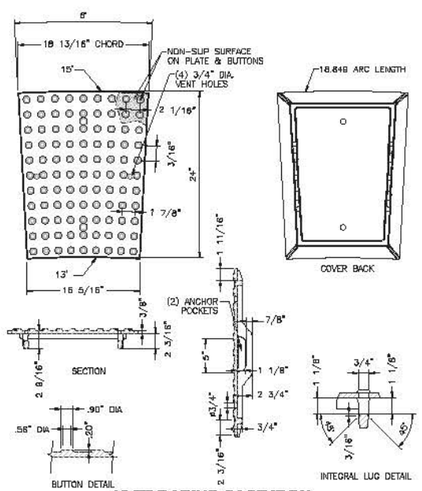


SECTION - CAST IRON



UNDERDRAIN BEDDING

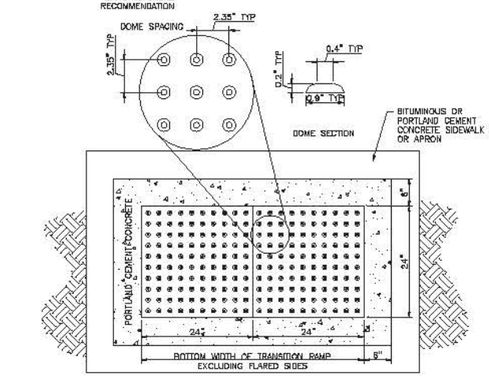
SCALE: NTS



15 FT RADIUS CAST IRON DETECTABLE WARNING PLATE

NTS

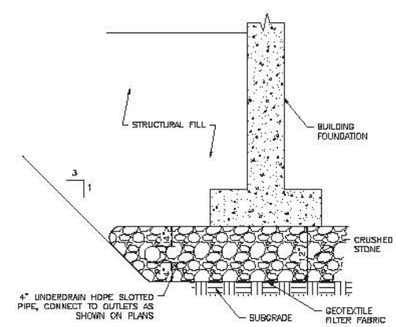
NOTES:
1. REFER TO RECTANGULAR DETECTABLE WARNING DEVICE DETAIL. THIS DRAWING FOR EMBEDMENT AND CONCRETE SURROUND DETAILS.
2. TAKES FIFTEEN (15) PLATES TO COMPLETE FULL 90° TURN.
3. DETECTABLE WARNING PLATES TO BE BEDDED IN CONCRETE.



NOTE:
1. ALL DETECTABLE WARNING DEVICES SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG). 2'x2', 2'x4' AND RADIUS DEVICES ARE ACCEPTABLE.
2. INSTALL DETECTABLE WARNING DEVICES AT ALL ROADWAYS, HIGH USE ACCESS WAYS, OR AT THE DIRECTION OF THE ENGINEER.
3. ALL DEVICES SHALL HAVE A MIN. 6" WIDTH PORTLAND CEMENT CONCRETE SURROUND REGARDLESS OF THE SURROUNDING WALK OR APRON MATERIAL.

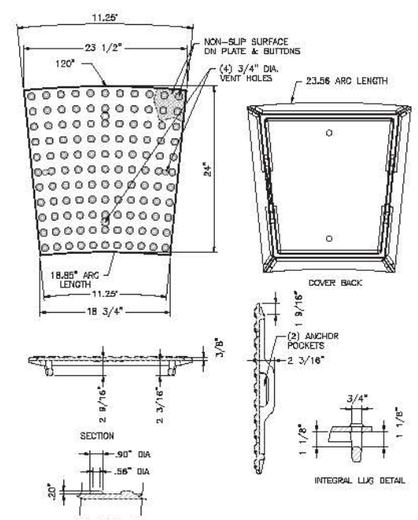
RECTANGULAR CAST IRON HANDICAP DETECTABLE WARNING DEVICE DETAIL

SCALE: NTS



FOUNDATION DRAIN DETAIL

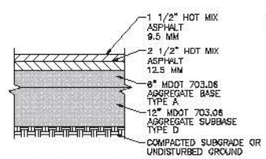
SCALE: NTS



NOTES:
1. REFER TO RECTANGULAR DETECTABLE WARNING DEVICE DETAIL. THIS DRAWING FOR EMBEDMENT AND CONCRETE SURROUND DETAILS.
2. TAKES FIFTEEN (15) PLATES TO COMPLETE FULL 90° TURN.
3. DETECTABLE WARNING PLATES TO BE BEDDED IN CONCRETE.

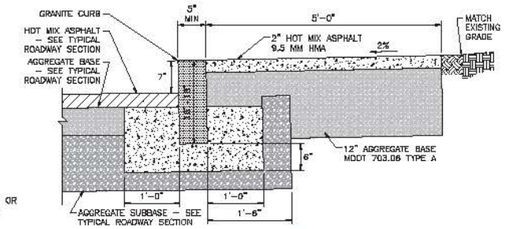
10 FT RADIUS CAST IRON DETECTABLE WARNING PLATE

NTS



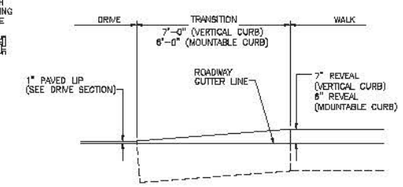
PARKING LOT PAVEMENT

SCALE: "NTS"



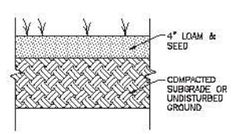
GRANITE CURB WITH BITUMINOUS SIDEWALK

SCALE: NTS



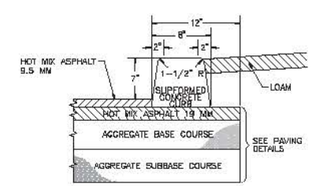
GRANITE CURBING TRANSITION AT DRIVES

NTS



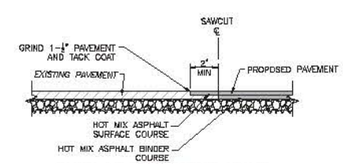
LOAM AND SEED

SCALE: NTS



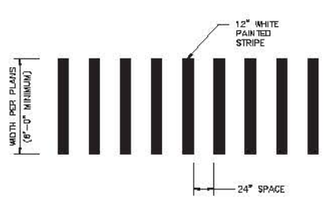
BITUMINOUS CURB

SCALE: NTS



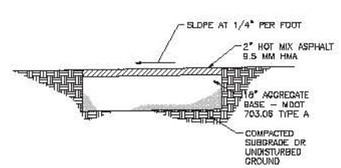
SHIPLAP PAVEMENT JOINT

SCALE: NTS



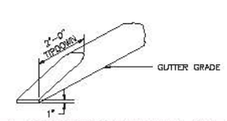
CROSSWALK LAYOUT

SCALE: NTS



BITUMINOUS SIDEWALK

SCALE: NTS



BITUMINOUS TERMINAL CURB

SCALE: NTS

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VDA
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STATE OF MAINE — JAN 9 S. WIEGMAN No. 9852 — LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

#	DATE	DESCRIPTION
5	10/12/18	RESPONSE TO COMMENTS
4	09/19/18	ISSUED FOR LEWISTON SITE PLAN REVIEW
3	06/03/18	100% DESIGN DEVELOPMENT
2	06/15/18	50% DESIGN DEVELOPMENT
1	03/16/18	SCHEMATIC DESIGN

BATES

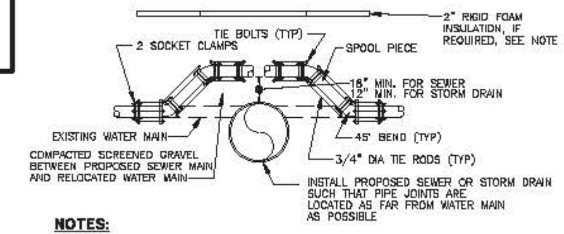
Bates College STEM Projects

CIVIL DETAILS I

Drawing Scale	NTS
Project Number	14021A
Date Issued	7/18/2018

C8.0

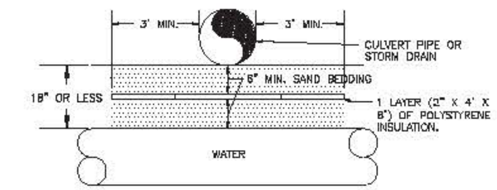
PRELIMINARY FOR REVIEW ONLY



NOTES:

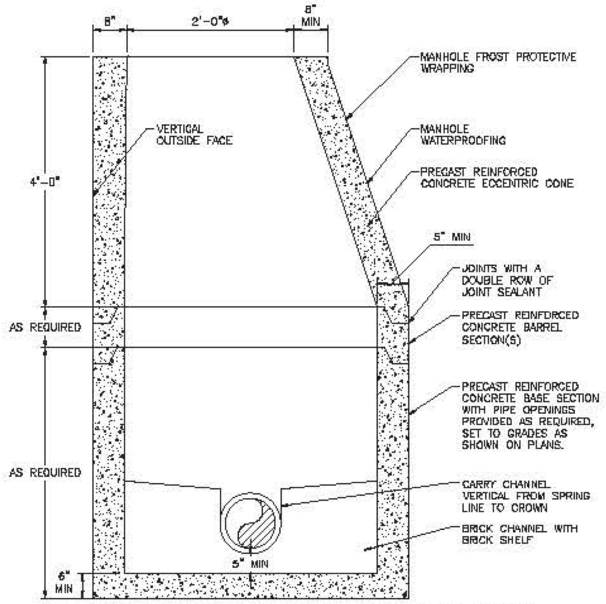
1. WATER MAIN MATERIALS TO BE CLASS 52 DUCTILE IRON. JOINT RESTRAINT TO BE BY MECHANICAL JOINT WITH MEGA-LUGS. ALL PUSH-ON JOINTS SHALL BE RESTRAINED WITH ROD CLAMPS AND TIE BOLTS.
2. TIE RODS, TIE BOLTS, SOCKET CLAMPS AND BRIDLES SHALL BE COATED WITH A BITUMINOUS PAINT AFTER ASSEMBLY OR IF NECESSARY PRIOR TO ASSEMBLY.
3. TIE RODS: 10" DIA WATER MAIN OR LARGER – 4 REQUIRED. 8" DIA WATER MAIN OR SMALLER – 2 REQUIRED.
4. EXISTING WATER MAINS TO BE RELOCATED OVER NEW SEWERS WHEREVER SUFFICIENT GROUND COVER EXISTS (6' MINIMUM COVER). IF SUFFICIENT COVER IS NOT AVAILABLE, A SINGLE LAYER OF 2" RIGID FOAM INSULATION SHALL BE INSTALLED.
5. WATER MAINS OR SERVICES WITHIN 4 FEET HORIZONTALLY OR 18 INCHES VERTICALLY OF ANY CULVERT OR STORM DRAIN PIPE SHALL HAVE INSULATION, SEE CULVERT/STORM DRAIN CROSSING DETAIL

WATER MAIN RELOCATION DETAIL
NTS



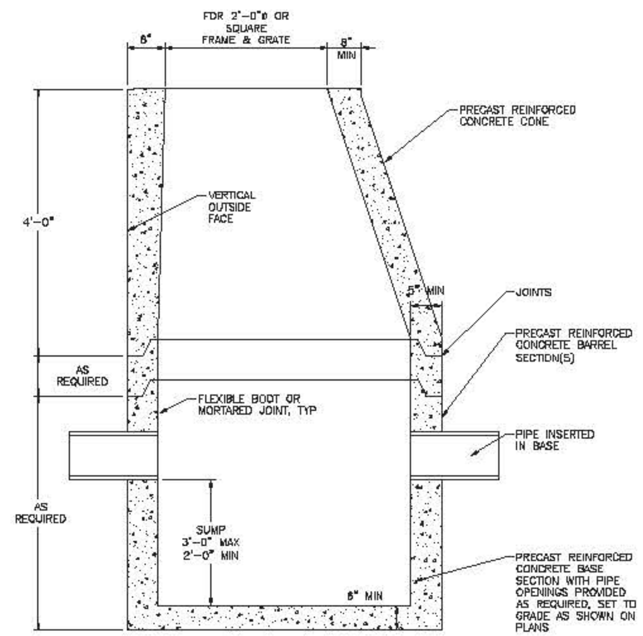
CULVERT/STORM DRAIN CROSSING DETAIL
NTS

NOTES:
1. INSULATION TO BE USED WHERE VERTICAL OR HORIZONTAL PIPE SEPARATION IS 18" OR LESS.
2. WATER MAINS OR SERVICES WITHIN 4 FEET HORIZONTALLY OF ANY CULVERT OR STORM DRAIN PIPE SHALL HAVE INSULATION.



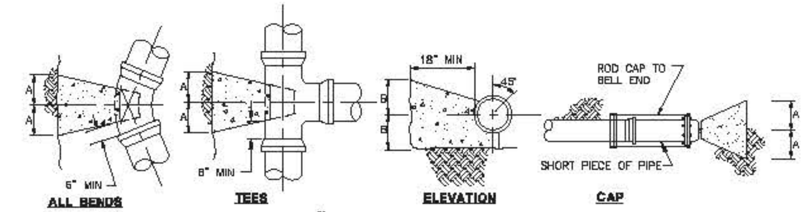
NOTES:
1. MANHOLE CHANNELS REQUIRING A CHANGE IN DIRECTION ARE TO BE BUILT ON A SMOOTH CURVE OF THE LONGEST POSSIBLE RADIUS. IF SIDE PIPES ENTER CHANNEL, SHAPE TO RECEIVE ADDED SIDE FLOW.
2. USE A FLAT SLAB TOP MANHOLE WHEN THE HEIGHT DIFFERENCE BETWEEN THE HIGHEST INVERT AND RIM IS LESS THAN 6'-0" AND WHEN MANHOLE DIAMETER IS GREATER THAN 4'-0".

TYPICAL 4-FT MANHOLE
SCALE: "NTS"

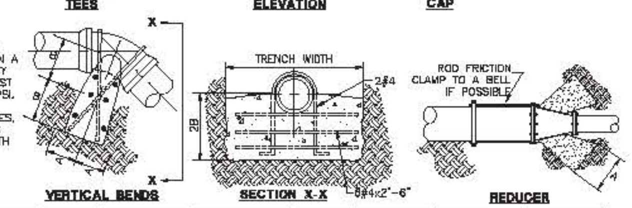


NOTE: USE FLAT SLAB TOP CATCH BASIN WHERE REQUIRED TO MATCH GRADE

4-FT CATCH BASIN
SCALE: NTS



NOTES
1. THRUST BLOCK SIZES SHOWN ARE BASED ON A SOIL BEARING CAPACITY OF 2000 PSF AND TEST PRESSURES OF 180 PSI.
2. ALL BENDS, TEES, WYES, HYDS. & DEAD ENDS SHALL BE BRACED WITH CONCRETE THRUST BLOCKS.
3. RODDING MAY BE REQUIRED



PIPE SIZE	90° BEND		45° BEND		22 1/2° BEND		11 1/4° BEND		TEE		VERTICAL BEND (DOWN)		PLUG		REDUCER	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
4"	15"	12"	12"	9"	9"	6"	6"	6"	12"	12"	24"	21"	12"	12"	12"	12"
6"	15"	12"	12"	9"	9"	6"	6"	6"	12"	12"	24"	21"	12"	12"	12"	12"
8"	20"	15"	14"	12"	9"	9"	9"	6"	18"	12"	33"	24"	14"	14"	18"	12"
10"	21"	21"	18"	15"	15"	9"	9"	9"	20"	16"	40"	27"	16"	16"	20"	18"
12"	27"	24"	23"	15"	15"	12"	12"	9"	25"	16"	48"	30"	18"	16"	25"	18"
16"	37"	30"	30"	21"	21"	15"	13"	12"	32"	24"	57"	38"	22"	22"	32"	24"

THRUST BLOCKS
NTS

TABLE I

SPECIFICATIONS FOR LOAMY COARSE SAND	
SIEVE #	% PASSING BY WEIGHT
10	85–100
20	70–100
60	15–40
200	8–15
200 CLAY SIZE	< 2.0

TABLE II

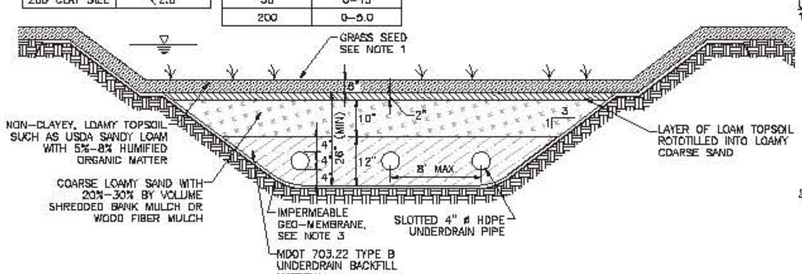
MDOT 703.22 TYPE B UNDERDRAIN BACKFILL	
SIEVE #	% PASSING BY WEIGHT
1"	95–100
0.5"	75–100
4	50–100
20	15–80
50	0–15
200	0–5.0

TABLE III

SEED MIXTURE	
CREEPING RED FESUCE	20 LBS/ACRE (0.5 LBS/1,000 S.F.)
TALL FESCUE	20 LBS/ACRE (0.5 LBS/1,000 S.F.)
BIRDSFOOT TREFOIL	8 LBS/ACRE (0.2 LBS/1,000 S.F.)

UNDERDRAIN SOIL FILTER TABLE

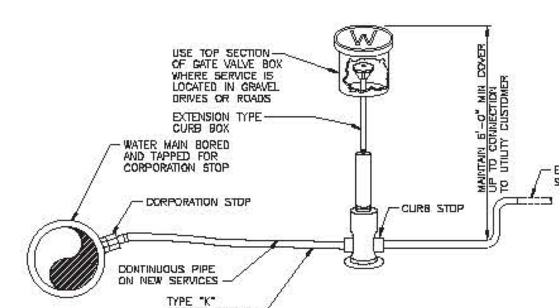
(A) SOIL FILTER REFERENCE	(B) ELEVATION OF SOIL FILTER	(C) OVERFLOW SPILLWAY ELEVATION	(D) RIM ELEVATION OUTLET STRUCTURE	(E) UNDERDRAIN INVERT ELVATION	MIN SURFACE AREA AT SOIL FILTER ELEVATION (SF)
USF A	229.0	230.75	230.5	226.8	1,790



NOTES:
1. GRASS SEED MIXTURE SHALL BE DROUGHT TOLERANT CONSERVATION MIX.
2. PLACE FILTER MEDIA AND LOAM TOPSOIL ONLY AFTER SITE HAS BEEN STABILIZED.
3. IMPERMEABLE GEO–MEMBRANE SHALL BE 4 LORE, PVC OR HDPE IMPERMEABLE LINER OF AT LEAST 20 MIL. THICKNESS.
4. UNDERDRAIN PIPE SHALL SLOPE AT 0.0050 MIN. (SEE DRAWING C5.0)

UNDERDRAIN SOIL FILTER CONSTRUCTION
NTS

UNDERDRAIN CONSTRUCTION, TESTING AND SUBMITTAL NOTES:
1. CONSTRUCTION OVERSIGHT: INSPECTION OF THE FILTER BASIN MUST BE PROVIDED FOR EACH PHASE OF CONSTRUCTION BY THE DESIGN ENGINEER WITH REQUIRED REPORTING TO THE DEP. ALL MATERIAL INTENDED FOR THE FILTER BASIN MUST BE APPROVED BY THE DESIGN ENGINEER AFTER TESTS BY A CERTIFIED LABORATORY SHOW THAT THE MATERIAL CONFORMS TO ALL DEP SPECIFICATIONS. AT A MINIMUM, INSPECTIONS WILL OCCUR:
   1.1. AFTER THE PRELIMINARY CONSTRUCTION OF THE FILTER GRADES AND ONCE THE UNDERDRAIN PIPES ARE INSTALLED (NOT BACKFILLED);
   1.2. AFTER THE DRAINAGE LAYER IS CONSTRUCTED AND PRIOR TO THE INSTALLATION OF THE SOIL FILTER MEDIA;
   1.3. AFTER THE SOIL FILTER MEDIA HAS BEEN INSTALLED, SEEDED AND MULCHED; AND
   1.4. AFTER ONE YEAR, TO INSPECT VEGETATION AND MAKE CORRECTIONS.
2. TESTING AND SUBMITTALS: THE SOURCE OF EACH COMPONENT OF THE SOIL FILTER MEDIA NEEDS TO BE IDENTIFIED PRIOR TO CONSTRUCTION. ALL RESULTS OF FIELD AND LABORATORY TESTING MUST BE SUBMITTED TO THE DEP FOR APPROVAL.
   2.1. MEDIA SOURCE: SAMPLES OF EACH TYPE OF MATERIAL SHOULD BE BLENDED FOR THE MIXED FILTER MEDIA AND
   2.2. UNDERDRAIN BEDDING MATERIAL. SAMPLES MUST BE A COMPOSITE OF THREE DIFFERENT LOCATIONS (GRABS) FROM
   2.3. THE STOCKPILE OR PIT FACE. SAMPLE SIZE REQUIREMENTS WILL BE DETERMINED BY THE TESTING LABORATORY.
   2.4. SIEVE ANALYSIS: A SIEVE ANALYSIS CONFORMING TO ASTM C136 SHOULD BE PERFORMED ON EACH TYPE OF THE SAMPLE MATERIAL.
   2.5. PERMEABILITY TESTING: TESTING THE PERMEABILITY OF THE SOIL FILTER MEDIA MIXTURE IS RECOMMENDED WITH THE MIXTURE AT A MEASURED BULK DRY DENSITY OF 90–92% BASED ON ASTM D698."



NOTES:
1. WATER SERVICE CONNECTIONS TO BE 1" DIAMETER UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
2. WATER MAINS OR SERVICES WITHIN 5 FEET HORIZONTALLY OR 4 FEET VERTICALLY OF ANY CULVERT OR STORM DRAIN PIPE SHALL HAVE INSULATION. SEE CULVERT/STORM DRAIN CROSSING DETAIL.

WATER SERVICE CONNECTION
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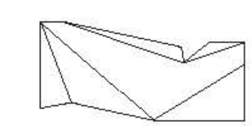
4	08/03/18	ISSUED FOR LEWISTON SITE PLAN REVIEW
3	08/03/18	100% DESIGN DEVELOPMENT
2	06/13/18	50% DESIGN DEVELOPMENT
1	03/16/18	SCHEMATIC DESIGN



BATES

Bates College STEM Projects

CIVIL DETAILS II

Drawing Scale: NTS
Project Number: 14021A
Date Issued: 7/13/2018

C8.1

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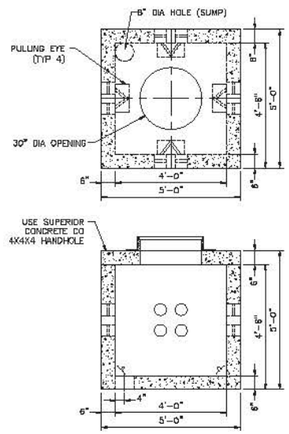
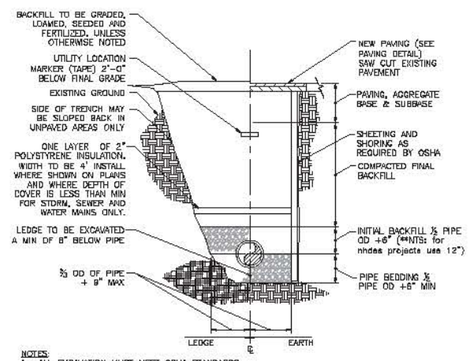
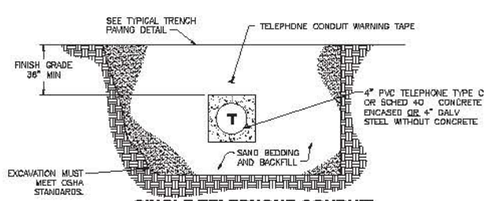


4x4x4 HANDHOLE
SCALE: NTS

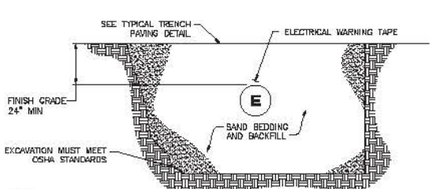


NOTES:
1. ALL EXCAVATION MUST MEET OSHA STANDARDS.
2. INSTALL 3 FOOT LONG IMPERMIOUS MATERIAL DAM IN BEDDING/INITIAL BACKFILL MATERIAL EVERY 100' AND WHERE SHOWN ON PLANS TO PREVENT TRENCH GROUNDWATER FROM BEING CHANNELED ALONG BEDDING/INITIAL BACKFILL.
3. SEE SPECIFICATIONS FOR BEDDING AND BACKFILL REQUIREMENTS.

PIPE TRENCH DETAIL
SCALE: NTS

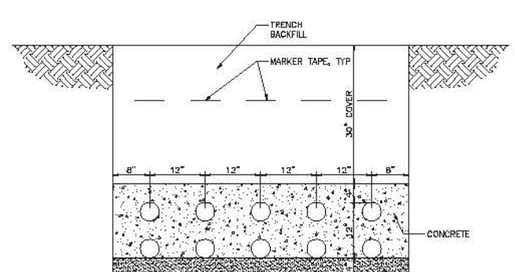


SINGLE TELEPHONE CONDUIT TRENCH SECTION
SCALE: NTS

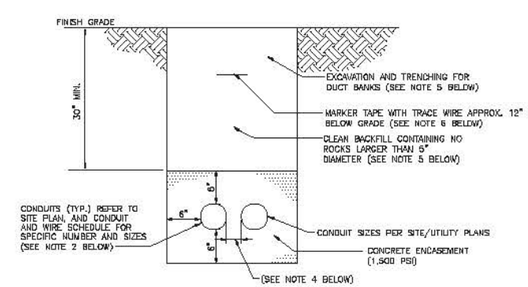


NOTES:
1. ALL CONDUITS TO BE 1½"ø PVC OR STEEL MEETING THE REQUIREMENTS OF THE NEC.
2. CONCRETE ENCASE CONDUITS UNDER STREETS AND WHERE REQUIRED AS NOTED IN THE SPECIFICATIONS.

SINGLE ELECTRICAL CONDUIT TRENCH SECTION
SCALE: NTS



ELECTRICAL SECONDARY CONDUIT TRENCH
SCALE: NTS



COMMUNICATIONS DUCT BANK DETAIL SEE NOTE 3 BELOW
(REFER TO NOTES BELOW FOR ADDITIONAL REQUIREMENTS)
NTS

NOTES: (DUCT BANK DETAIL)
1. DIMENSIONS TYPICAL FOR ALL DUCT BANKS, UNLESS OTHERWISE NOTED.
2. FOR CONDUIT DETAILS, SEE CONDUIT AND WIRE SCHEDULES. REFERENCES C2.2 DENOTES CONDUIT NUMBERS. REFER TO SPECIFIC DUCT BANK SECTIONS AND CONDUIT AND WIRE SCHEDULES FOR DETAILS.
3. THIS TYPICAL DUCT BANK SECTION HAS BEEN SHOWN AS AN EXAMPLE OF THE REQUIREMENTS FOR THE UNDERGROUND INSTALLATION FOR THE DUCT BANK SYSTEM. THIS DENOTES SPECIFIC SPACING, CONCRETE ENCASEMENT REQUIRED FOR DUCT BANK INSTALLATIONS.
4. IT SHALL BE REQUIRED THAT A MINIMUM OF 1'-6" CLEARANCE BE PROVIDED AT ALL TIMES BETWEEN ALL POWER CONDUITS AND ALL SIGNAL AND/OR CONTROL CONDUITS IN ORDER TO AVOID ANY ELECTRICAL NOISE INTERFERENCE WITH THE CABLES OR WIRES WITHIN THESE SIGNAL AND CONTROL CONDUITS.
5. EXCAVATION, TRENCHING AND BACKFILLING SHALL BE FURNISHED AND INSTALLED UNDER DIVISION 31 OF THIS CONTRACT.
6. INSTALL MARKER TAPE WITH TRACE WIRE THE ENTIRE LENGTH OF EACH DUCT BANK.

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BATES

Bates College STEM Projects

CIVIL DETAILS III

Drawing Scale
NTS

Project Number
14021A

Date Issued
7/12/2018

C8.2

ATTACHMENT 2

Landscape Plan

SECTION 2

LANDSCAPE

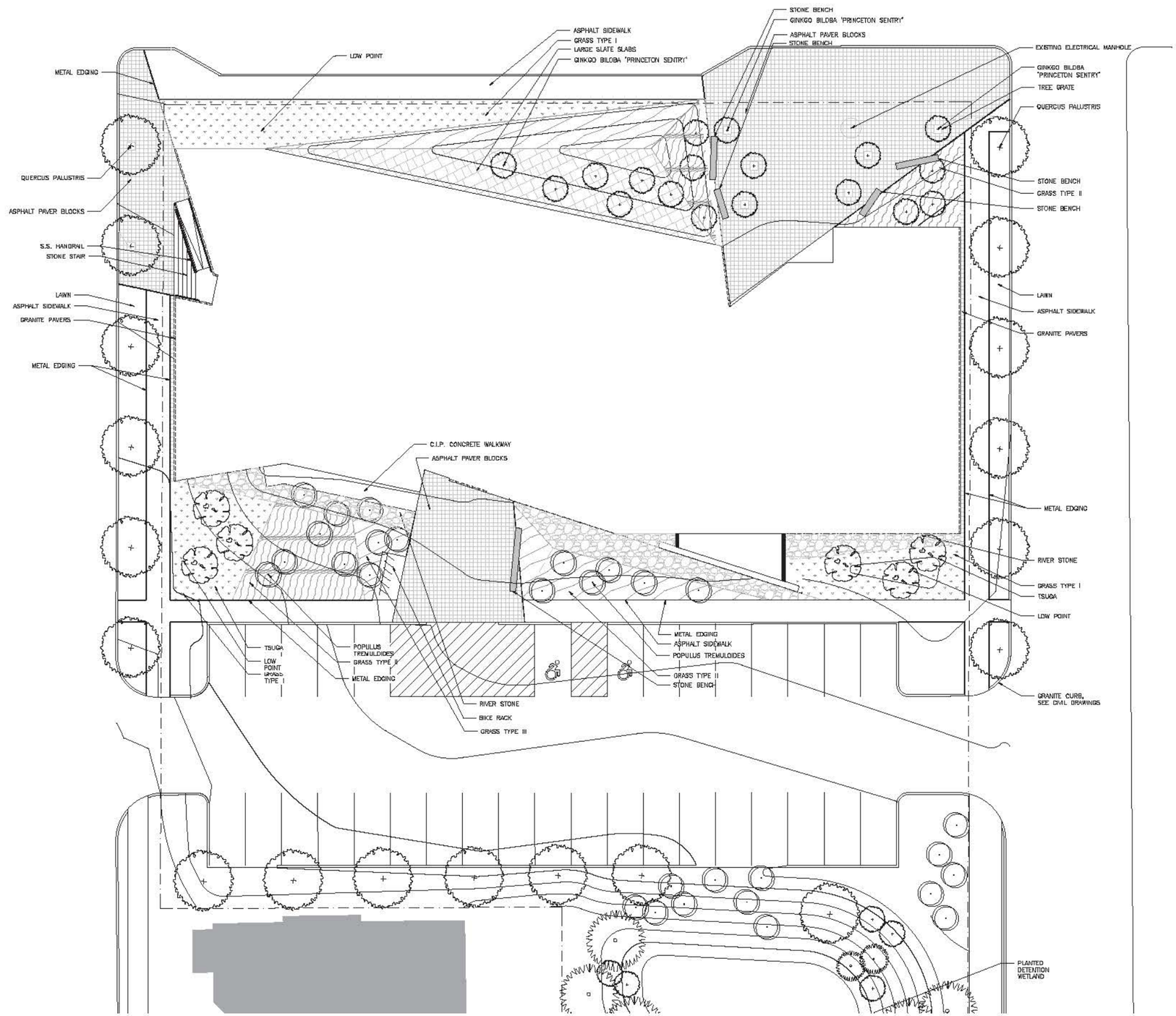
1.0

A. Narrative

The project is located in a developed urban residential/institutional area. The buildings across Campus Avenue from the site are academic buildings, the building across Bardwell Street is a residence hall and the buildings across Nichols Street are administrative buildings for the College. The building adjacent to the site on the south side of the property is a residential structure owned by the College.

The plan proposes to add landscaping along new esplanades on Bardwell and Nichols Streets. The landscaping will consist of street trees (Pin Oaks) at a 30' spacing. These trees will be within the City right-of-way. On Campus Avenue the entire right of way is taken up with on-street parking and sidewalk space. The Campus Avenue frontage will feature a vertical terrain earth feature with grasses and Ginko trees in the landscape and in the entrance patio in tree wells.

The area between the new parking lot and the building will be planted with a mixture of trees and shrubs to provide screening of the building. American Ash trees will be planted along the edge of the parking lot and the residential structure south of the parking lot. The under drained soil filter will have perimeter landscaping to screen the grassed filter. Existing vegetation in the vacant lot to the south of the site will remain vegetated with a mixture of trees and shrubs.



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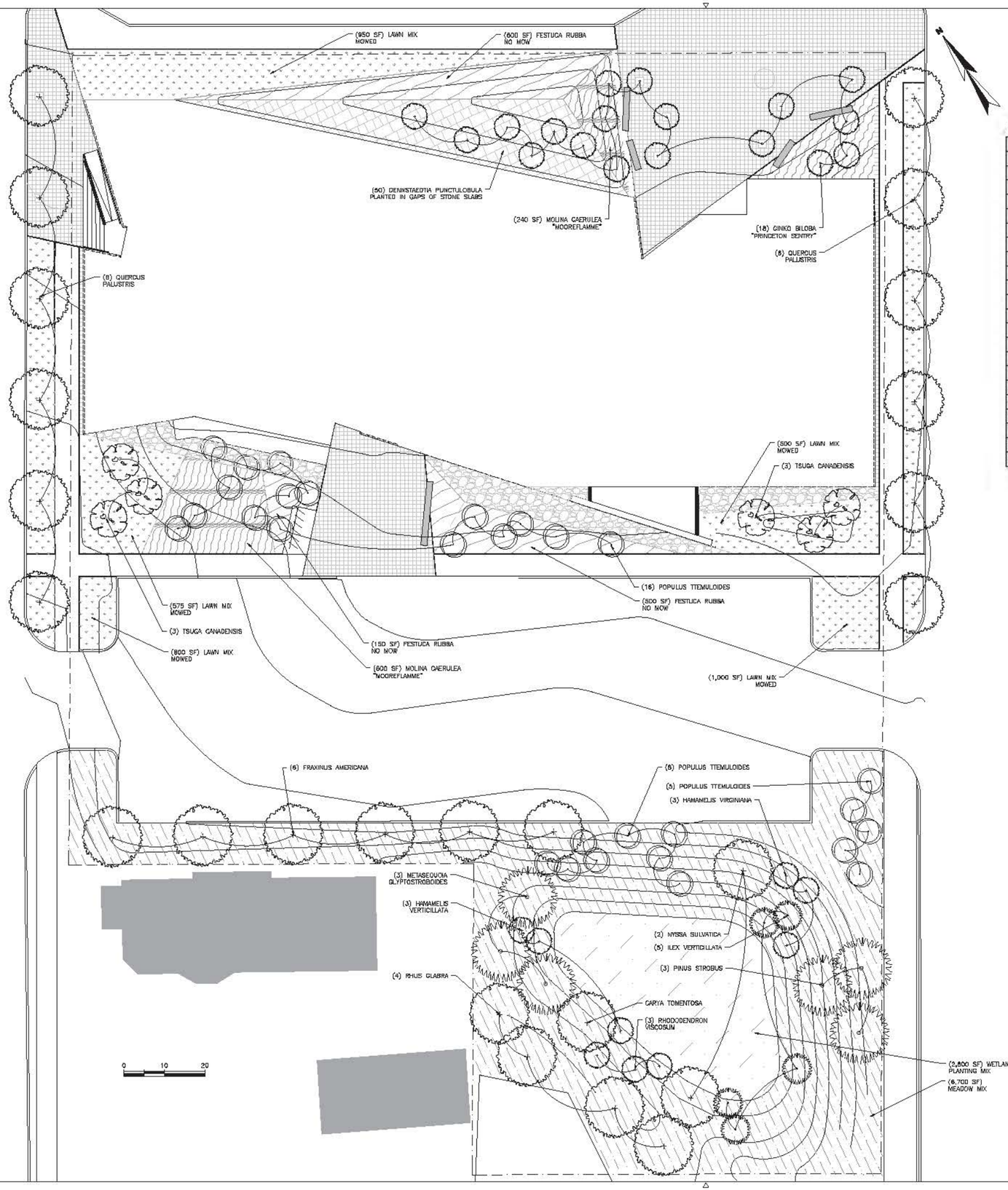
MATERIALS MANAGEMENT PLAN

Drawing Scale	1"=127-0"
Project Number	14031A
Date Issued	08/2016

L1.0



PLANT SCHEDULE (NORTH)

QTY	KEY	BOTANICAL NAME	COMMON NAME	SIZE	NOTES
TREES					
1	---	CARYA TOMENTOSA	MOCKERNUT HICKORY	6"HT	---
18	---	GINKO BILOBA "PRINCETON SENTRY"	PRINCETON SENTRY GINCKO	#11	---
6	---	FRAXINUS AMERICANA	AMERICAN ASH	2.5"CAL	---
3	---	METASEQUOIA GLYPTOSTROBOIDES	DAWN REDWOOD	2.5"CAL	---
2	---	NYSSA SYLVATICA	BLACK GUM	#9	---
3	---	PINUS STROBUS	EASTERN WHITE PINE	6"HT	---
29	---	POPULUS TREMULOIDES	QUAKING ASPEN	#9	---
12	---	QUERCUS PALUSTRIS	PIN OAK	2.5"CAL	---
4	---	RHUS GLABRA	SMOOTH SUMAC	2.5"CAL	---
6	---	TSUGA CANADENSIS	EASTERN HICKORY	#9	---
SHRUBS					
5	---	HAMAMELIS VIRGINIANA	COMMON WITCH HAZEL	#7	---
5	---	ILEX VERTICILLATA	COMMON WINTERBERRY	#7	---
3	---	RHODODENDRON VISCOSUM	SWAMP AZALEA	#7	---
GRASSES AND FERNS					
3800sf	---	---	LAWN SEED MIX	SEED	---
6700sf	---	---	MEADOW MIX	SEED	---
2800sf	---	---	WETLAND PLANTING MIX	#1	---
50	---	DENNSTAEDTIA PUNCTILOBULA	HAY-SCENTED FERN	#1	---
1250sf	---	FESTUCA RUBRA	NO MOW RED FESCUE	#1	---
840sf	---	MOLINA CAERULEA "MOORFLAMME"	MOOR FLAME GRASS	#1	---

LAWN SEED MIX

MEADOW MIX

NO MOW FESTUCA RUBRA

WETLAND PLANTING MIX

MOLINA CAERULEA "MOORFLAMME"

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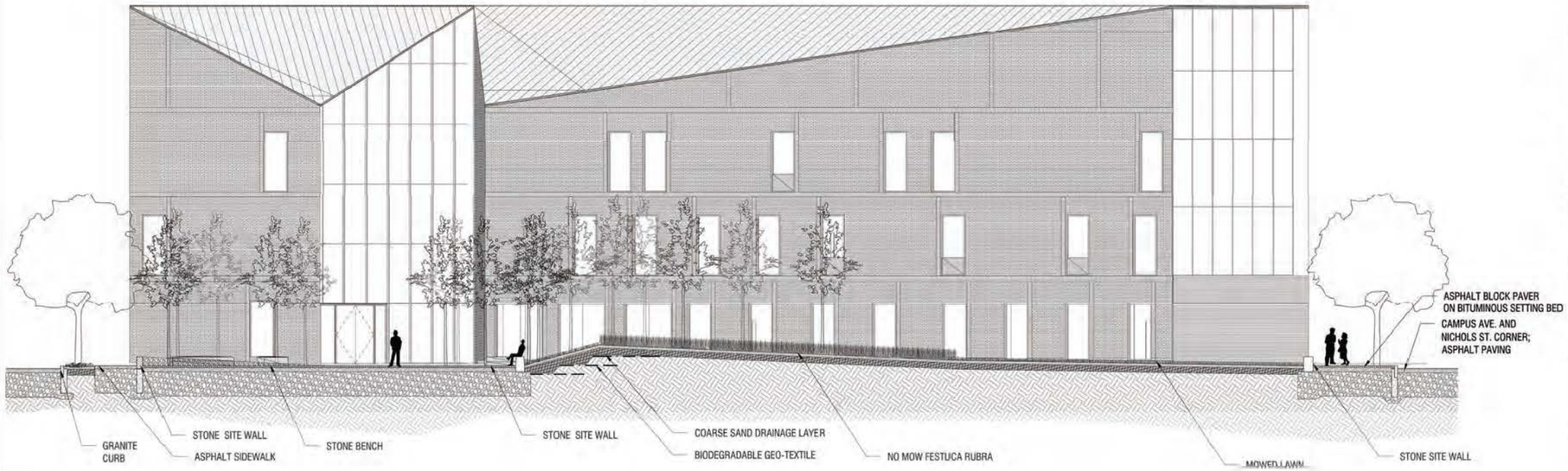
PLANTING PLAN

Drawing Scale
1"=10'-0"

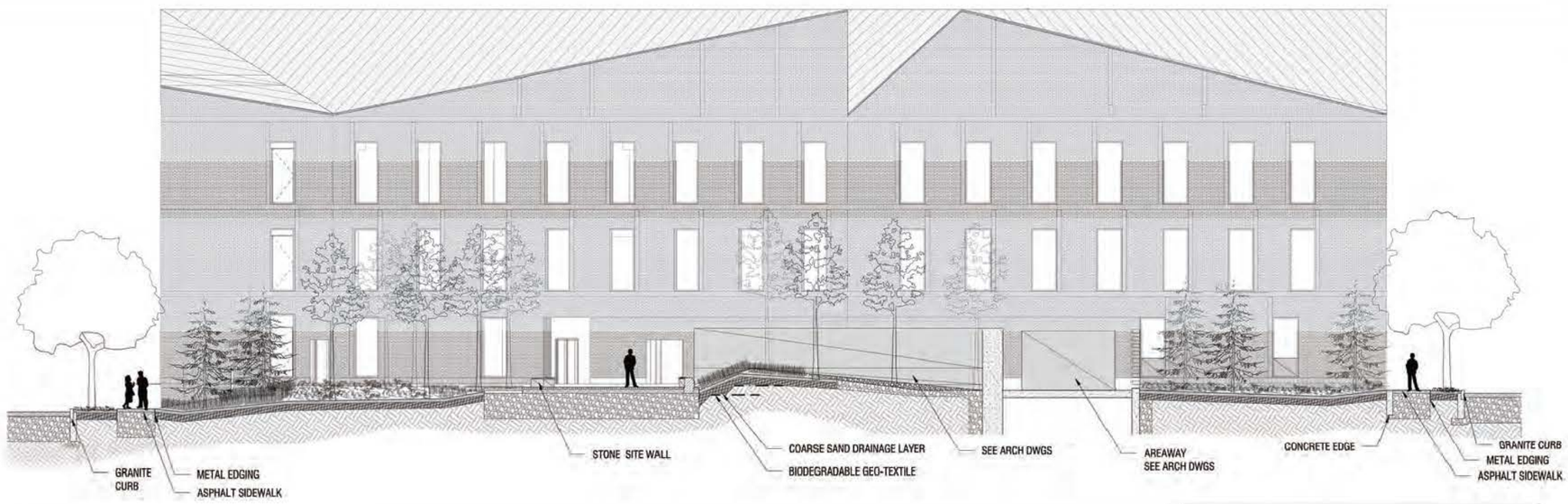
Project Number
14031A

Date Issued
8/3/2016

L2.0



2 SITE SECTION
SCALE 1/8"=1'-0"



1 SITE SECTION
SCALE 1/8"=1'-0"

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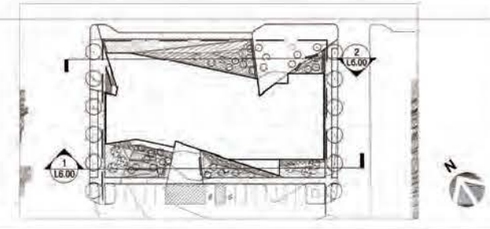

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BATES

Bates College STEM Projects

SITE SECTIONS

Drawing Scale
1/8"=1'-0"

Project Number
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Date Issued
8/3/2018

L3.0

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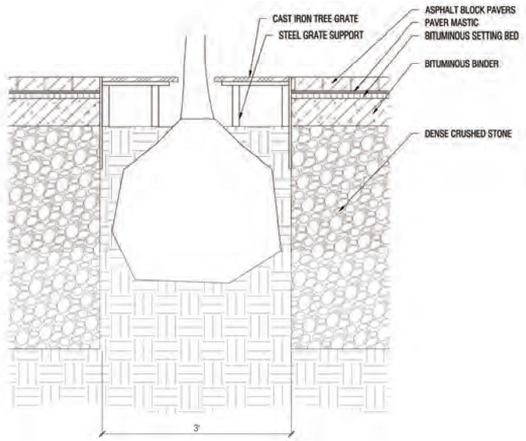

TREE GRATE DETAIL
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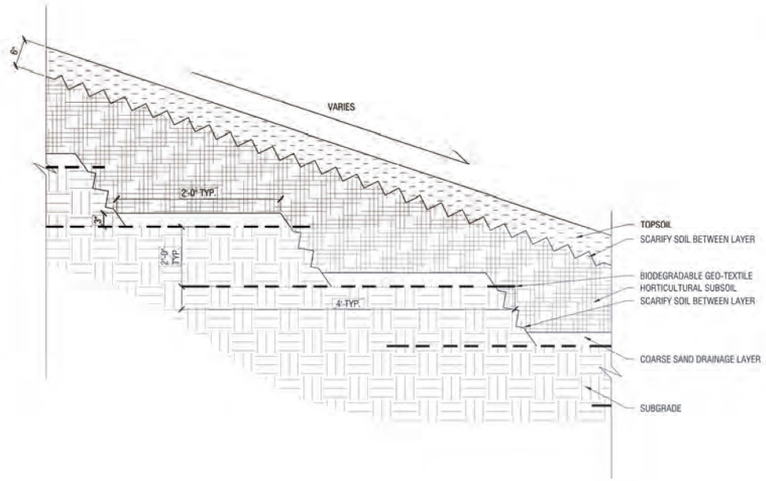

STABILIZED VEGETATED SLOPE SOIL DETAIL
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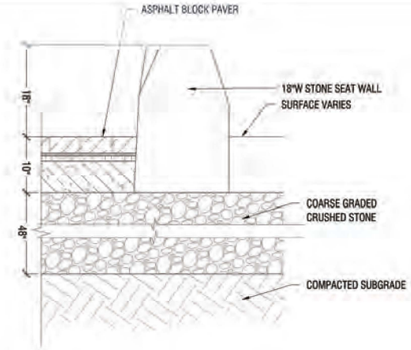
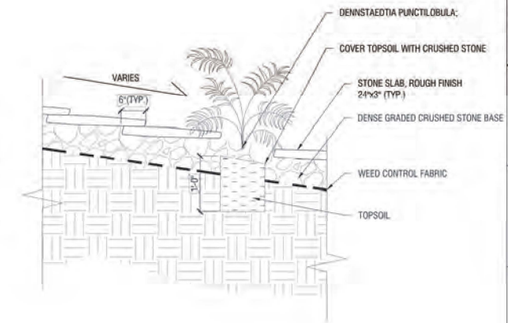
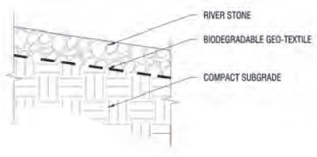


STONE SEAT WALL
SCALE: NTS



STONE SLABS AT SLOPE WITH PLANTING
SCALE: NTS



RIVER STONE AT SLOPE
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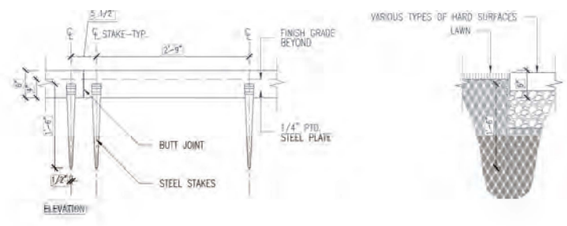

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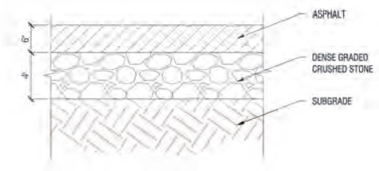
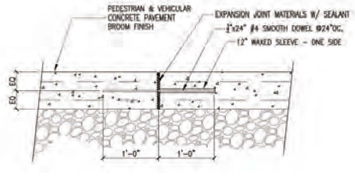
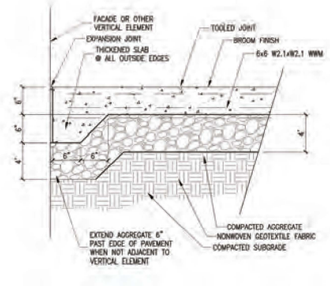


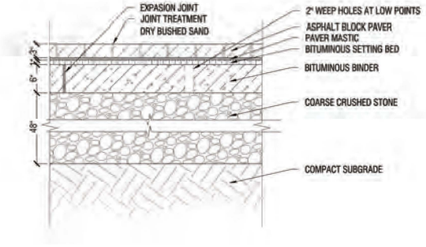
PEDESTRIAN ASPHALT PAVING
SCALE: NTS



EXPANSION JOINT
SCALE: NTS



PEDESTRIAN C.I.P. CONCRETE PAVING
SCALE: NTS



ASPHALT PAVER BLOCK DETAIL
SCALE: NTS

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#	DATE	DESCRIPTION
4	08/03/18	ISSUED FOR LEWISTON SITE PLAN REVIEW

BATES
Bates College STEM Projects

SITE DETAILS

Drawing Scale
1"=10'-0"

Project Number
14021A

Date Issued
[illegible]

L4.0

ATTACHMENT 3

Stormwater & Erosion Control Plan

SECTION 3

STORMWATER MANAGEMENT

3.0 Stormwater Management (Flooding and General Standards)

A. Narrative

The project is located in a developed residential neighborhood with lots sizes ranging from 1/8 acre to ½ acre. The site encompasses one block and is bounded by public streets on three sides, with residential-style buildings in the rear of the facility. The City of Lewiston has a separated storm drain within the project area that the proposed development will be discharging into.

The project's private stormwater infrastructure will be constructed to collect and treat stormwater for quality treatment, and to then control the runoff rate for certain interval rain events to the stormwater to the City's separated storm drainage system. The treatment system consists of one grassed underdrained soil filter (GUSF) for quality treatment. The overflow for the GUSF has been sized to allow for additional stormwater detention in extreme rain events.

B. Maps

The project boundaries are delineated on the attached Project Location Map which is a copy of the "Lewiston, ME" USGS 7½ minute quadrangle map.

A soils map entitled "Soil Map – Androscoggin and Sagadahoc Counties, Maine, (Bates College – Proposed Student Housing)", obtained from the NRCS Web Soil Survey is attached to this section.

C. Drainage Plans

Reference is made to the attached Pre-Development and Post-Development Drainage Plans which are included in this section.

D. Runoff Analysis

The proposed development was evaluated for stormwater quality requirements in accordance with the MaineDEP's redevelopment standard. Discussion on this is incorporated in the attached Stormwater Management Report.

A Runoff Analysis developed using HydroCAD version 10.0 software was performed to evaluate and quantify the stormwater runoff characteristics of the site in both the pre-development and post-development conditions. This was completed to demonstrate that the anticipated peak runoff from the site to the City's separated storm drainage system would not increase from the pre-development to the post-development condition for the 2-year, 10-year, and 25-year rain events.

Reference is made to the attached Stormwater Management Plan for the project and to Pre-Development and Post-Development Drainage Plans listed in “C. Drainage Plans”, above.

E. Flooding Standard Submissions

The Flooding Standard was evaluated for this project. See the attached Stormwater Management Plan.

See the drainage plans referenced above in paragraph “C. Drainage Plans”.

F. General Standards Submissions

The General Standards were evaluated for this project. See the attached Stormwater Management Plan.

See the drainage plans referenced above in paragraph “C. Drainage Plans”.

G. Components of the Maintenance Plan

A detailed inspection and maintenance program and corresponding checklist has been prepared and attached to “Basic Standards Submissions” of this application.

H. Maintenance by a Homeowner Association

Not Applicable.

I. Maintenance of Facilities by a Municipality or Quasi- Municipal District

The City of Lewiston maintains the public stormwater system in the streets. The on-site stormwater system will be maintained by Bates College through its own maintenance staff or by contracting the maintenance services out.

J. General Inspection and Maintenance Requirements

A detailed inspection and maintenance program and corresponding checklist has been prepared and attached to “Basic Standards Submissions” of this application.

STORMWATER MANAGEMENT PLAN

Bates College STEM Building
Campus Avenue, Nichols Street, and Bardwell Street
Lewiston, Maine

1.1 INTRODUCTION

This Stormwater Management Plan has been prepared to address the stormwater runoff impacts for stormwater quality associated with the development of the proposed STEM Building at the Bates College campus in Lewiston, Maine.

2.1 EXISTING CONDITIONS

The project site is a 67,213-square-foot (1.54 acres) set of parcels that is part of a densely-developed neighborhood comprised of a mix of college-related office buildings, and single- and multi-family residences. The project area and is generally bounded on the southeast by Bardwell Street, on the northeast by Campus Avenue, and on the northwest by Nichols Street. The existing site includes a several buildings, landscaping, walkways, underground utilities, and a parking area. The existing uses are summed in Table 1, below:

Table 1: Existing Land Use

Existing Use	Area (SF)
Ex Buildings	2,783
Ex Parking Lot	5,900
Ex driveways	1,270
Ex Landscaped	1,000
Ex grassed area	37,234
Undeveloped Area	19,026
TOTAL	**67,213**

2.1.1 Land Cover

See “2.1 Existing Conditions”, above.

2.1.2 Site Topography

The site grading is constrained by the grading of the surrounding streets. The development footprints must relate to the grades in the streets and in general the slopes on the proposed

development are gently sloping and match into the surrounding streets and property lines. In general, the existing site slopes to the south where there are currently depressions that collect a large portion of the stormwater from the site before draining into the City's storm drain system in Nichols Street. Locations on-site nearest to roadways typically slope gently towards the surrounding streets, and into the drainage systems within the surrounding streets.

2.1.3 Surface Water Features

There are no surface waters on or adjacent to the developed portion of the site. The site is not tributary to any lakes or surface waters listed as critically impaired by phosphorus.

2.1.4 Soils

See "Section 11. Soils", of this application.

3.1 PROPOSED CONDITIONS

The construction of the new building will involve the demolition of the existing buildings and paved areas, as noted in Section 2.1. The proposed conditions will redevelop the parcel through the installation of a new building, driveways, walkways, and parking areas; utility improvements; the installation of a proposed stormwater control BMP; and the re-grading and landscaping the remainder of the site. These uses are summarized in Table 2, below:

Table 2: Proposed Land Use

Proposed Use	Area (SF)
New STEM Building	15,000
Brick Frontage	1,750
Front walks	210
Parking	10,260
Back Walks	2,380
Parking Ramps	800
Landscaped Areas	3,500
Prop Trees	400
Rock/Hardscaping	2,607
Grassed	11,280
Undeveloped	19,026
TOTAL	**67,213**

Treatment of the stormwater runoff will be achieved in part by directing runoff from the site to a grassed underdrained soil filter (GUSF). In general, the proposed drainage patterns will not be substantially altered from the existing condition, with most stormwater runoff being conveyed to the southern portion of the site, and areas adjacent to the roadways sloping gently away from the proposed building to meet roadway grade.

3.1.1 Alteration to Land Cover

In general terms, the project will be increasing the total amount of impervious surface area through incorporation of a building, parking lot, and walkways. Specific amounts of impervious and pervious surfaces in the existing and proposed conditions are noted in Section 2.1 and Section 3.1 of this report. Additional impervious surfaces will be treated through the redevelopment standard, which is later discussed in Section 4.2.3 of this report.

3.1.2 Downstream Waterbodies

Surface runoff from the development is directed into the City's storm drain system. The storm drain system discharges into the Androscoggin River, and ultimately the Atlantic Ocean.

4.1 REGULATORY REQUIREMENTS

4.1.1 City of Lewiston

The proposed project will require Development Review approval by the City of Lewiston Planning Board. According to the "Zoning and Land Use Code of the City of Lewiston, Maine," (the "Code"), "Sec. 4. Approval Criteria, (f) Stormwater Management" of Appendix A – Zoning and Land Use Code, Article XIII. Development Review and Standards, *"…All projects including one acre or more of disturbed land shall meet the requirements of this subsection 4(f) and the requirements of the Site Location of Development Law, 38 MRSA, 481--490, the Maine Stormwater Management Law, 38 M.R.S.A. Section 420-D, and regulations promulgated there under…"*.

4.1.2 Maine Department of Environmental Protection (MDEP)

The MDEP Rules Chapter 500 describes stormwater management requirements for new development and redevelopment projects which involve modification to an existing Site Location of Development Permit (SLDP). These rules describe performance standards divided into five major categories: Basic Standards, General Standards, Phosphorous Standards, Urban Impaired Stream Standards and Flooding Standards.

A. Basic Standards: As a modification of an existing SLDP, the proposed project must meet the Basic Standards.
B. General Standards: As a modification of an existing SLDP, the proposed project must meet the General Standards.
C. Phosphorous Standards: A project is subject to the phosphorous standards when it is in the watershed of a lake most at risk as identified in Chapter 502. This project is not in the watershed of a lake that is identified as being Most at Risk in Chapter 502 and therefore the project is not subject to the Phosphorous Standards.
D. Urban Impaired Stream Standard: Stormwater from this project is not tributary to an "Urban Impaired Stream" as defined by MDEP Chapter 502 and, therefore is not subject to the Urban Impaired Stream Standards.
E. Flooding Standard: As a modification of an existing SLDP, the proposed project must meet the Flooding Standard.

4.2 WATER QUALITY TREATMENT

4.2.1 General Considerations

Stormwater quality treatment for the project will be provided through a Grassed Underdrained Soil Filter (GUSF). In general, the building roof area, a majority of the parking lot area, and tributary developed areas convey surface runoff to the proposed GUSF. The treatment system and the associated contributing drainage areas are shown on the attached Post Development Stormwater Plan. The details for the treatment system are shown on the attached plan set.

4.2.2 BMP Design Considerations

A. The underdrained soil filter was designed and sized in accordance with "Section 7.1.3 General Design Criteria", of MDEP Volume III. BMP Technical Design Manual:

   a. Treatment Volume - A grassed underdrained soil filter (USF) must detain and filter a runoff volume equal to 1.0 inch times the subcatchment's impervious area plus 0.4 inch times the subcatchment's landscaped developed area.
   b. Filter Area - The surface area of the filter must be no less than the sum of 5% of the impervious area and 2% of the landscaped area draining to the filter;
   c. Basin Size - The size of a filter bed should never exceed 3,000 sq. ft. in basin bottom area; and
   d. Peak Storage Depth of The Channel Protection Volume - May not exceed 18 inches and should be designed to drain dry within 24 to 48 hours. Additional storage may be provided to retain flood volumes, but shall not be considered treatment volume under the Quality standard.
   e. Confirmation of this sizing is provided in Table 8 of this report.

4.2.3 Required and Proposed Project Stormwater Runoff Quality Treatment

1. The proposed development is subject to the General Standard. The project classifies as Redevelopment under section 4.C.(2)(d) of the General Standards of Chapter 500. As a redevelopment, pollutant rankings are assigned to the existing and proposed surfaces of the project's disturbed area. This information has been collated in Table 3 and Table 4, below. Please note that the Undeveloped Area in Table 1 and Table 2 has been excluded from this calculation, as this area is not to be disturbed by construction activities:

Table 3: Existing Pollutant Ranking Calculation

Existing Use	Area (sf)	Pollutant Ranking	Weighted Pollutant Ranking
Ex Buildings	2783	2	0.12
Ex Parking Lot	5900	4	0.49
Ex driveways	1270	3	0.08
Ex Landscaped	1000	1	0.02
Ex grassed area	37,234	2	1.55
TOTAL	**48,187**	**-**	**2.25**

Table 4: Proposed Pollutant Ranking Calculation			
Proposed Use	**Area (Sf)**	**Pollutant Ranking**	**Weighted Pollutant Ranking**
New STEM Building	15000	*3*	0.93
Brick Frontage	1750	2	0.07
Front walks	210	2	0.01
Parking	10260	*4*	0.85
Back Walks	2380	2	0.10
Parking Ramps	800	*4*	0.07
Landscaped Areas	3500	1	0.07
Prop Trees	400	1	0.01
Rock/Hardscaping	2607	2	0.11
Grassed	11,280	2	0.47
TOTAL	**48,187**	**-**	**2.69**

2. The pollutant ranking increases from 2.25 to 2.69 from the existing condition to the proposed condition. Therefore, 60% of the proposed site's disturbed area needs to be treated for water quality measures under 4.C.(2)(d)(i)e. Table 5, below, shows this calculation:

Table 5: Treated Area Calculation		
Total Disturbed Area	48,187	SF
60% of Area	28,912	SF
Treated Area	***34,486***	*SF*

3. Priority for treatment must be given to areas with the highest pollutant ranking which, for this site, is the parking lot and building roof. A vegetated soil filter (Grassed Underdrained Soil Filter (GUSF)) was incorporated to treat this area. The area being conveyed to the GUSF is noted as 34,486 SF, and calculations for priority Pollutant Source Rankings treated by the GUSF are indicated below as Table 6 and Table 7:

Table 6: Pollutant Source Ranking "4"			
Pollutant Source	**Total Area (SF)**	**Treated Area (SF)**	**Percentage**
Parking Lot Area	10,260	8,955	87%
Parking Ramps	800	450	56%
TOTAL	11,060	9,405	**85%**

Table 7: Pollutant Source Ranking "3"			
Pollutant Source	**Total Area (SF)**	**Treated Area (SF)**	**Percentage**
Roof Area	15,000	15,000	100%
TOTAL	15,000	15,000	**100%**

The following Table 8 shows the GUSF with associated drainage area, treatment volumes and required treatment volumes and demonstrates that the GUSF is sized appropriately to accommodate the stormwater from its subcatchment.

TABLE 8: Grassed Underdrained Soil Filter 1				
Basin Design				
Treatment Volume	Total SF	Multiplier	Volume	Unit
Impervious Area	25,904	1.0	2,159	cf
Developed Area	8,582	0.4	286	cf
Total Treatment Volume Required			**2,445**	**cf**
Treatment Volume Provided			**2,685**	**cf**
Surface Area at Filter Elevation	1,790	sf		
Water Quaility Volume (18-inch Ponding)	2,685	cf		
Surface Area Check				
Impervious Area	25904	5%	1,295	sf
Non-Impervious Developed Area	8582	2%	172	sf
Total Surface Area Required, min.			**1,467**	**sf**

The following Table 9 includes a summary of all Stormwater BMPs used on the proposed site:

Table 9: Summary Treatment Table			
Subcatchment	**Total Area (SF)**	**% Treated Area**	**BMP**
Grassed Underdrained Soil Filter 1	34,486	100%	GUSF 1
TOTALS	**34,486**	**100%**	

4.3 RUNOFF ANALYSIS

A runoff analysis was completed to compare pre-development runoff rates to post-development runoff rates.

4.3.1 Modeling Technique

The Soil Conservation Service (SCS) TR-20 methodology was used to determine the flow rates for this hydrologic analysis and HydroCAD (release 10.00) computer modeling software was utilized to perform the computations. This method relies heavily upon detailed watershed characteristics and historical rainfall data to model estimated peak discharges at selected recurrence intervals. Printed results of the HydroCAD modeling and hydrologic computations for the pre-development and post-development conditions for the 2, 10 and 25-year recurrence interval are contained in as an appendix to this section.

Site specific watershed details, including drainage areas, land use cover, and time of concentrations have been calculated and discussed in the following sections.

4.3.2 Study Points

Runoff from the site has been analyzed at Study Points, located at each point where concentrated stormwater flows from the site cross a property line. For this project, a total four (4) points of analysis or Study Points (SP) were evaluated. These study points are indicated on the attached stormwater plans, with Study Point 1 generally at the location of concentrated flows to Campus Avenue, Study Point 2 generally at the location of concentrated flows to Bardwell Street, Study Point 3 generally at the location of concentrated flows to Nichols Street, and Study Point 4 being the catch basin at the southern portion of the facility.

4.3.3 Pre-Development

The pre-development model represents the site in the existing conditions. The study area watershed was broken down into four subcatchments to model total flow condition at the provided study points.

Runoff within Subcatchment 103-E conveys flows to Study Point 1. Subcatchment 12-R conveys flows to Study Point 2. Subcatchment 14-R conveys flows to Study Point 3. Subcatchment 13-R conveys flows to the wetland location at the southern portion of the facility, and then ultimately to an existing catch basin, Study Point 4.

4.3.4 Post-Development

The post-development conditions depict the developed site including the facility improvements and the access improvements. The previously mentioned subcatchments remain in limited forms. An additional subcatchment, 103-E2, was developed to show additional flows conveyed to Campus Avenue through new landscaping. 6 additional subcatchments were developed to indicate surface runoff to the Grassed Underdrained Soil Filter, and several ponds were created to model the piping system to this location. The GUSF was modeled under Pond 1P, which incorporates several the exfiltration to underdrains, the Outlet Control Structure, the emergency spillway, and the storage.

4.3.5 Comparison of Peak Flow Rates

A summary of the Pre-Development and Post-Development peak discharge rates at the study points are shown in Table 10:

Table 10: Summary Table of Pre-Development and Post Development Flow Rates

Study Point	2-Year Storm			10-Year Storm			25-Year Storm		
	Pre (cfs)	Post (cfs)	Diff. (cfs)	Pre (cfs)	Post (cfs)	Diff. (cfs)	Pre (cfs)	Post (cfs)	Diff. (cfs)
SP-1	0.3	0.2	-0.1	0.5	0.4	-0.1	0.6	0.5	-0.1
SP-2	0.1	0	-0.1	0.1	0	-0.1	0.2	0	-0.2
SP-3	0.3	0.3	-	0.6	0.5	-0.1	0.7	0.6	-0.1
SP-4	0.7	0.5	-0.2	1.4	0.8	-0.6	1.7	1.7	-

In general, pre-development and post-development runoff rates are consistent with only minor variations in the peak discharge rates. Peak discharge rates for the existing condition are less than, or equal to, the post-development conditions in the design storms.

4.4 DISCHARGE TO WETLANDS STANDARD

The discharge of runoff to a wetland due to a 2-year storm may not increase the mean storage depth within a wetland more than two inches above pre-development levels for more than 24 hours from the end of the storm event. In the existing condition, Pond PW (wetland location) achieves a maximum elevation of 227.03' in the 2-year rain event. In the proposed condition, Pond PW achieves a maxiumum elevation of 226.82' in the 2-year rain event. The difference is a decrease in peak elevation. Since the peak wetland elevation does not exceed the 2" maximum increase during a comparison of peak events, the discharge to wetland standard is met.

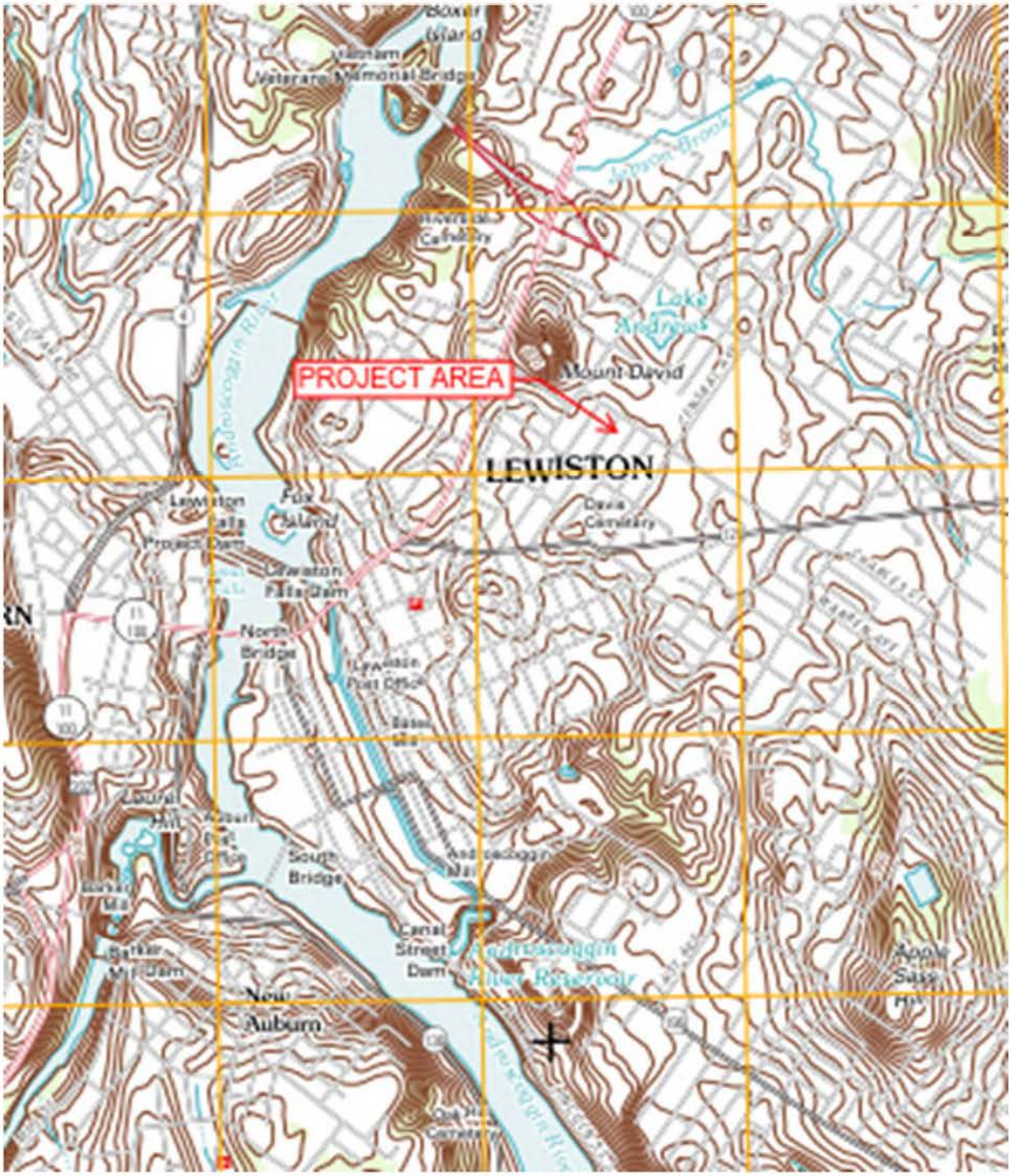
5.1 CONCLUSIONS

By incorporating the proposed BMP presented in this report, runoff from the proposed site will receive treatment/control that meets the applicable Basic, Flooding, and General Standards of Chapter 500, Stormwater Management.

5.2 MAINTENANCE & PROTECTION OF STORMWATER SYSTEM

According to Appendix A – Zoning and Land Use Code, Article XIII. Development Review and Standards, "Sec. 15. Post-construction stormwater management standards", of the City's Code, the applicant shall prepare and receive approval of a Post-Construction Stormwater Management Plan developed in accordance with the applicable standards of the Code.

Long-term responsibilities for maintenance and protection of the project's stormwater drainage system, stormwater treatment systems, paved areas and permanent erosion and sedimentation control measures will be assumed by the applicant. A Maintenance Plan has been developed for the project and the components of the plan are detailed in "Section 14. Basic Standards Submissions" of this application.

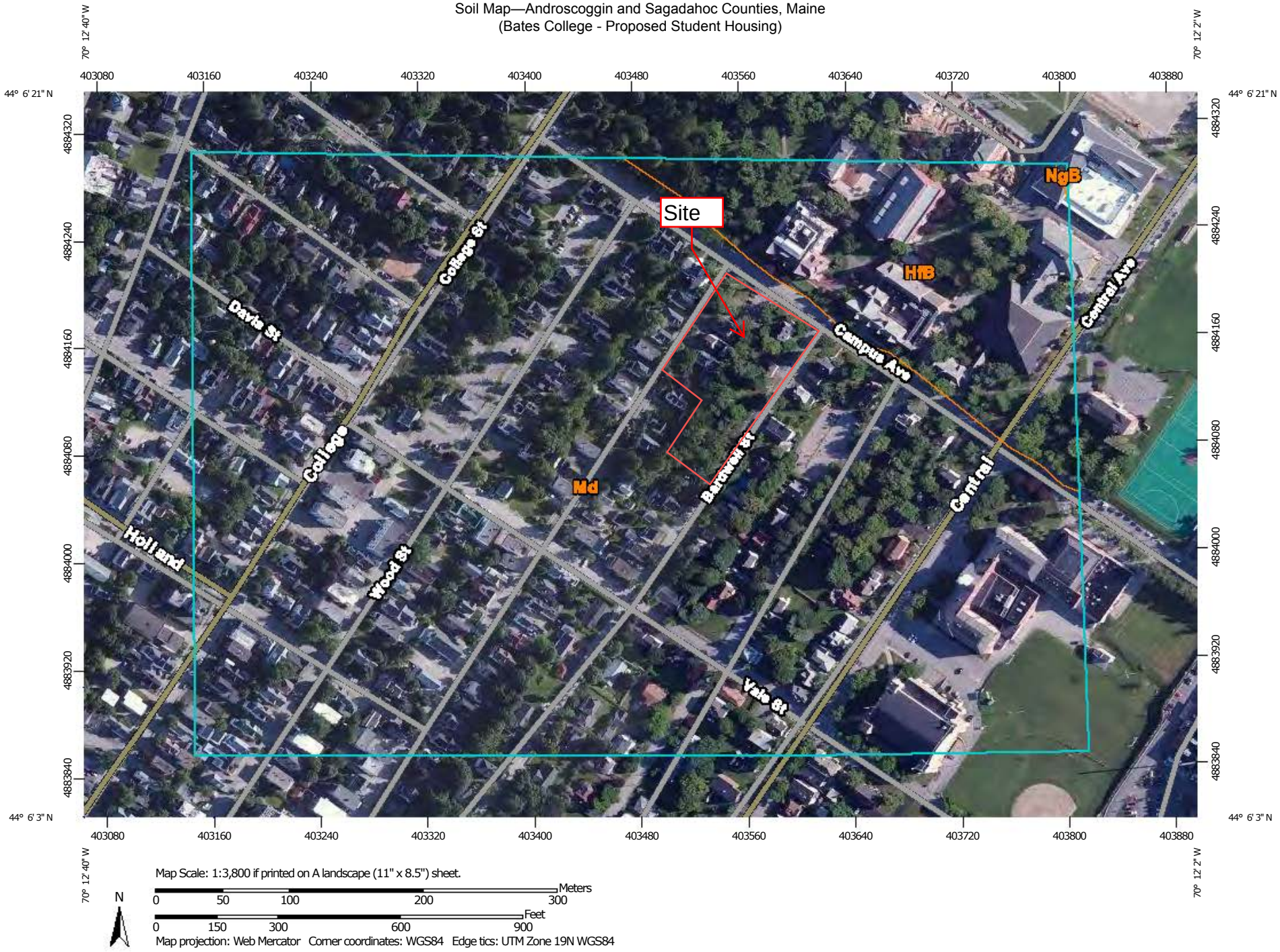


Location Map

Source: USGS

Not to scale

Soil Map—Androscoggin and Sagadahoc Counties, Maine
(Bates College - Proposed Student Housing)



Map Scale: 1:3,800 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

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 Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

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: http://websoilsurvey.nrcs.usda.gov
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 14, Dec 3, 2013

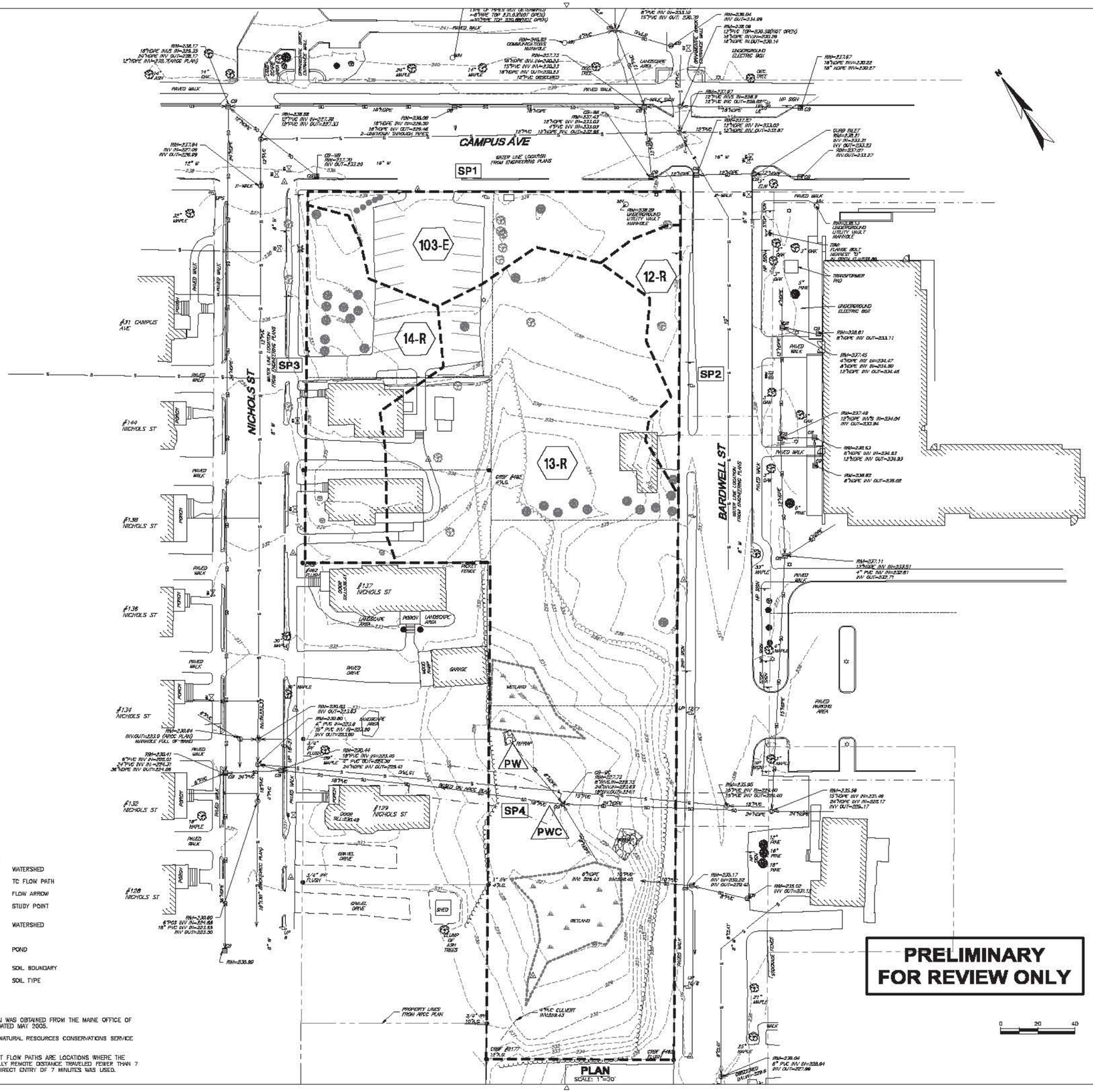
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 20, 2010—Aug 29, 2010

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.

Map Unit Legend

Androscoggin and Sagadahoc Counties, Maine (ME606)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
HfB	Hartland very fine sandy loam, 2 to 8 percent slopes	10.3	14.1%
Md	Made land, loamy materials	62.7	85.9%
NgB	Ninigret fine sandy loam, 0 to 8 percent slopes	0.0	0.0%
Totals for Area of Interest		**73.0**	**100.0%**



LEGEND

- WATERSHED
- TC FLOW PATH
- FLOW ARROW
- SP1 — STUDY POINT
- WS-1 — WATERSHED
- P1 — POND
- SOIL BOUNDARY
- LrC — SOIL TYPE

NOTE:

1. SOILS INFORMATION WAS OBTAINED FROM THE MAINE OFFICE OF GIS ONLINE AND DATED MAY 2005.
2. SOILS ARE FROM NATURAL RESOURCES CONSERVATION SERVICE (NRCS USDA).
3. LOCATIONS WITHOUT FLOW PATHS ARE LOCATIONS WHERE THE MOST HYDRAULICALLY REMOTE DISTANCE TRAVELED FEWER THAN 7 MINUTES, AND A DIRECT ENTRY OF 7 MINUTES WAS USED.

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7/18/2019

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#	DATE	DESCRIPTION
3	07/18/19	PERMITTING SUBMISSION
2	06/19/19	90% DESIGN DEVELOPMENT
1	03/16/19	SCHEMATIC DESIGN

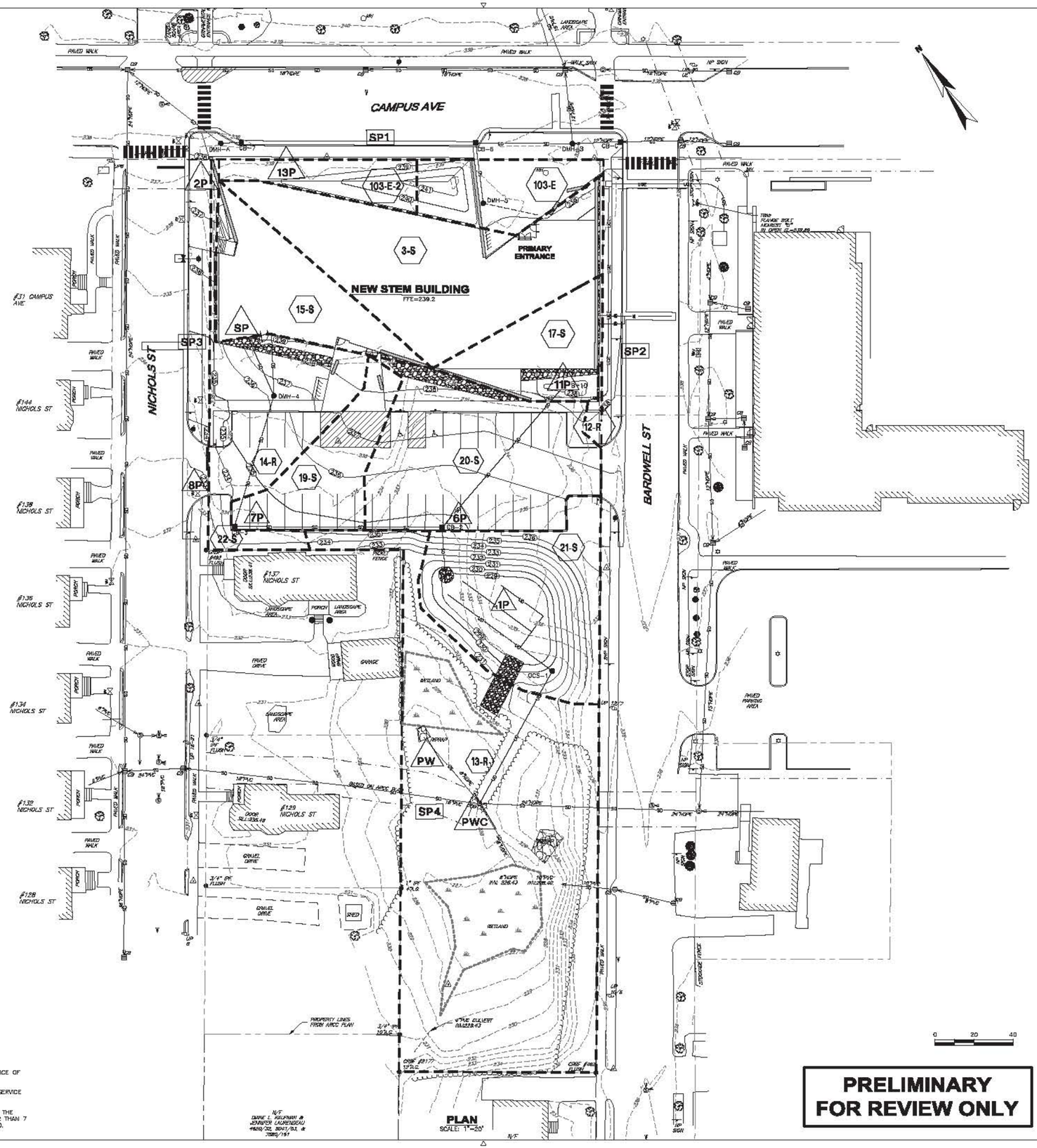
BATES

Bates College STEM Projects

PRE-DEVELOPMENT DRAINAGE PLAN

Drawing Scale	NTS
Project Number	14021A
Date Issued	7/18/2019

C9.0



PLAN
SCALE: 1"=20'

LEGEND

— — —	WATERSHED
—▸—▸—	TC FLOW PATH
→	FLOW ARROW
SP1 ●	STUDY POINT
WS-1	WATERSHED
P1	POND
	SOIL BOUNDARY
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PRELIMINARY FOR REVIEW ONLY

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JAN
B. S.
WIEGMAN
No. 5862
LICENSED
PROFESSIONAL ENGINEER
7/18/2018

#	DATE	DESCRIPTION
3	07/12/18	PERMITTING SUBMISSION
2	06/19/18	50% DESIGN DEVELOPMENT
1	02/16/18	SCHEMATIC DESIGN

NOT FOR CONSTRUCTION

BATES

Bates College STEM Projects

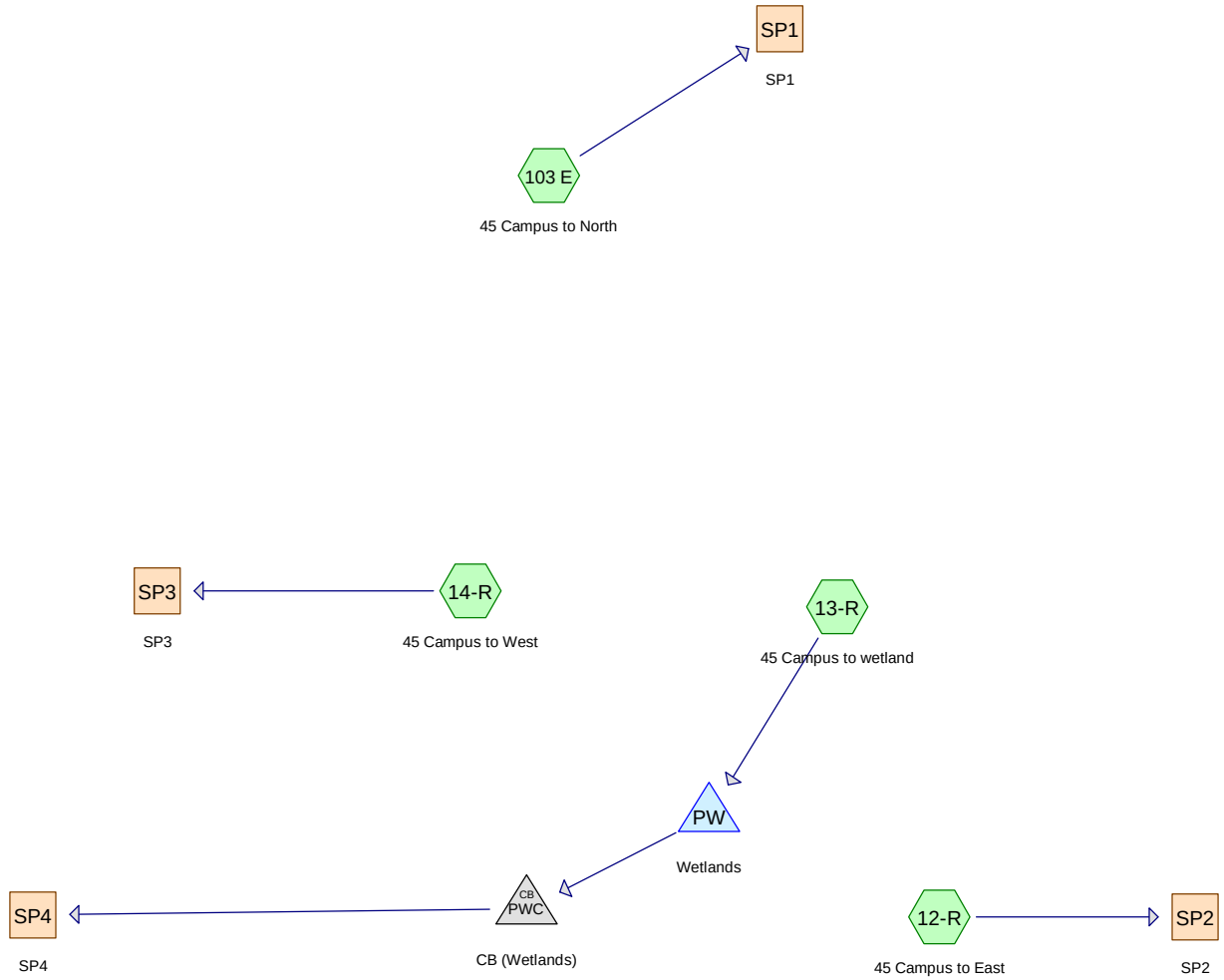
POST-DEVELOPMENT DRAINAGE PLAN

Drawing Scale
1" = 20'

Project Number
14021A

Date Issued
7/18/2018

C9.1



Subcat Reach Pond Link

Routing Diagram for April Bates PRE 4-19
Prepared by {enter your company name here}, Printed 6/13/2018
HydroCAD® 10.00-12 s/n 01135 © 2014 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
39,251	74	>75% Grass cover, Good, HSG C (12-R, 13-R, 14-R, 103 E)
18,776	78	Meadow, non-grazed, HSG D (13-R)
4,157	98	Pavement (14-R, 103 E)
889	98	Roofs (12-R, 14-R)
2,750	98	Roofs, pavment, ramps (13-R)
1,396	72	Woods/grass comb., Good, HSG C (13-R)
67,219	**78**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
40,647	HSG C	12-R, 13-R, 14-R, 103 E
18,776	HSG D	13-R
7,796	Other	12-R, 13-R, 14-R, 103 E
67,219		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcat Numbe
0	0	39,251	0	0	39,251	>75% Grass cover, Good	
0	0	0	18,776	0	18,776	Meadow, non-grazed	
0	0	0	0	4,157	4,157	Pavement	
0	0	0	0	889	889	Roofs	
0	0	0	0	2,750	2,750	Roofs, pavment, ramps	
0	0	1,396	0	0	1,396	Woods/grass comb., Good	
0	**0**	**40,647**	**18,776**	**7,796**	**67,219**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	PW	226.43	225.73	25.0	0.0280	0.013	8.0	0.0	0.0
2	PW	227.00	225.73	25.0	0.0508	0.013	8.0	0.0	0.0
3	PWC	224.10	223.40	150.0	0.0047	0.013	18.0	0.0	0.0

Time span=0.00-60.00 hrs, dt=0.10 hrs, 601 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 12-R: 45 Campus to East Runoff Area=2,444 sf 1.64% Impervious Runoff Depth=0.91"
Tc=7.0 min CN=74 Runoff=0.1 cfs 185 cf

Subcatchment 13-R: 45 Campus to wetland Runoff Area=48,397 sf 5.68% Impervious Runoff Depth=1.07"
Flow Length=300' Tc=7.0 min CN=77 Runoff=1.2 cfs 4,320 cf

Subcatchment 14-R: 45 Campus to West Runoff Area=9,076 sf 22.58% Impervious Runoff Depth=1.19"
Tc=7.0 min CN=79 Runoff=0.3 cfs 899 cf

Subcatchment 103 E: 45 Campus to North Runoff Area=7,302 sf 40.50% Impervious Runoff Depth=1.52"
Flow Length=172' Tc=7.0 min CN=84 Runoff=0.3 cfs 923 cf

Reach SP1: SP1 Inflow=0.3 cfs 923 cf
Outflow=0.3 cfs 923 cf

Reach SP2: SP2 Inflow=0.1 cfs 185 cf
Outflow=0.1 cfs 185 cf

Reach SP3: SP3 Inflow=0.3 cfs 899 cf
Outflow=0.3 cfs 899 cf

Reach SP4: SP4 Inflow=0.7 cfs 4,320 cf
Outflow=0.7 cfs 4,320 cf

Pond PW: Wetlands Peak Elev=227.03' Storage=603 cf Inflow=1.2 cfs 4,320 cf
Outflow=0.7 cfs 4,320 cf

Pond PWC: CB (Wetlands) Peak Elev=224.53' Inflow=0.7 cfs 4,320 cf
18.0" Round Culvert n=0.013 L=150.0' S=0.0047 '/' Outflow=0.7 cfs 4,320 cf

Total Runoff Area = 67,219 sf Runoff Volume = 6,326 cf Average Runoff Depth = 1.13"
88.40% Pervious = 59,423 sf 11.60% Impervious = 7,796 sf

Summary for Subcatchment 12-R: 45 Campus to East

[49] Hint: Tc<2dt may require smaller dt

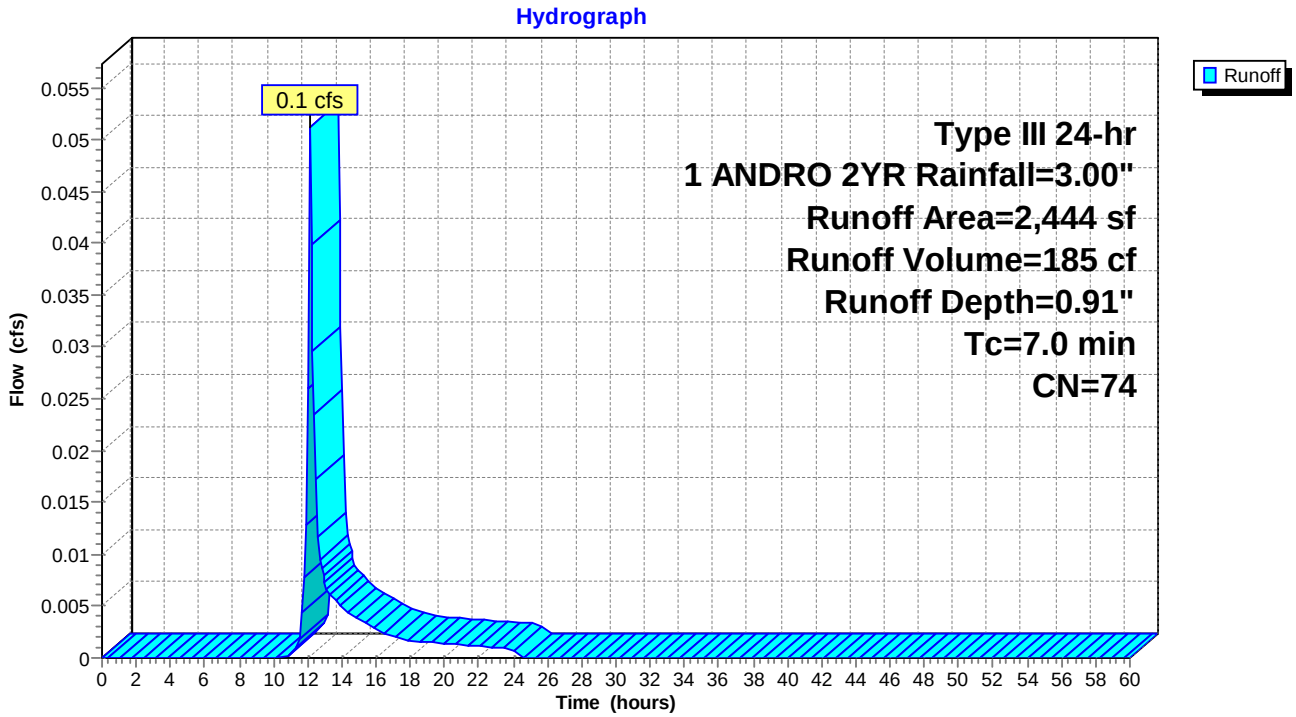
Runoff = 0.1 cfs @ 12.12 hrs, Volume= 185 cf, Depth= 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs
Type III 24-hr 1 ANDRO 2YR Rainfall=3.00"

	Area (sf)	CN	Description
*	0	98	Pavement
*	40	98	Roofs
	2,404	74	>75% Grass cover, Good, HSG C
	0	65	Brush, Good, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	72	Woods/grass comb., Good, HSG C
	2,444	74	Weighted Average
	2,404		98.36% Pervious Area
	40		1.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, DIRECT <7**

Subcatchment 12-R: 45 Campus to East



Summary for Subcatchment 13-R: 45 Campus to wetland

[49] Hint: Tc<2dt may require smaller dt

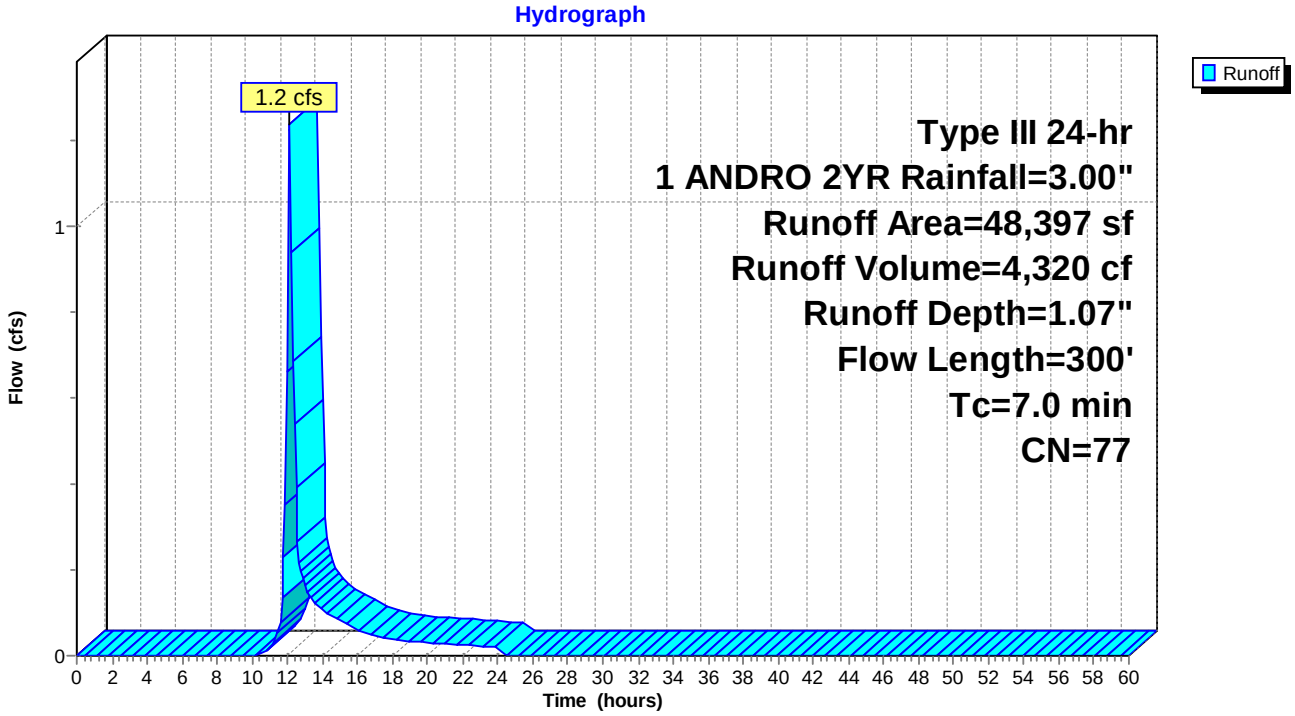
Runoff = 1.2 cfs @ 12.12 hrs, Volume= 4,320 cf, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs
Type III 24-hr 1 ANDRO 2YR Rainfall=3.00"

	Area (sf)	CN	Description
*	2,750	98	Roofs, pavment, ramps
	25,475	74	>75% Grass cover, Good, HSG C
	18,776	78	Meadow, non-grazed, HSG D
	1,396	72	Woods/grass comb., Good, HSG C
	48,397	77	Weighted Average
	45,647		94.32% Pervious Area
	2,750		5.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	30	0.0330	0.1		**Sheet Flow, SF 1** Grass: Dense n= 0.240 P2= 3.00"
1.3	270	0.0460	3.5		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
1.1					**Direct Entry, DIRECT TO 7**
7.0	300	Total			

Subcatchment 13-R: 45 Campus to wetland



Summary for Subcatchment 14-R: 45 Campus to West

[49] Hint: Tc<2dt may require smaller dt

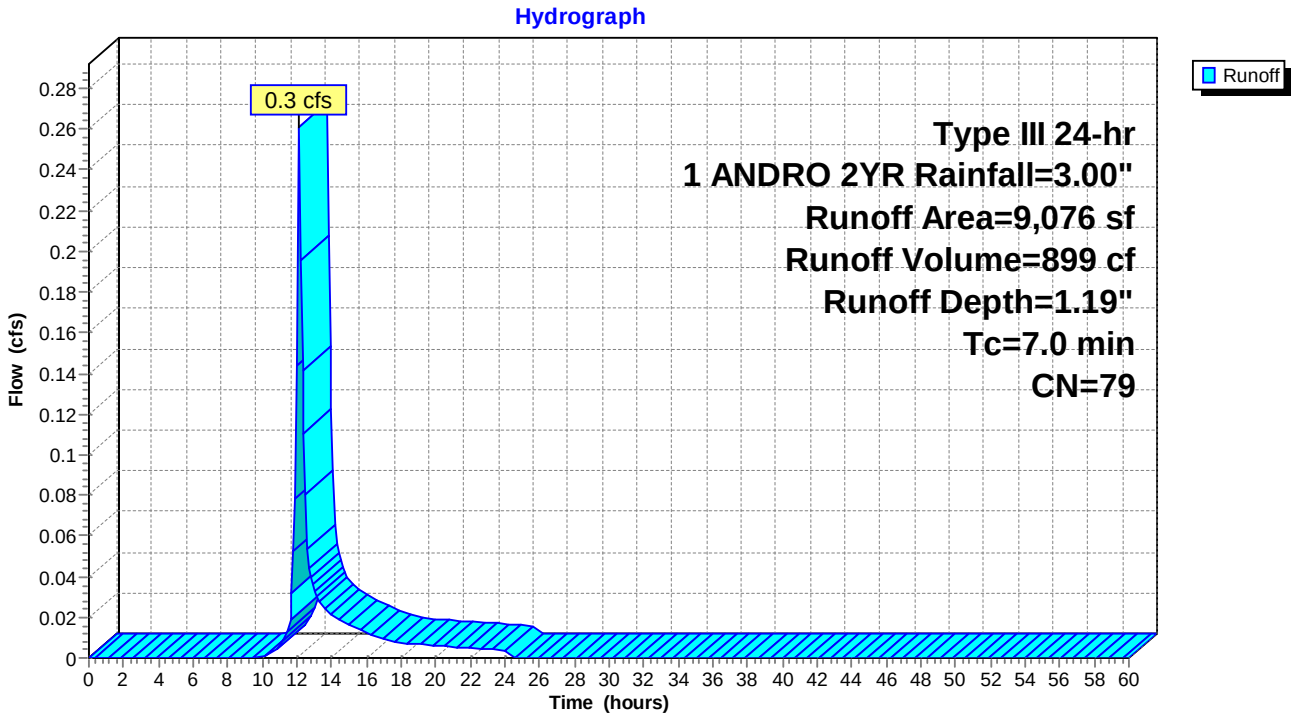
Runoff = 0.3 cfs @ 12.11 hrs, Volume= 899 cf, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs
Type III 24-hr 1 ANDRO 2YR Rainfall=3.00"

	Area (sf)	CN	Description
*	1,200	98	Pavement
*	849	98	Roofs
	7,027	74	>75% Grass cover, Good, HSG C
	0	65	Brush, Good, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	72	Woods/grass comb., Good, HSG C
	9,076	79	Weighted Average
	7,027		77.42% Pervious Area
	2,049		22.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, DIRECT <7**

Subcatchment 14-R: 45 Campus to West



Summary for Subcatchment 103 E: 45 Campus to North

[49] Hint: Tc<2dt may require smaller dt

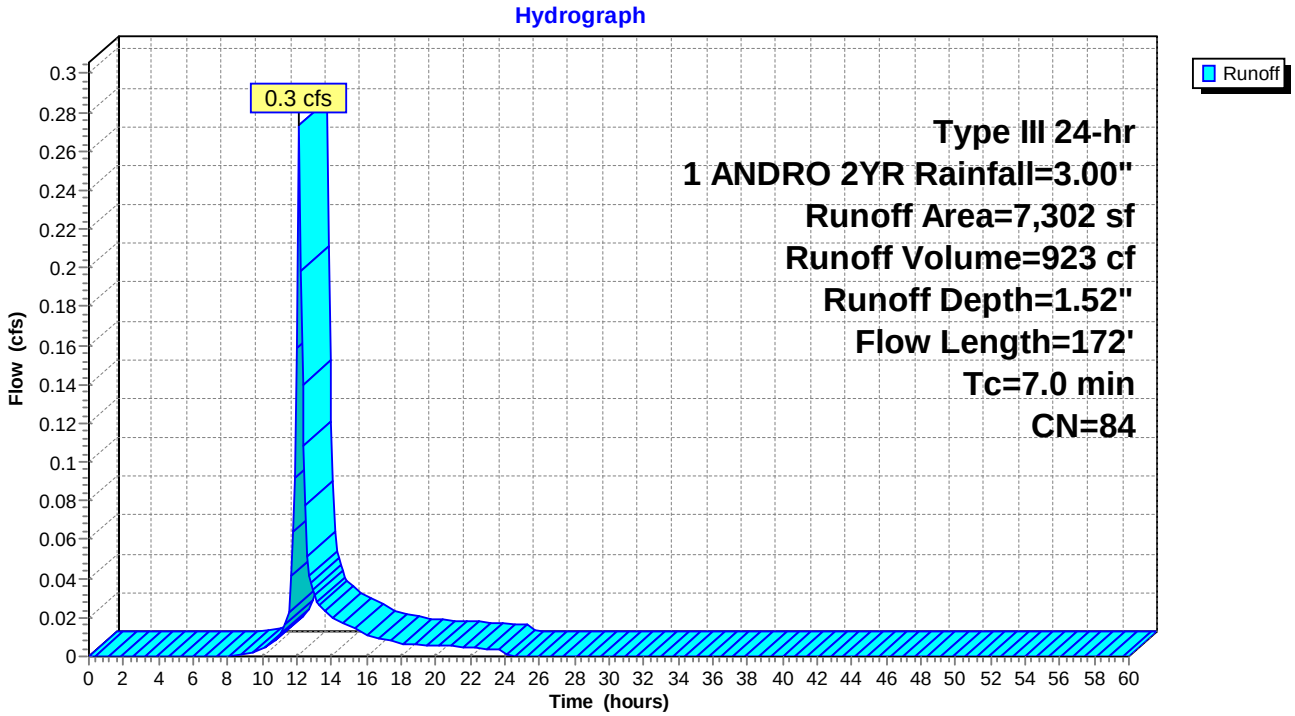
Runoff = 0.3 cfs @ 12.11 hrs, Volume= 923 cf, Depth= 1.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs
Type III 24-hr 1 ANDRO 2YR Rainfall=3.00"

	Area (sf)	CN	Description
*	2,957	98	Pavement
*	0	98	Roofs
	4,345	74	>75% Grass cover, Good, HSG C
	7,302	84	Weighted Average
	4,345		59.50% Pervious Area
	2,957		40.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	58	0.0050	0.7		**Sheet Flow, SF 1**
					Smooth surfaces n= 0.011 P2= 3.00"
1.0	114	0.0090	1.9		**Shallow Concentrated Flow, SCF 1**
					Paved Kv= 20.3 fps
4.6					**Direct Entry, DIRECT <7**
7.0	172	Total			

Subcatchment 103 E: 45 Campus to North



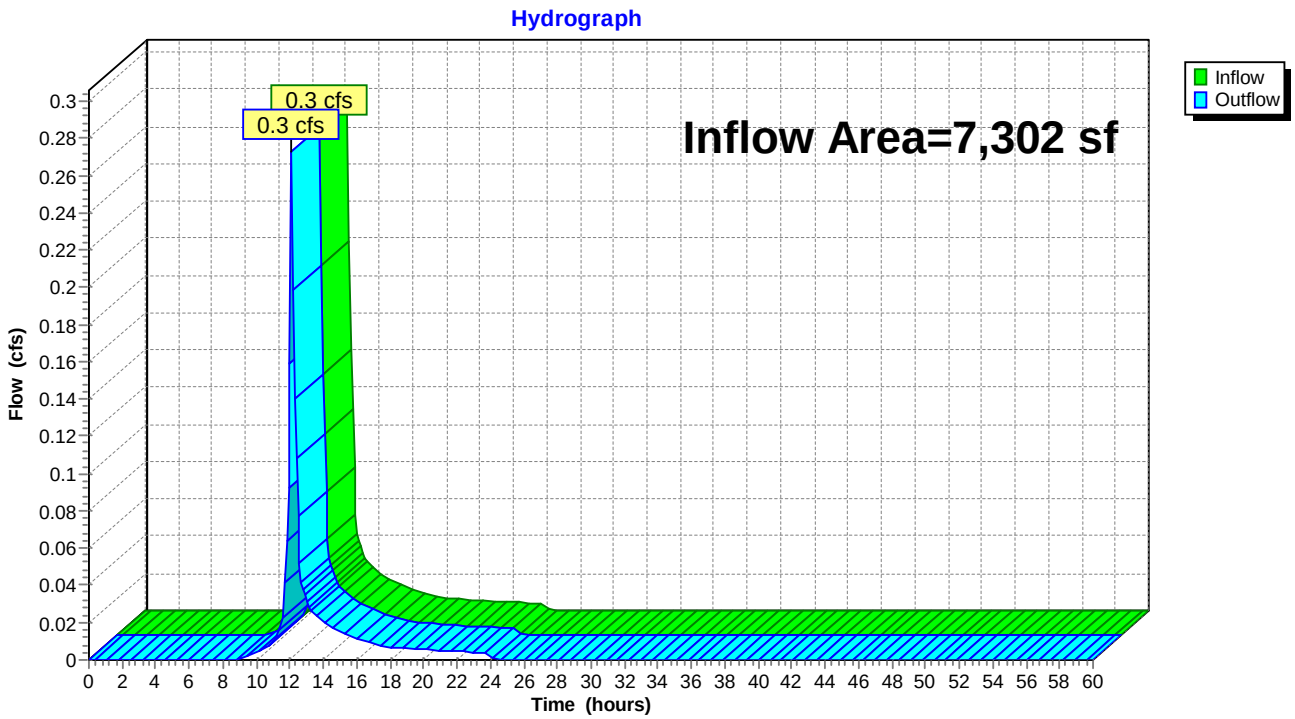
Summary for Reach SP1: SP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	7,302 sf,	40.50% Impervious,	Inflow Depth =	1.52"	for 1 ANDRO 2YR event
Inflow =	0.3 cfs @	12.11 hrs,	Volume=	923 cf	
Outflow =	0.3 cfs @	12.11 hrs,	Volume=	923 cf,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs / 2

Reach SP1: SP1



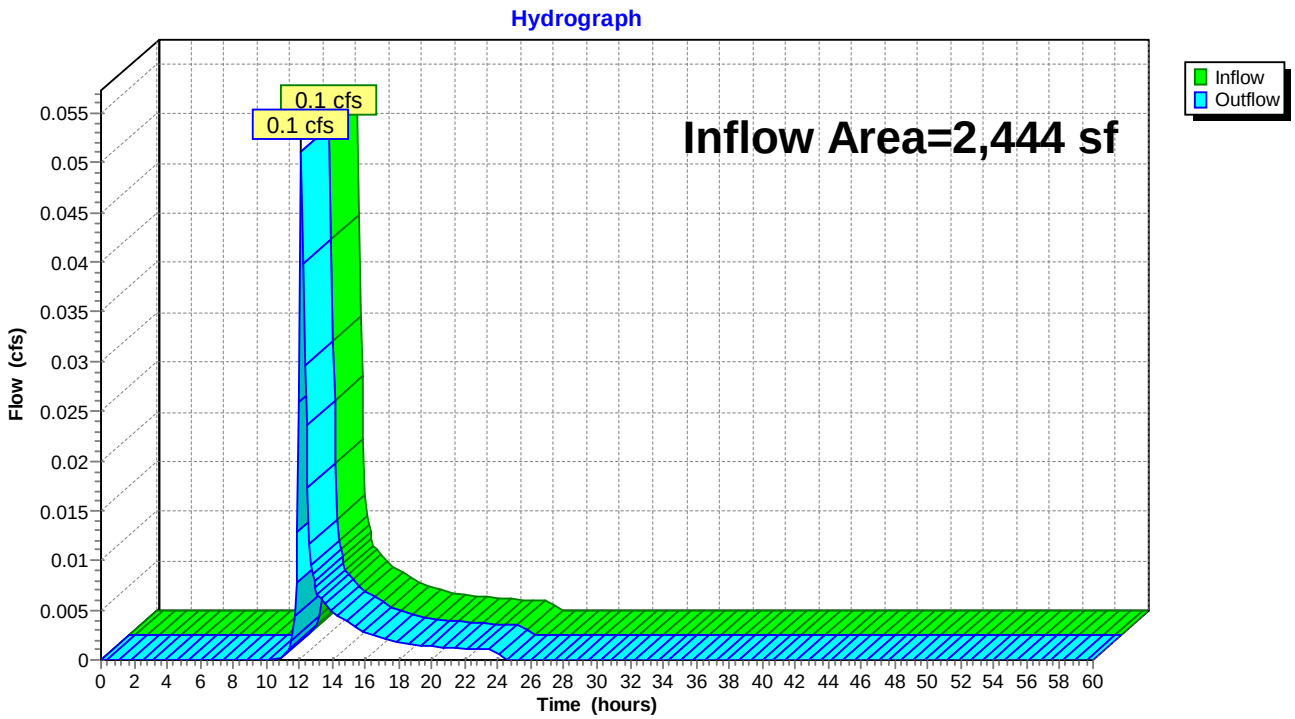
Summary for Reach SP2: SP2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2,444 sf, 1.64% Impervious, Inflow Depth = 0.91" for 1 ANDRO 2YR event
Inflow = 0.1 cfs @ 12.12 hrs, Volume= 185 cf
Outflow = 0.1 cfs @ 12.12 hrs, Volume= 185 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs / 2

Reach SP2: SP2



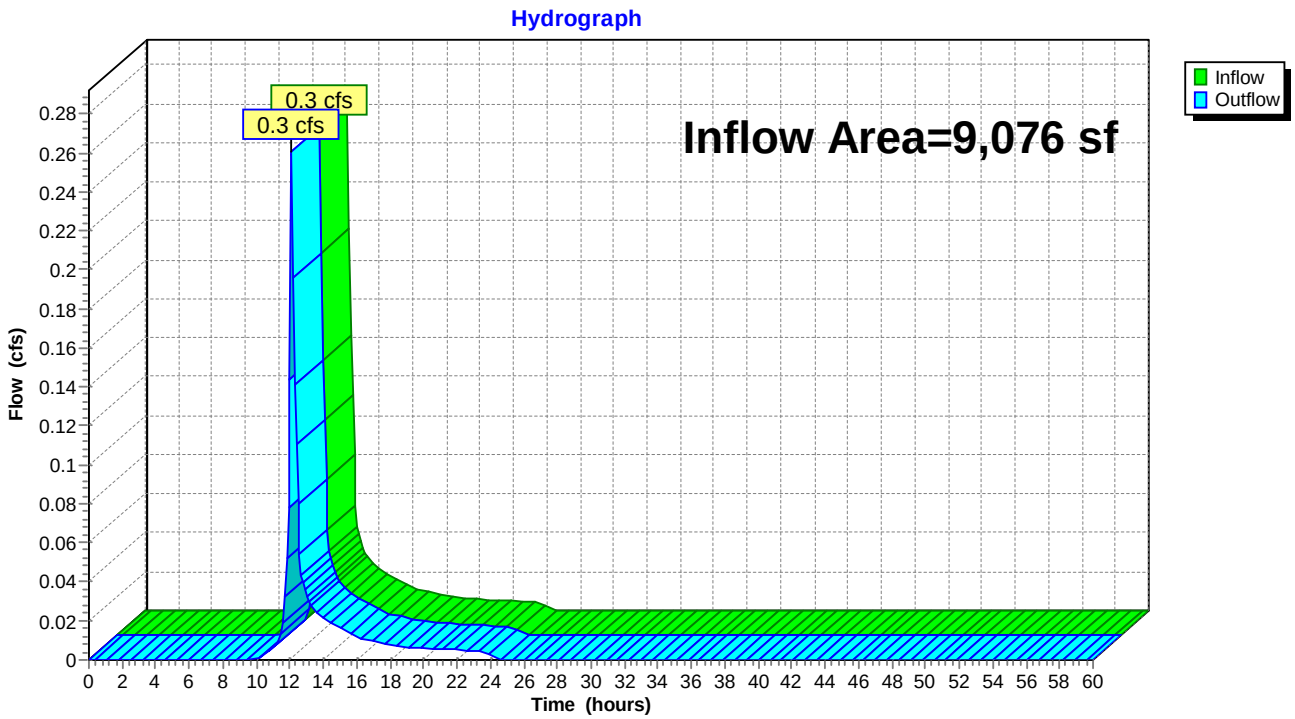
Summary for Reach SP3: SP3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	9,076 sf,	22.58% Impervious,	Inflow Depth =	1.19"	for 1 ANDRO 2YR event
Inflow =	0.3 cfs @	12.11 hrs,	Volume=	899 cf	
Outflow =	0.3 cfs @	12.11 hrs,	Volume=	899 cf,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs / 2

Reach SP3: SP3



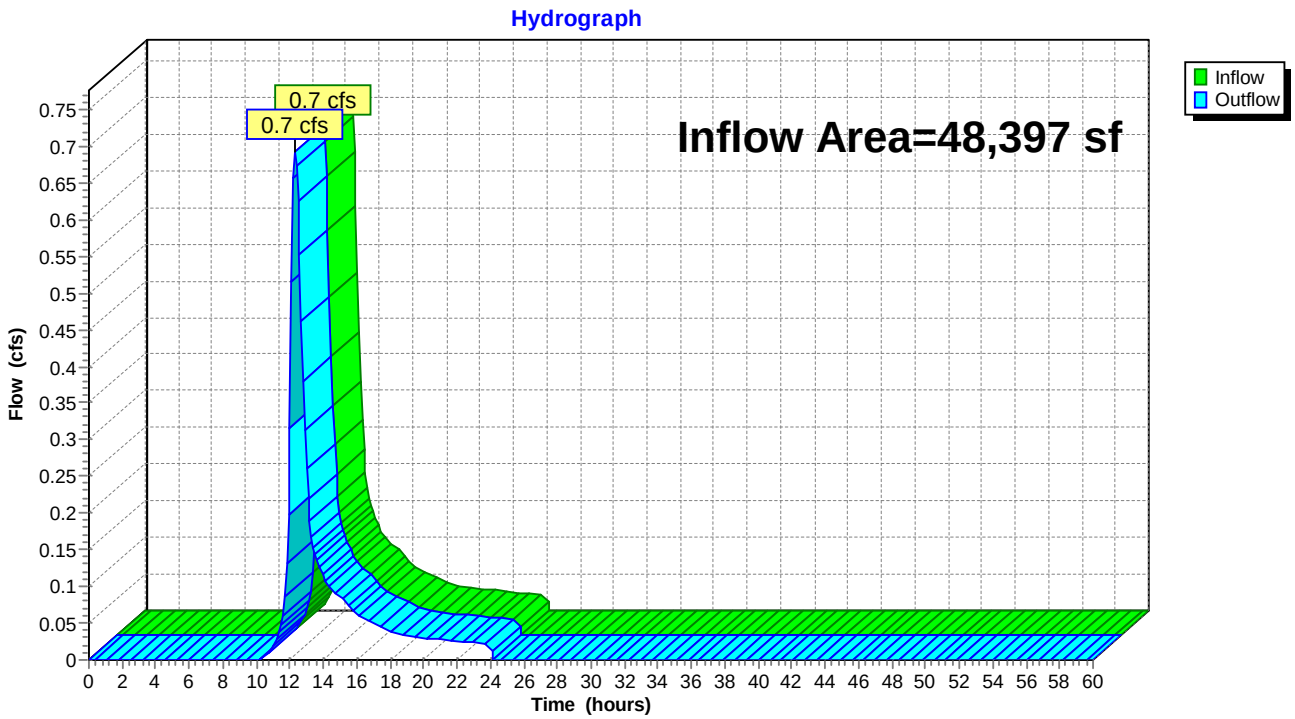
Summary for Reach SP4: SP4

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	48,397 sf,	5.68% Impervious,	Inflow Depth =	1.07"	for 1 ANDRO 2YR event
Inflow =	0.7 cfs @	12.32 hrs,	Volume=	4,320 cf	
Outflow =	0.7 cfs @	12.32 hrs,	Volume=	4,320 cf,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs / 2

Reach SP4: SP4



Summary for Pond PW: Wetlands

Inflow Area = 48,397 sf, 5.68% Impervious, Inflow Depth = 1.07" for 1 ANDRO 2YR event
Inflow = 1.2 cfs @ 12.12 hrs, Volume= 4,320 cf
Outflow = 0.7 cfs @ 12.32 hrs, Volume= 4,320 cf, Atten= 44%, Lag= 12.0 min
Primary = 0.7 cfs @ 12.32 hrs, Volume= 4,320 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs / 2
Peak Elev= 227.03' @ 12.32 hrs Surf.Area= 2,280 sf Storage= 603 cf

Plug-Flow detention time= 8.0 min calculated for 4,313 cf (100% of inflow)
Center-of-Mass det. time= 8.1 min (865.1 - 857.0)

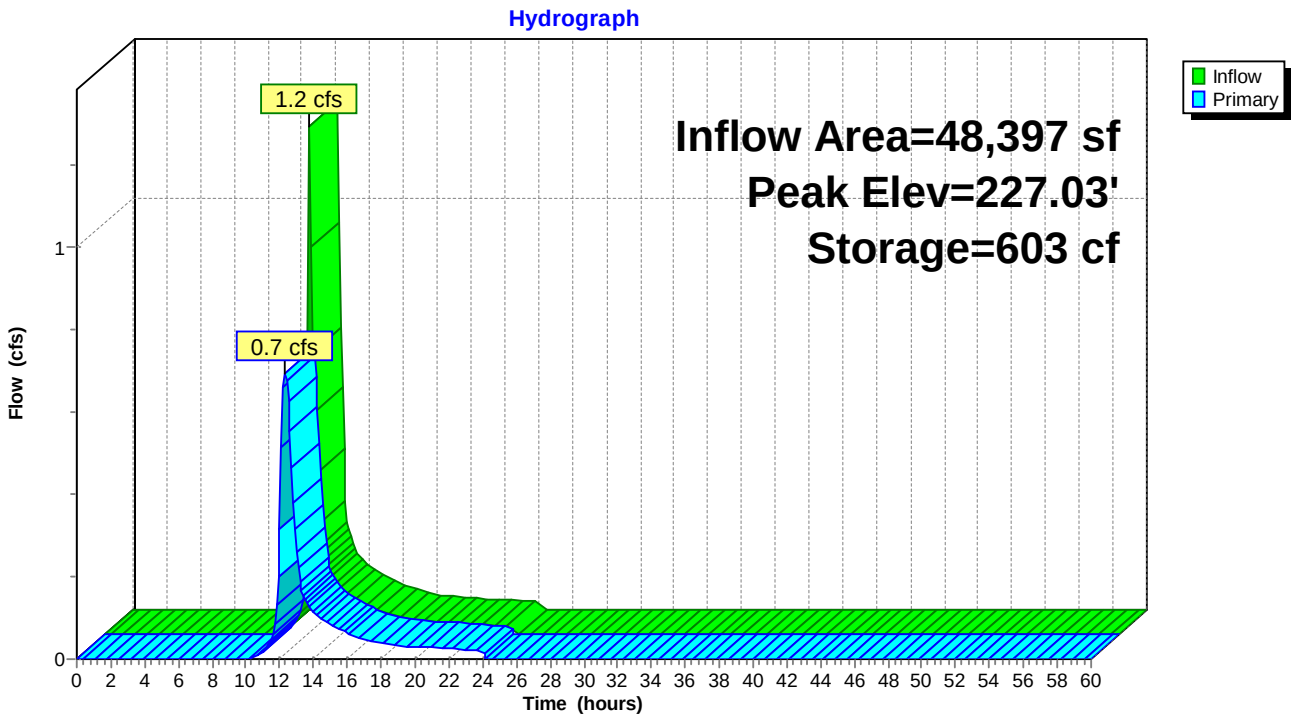
Volume	Invert	Avail.Storage	Storage Description
#1	226.50'	14,403 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
226.50	5	0	0
227.00	2,135	535	535
228.00	6,800	4,468	5,003
229.00	12,000	9,400	14,403

Device	Routing	Invert	Outlet Devices
#1	Primary	227.73'	**4.0" x 4.0" Horiz. Orifice/Grate X 16.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	226.43'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 226.43' / 225.73' S= 0.0280 '/' Cc= 0.900 n= 0.013, Flow Area= 0.35 sf
#3	Primary	227.00'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 227.00' / 225.73' S= 0.0508 '/' Cc= 0.900 n= 0.013, Flow Area= 0.35 sf

Primary OutFlow Max=0.7 cfs @ 12.32 hrs HW=227.03' TW=224.53' (Dynamic Tailwater)
- **1=Orifice/Grate** (Controls 0.0 cfs)
- **2=Culvert** (Inlet Controls 0.7 cfs @ 2.1 fps)
- **3=Culvert** (Inlet Controls 0.0 cfs @ 0.5 fps)

Pond PW: Wetlands



Summary for Pond PWC: CB (Wetlands)

[57] Hint: Peaked at 224.53' (Flood elevation advised)

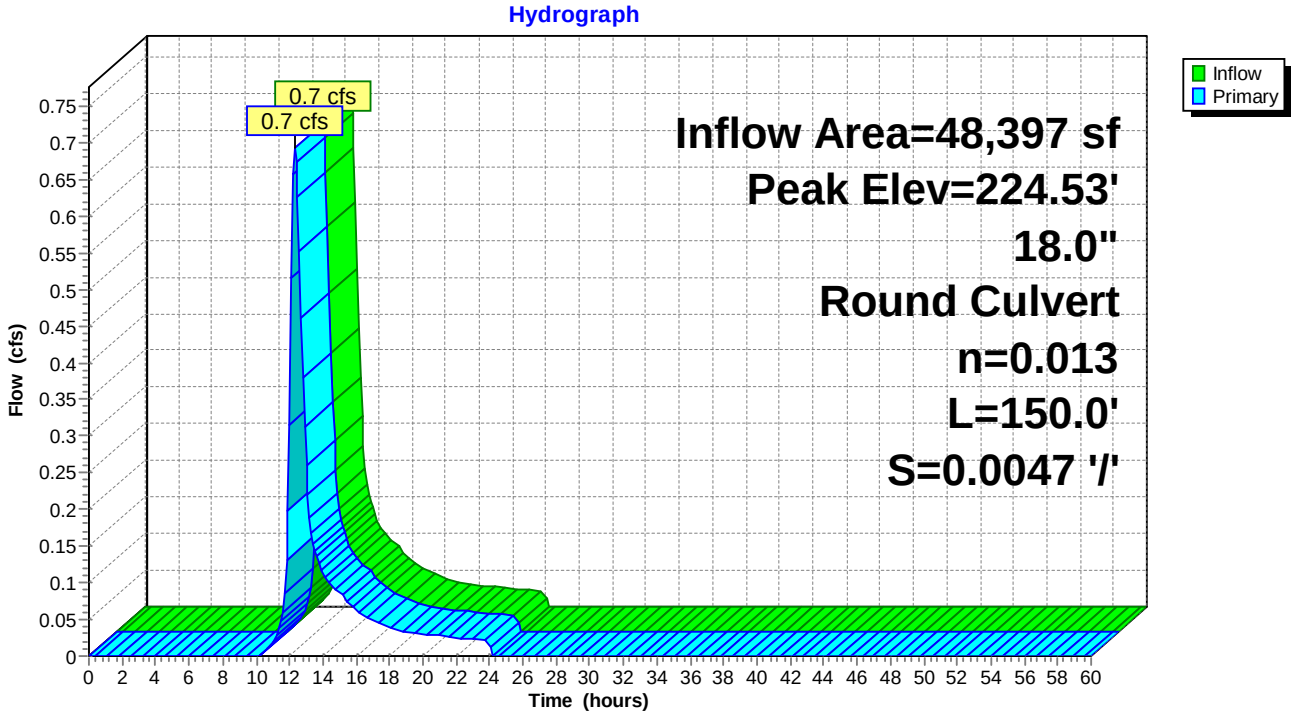
Inflow Area =	48,397 sf,	5.68% Impervious,	Inflow Depth =	1.07"	for 1 ANDRO 2YR event
Inflow =	0.7 cfs @	12.32 hrs,	Volume=	4,320 cf	
Outflow =	0.7 cfs @	12.32 hrs,	Volume=	4,320 cf,	Atten= 0%, Lag= 0.0 min
Primary =	0.7 cfs @	12.32 hrs,	Volume=	4,320 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs / 2
Peak Elev= 224.53' @ 12.32 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	224.10'	**18.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 224.10' / 223.40' S= 0.0047 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.7 cfs @ 12.32 hrs HW=224.53' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.7 cfs @ 2.5 fps)

Pond PWC: CB (Wetlands)



Time span=0.00-60.00 hrs, dt=0.10 hrs, 601 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 12-R: 45 Campus to East Runoff Area=2,444 sf 1.64% Impervious Runoff Depth=2.05"
Tc=7.0 min CN=74 Runoff=0.1 cfs 417 cf

Subcatchment 13-R: 45 Campus to wetland Runoff Area=48,397 sf 5.68% Impervious Runoff Depth=2.29"
Flow Length=300' Tc=7.0 min CN=77 Runoff=2.7 cfs 9,244 cf

Subcatchment 14-R: 45 Campus to West Runoff Area=9,076 sf 22.58% Impervious Runoff Depth=2.46"
Tc=7.0 min CN=79 Runoff=0.6 cfs 1,861 cf

Subcatchment 103 E: 45 Campus to North Runoff Area=7,302 sf 40.50% Impervious Runoff Depth=2.91"
Flow Length=172' Tc=7.0 min CN=84 Runoff=0.5 cfs 1,769 cf

Reach SP1: SP1 Inflow=0.5 cfs 1,769 cf
Outflow=0.5 cfs 1,769 cf

Reach SP2: SP2 Inflow=0.1 cfs 417 cf
Outflow=0.1 cfs 417 cf

Reach SP3: SP3 Inflow=0.6 cfs 1,861 cf
Outflow=0.6 cfs 1,861 cf

Reach SP4: SP4 Inflow=1.4 cfs 9,245 cf
Outflow=1.4 cfs 9,245 cf

Pond PW: Wetlands Peak Elev=227.37' Storage=1,650 cf Inflow=2.7 cfs 9,244 cf
Outflow=1.4 cfs 9,245 cf

Pond PWC: CB (Wetlands) Peak Elev=224.72' Inflow=1.4 cfs 9,245 cf
18.0" Round Culvert n=0.013 L=150.0' S=0.0047 '/' Outflow=1.4 cfs 9,245 cf

Total Runoff Area = 67,219 sf Runoff Volume = 13,291 cf Average Runoff Depth = 2.37"
88.40% Pervious = 59,423 sf 11.60% Impervious = 7,796 sf

Summary for Subcatchment 12-R: 45 Campus to East

[49] Hint: Tc<2dt may require smaller dt

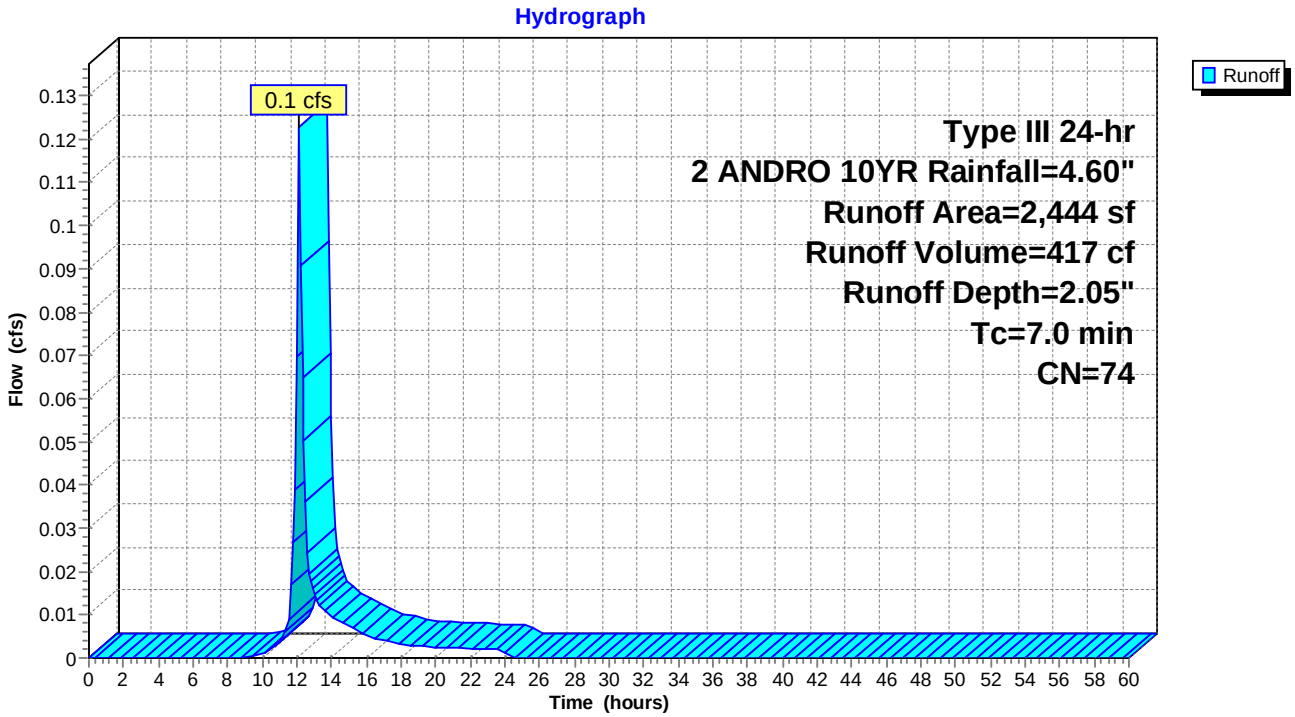
Runoff = 0.1 cfs @ 12.11 hrs, Volume= 417 cf, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs
Type III 24-hr 2 ANDRO 10YR Rainfall=4.60"

	Area (sf)	CN	Description
*	0	98	Pavement
*	40	98	Roofs
	2,404	74	>75% Grass cover, Good, HSG C
	0	65	Brush, Good, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	72	Woods/grass comb., Good, HSG C
	2,444	74	Weighted Average
	2,404		98.36% Pervious Area
	40		1.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, DIRECT <7**

Subcatchment 12-R: 45 Campus to East



Summary for Subcatchment 13-R: 45 Campus to wetland

[49] Hint: Tc<2dt may require smaller dt

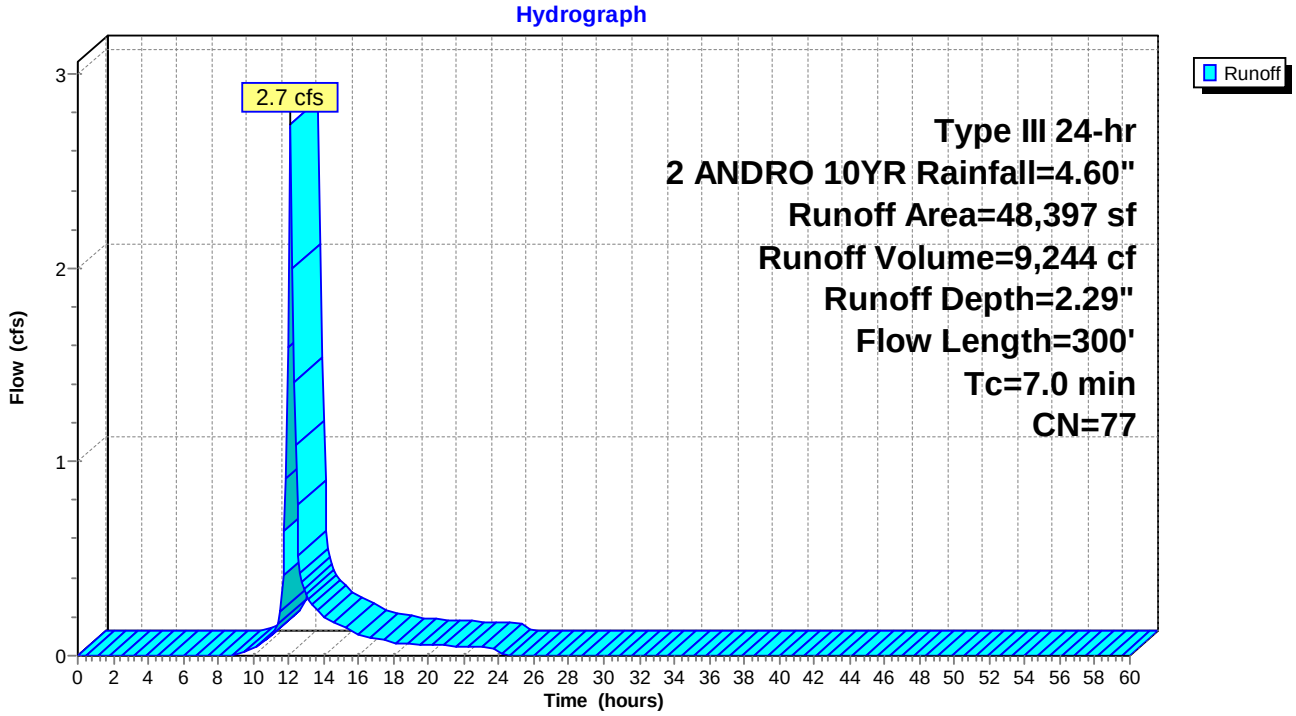
Runoff = 2.7 cfs @ 12.11 hrs, Volume= 9,244 cf, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs
Type III 24-hr 2 ANDRO 10YR Rainfall=4.60"

	Area (sf)	CN	Description
*	2,750	98	Roofs, pavment, ramps
	25,475	74	>75% Grass cover, Good, HSG C
	18,776	78	Meadow, non-grazed, HSG D
	1,396	72	Woods/grass comb., Good, HSG C
	48,397	77	Weighted Average
	45,647		94.32% Pervious Area
	2,750		5.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	30	0.0330	0.1		**Sheet Flow, SF 1** Grass: Dense n= 0.240 P2= 3.00"
1.3	270	0.0460	3.5		**Shallow Concentrated Flow, SCF 1** Unpaved Kv= 16.1 fps
1.1					**Direct Entry, DIRECT TO 7**
7.0	300	Total			

Subcatchment 13-R: 45 Campus to wetland



Summary for Subcatchment 14-R: 45 Campus to West

[49] Hint: Tc<2dt may require smaller dt

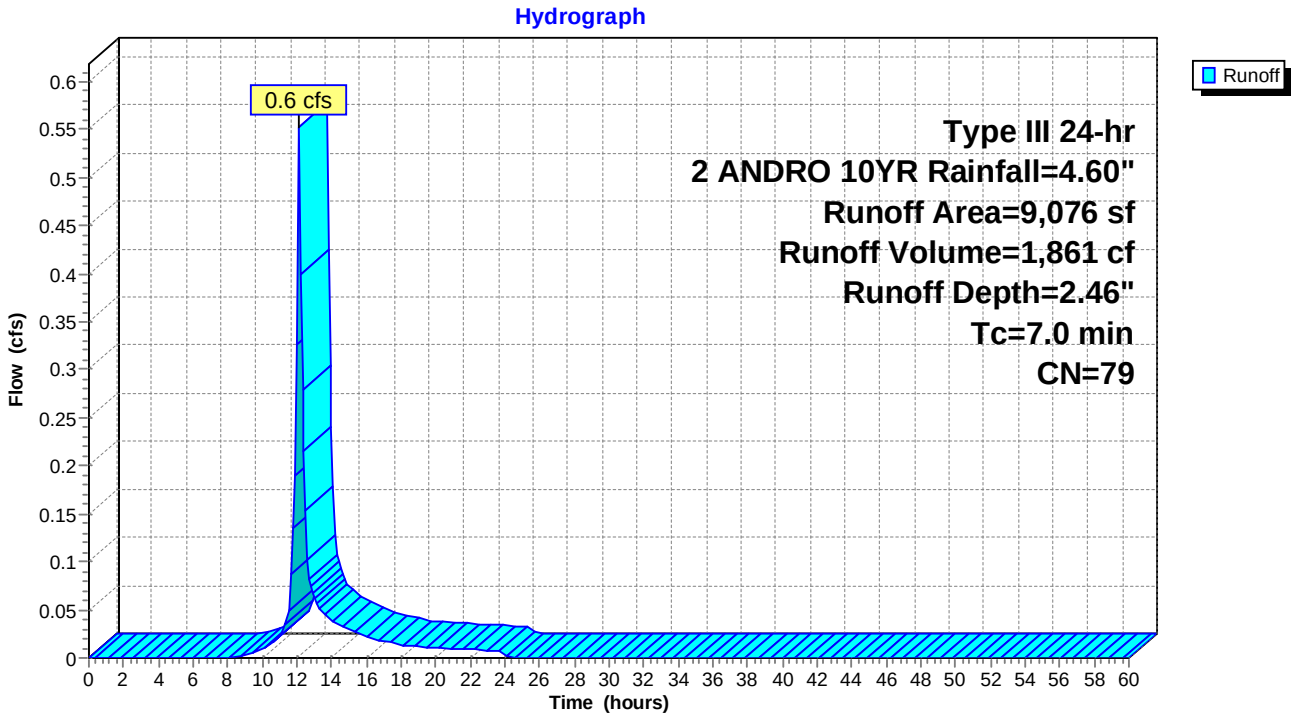
Runoff = 0.6 cfs @ 12.11 hrs, Volume= 1,861 cf, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs
Type III 24-hr 2 ANDRO 10YR Rainfall=4.60"

	Area (sf)	CN	Description
*	1,200	98	Pavement
*	849	98	Roofs
	7,027	74	>75% Grass cover, Good, HSG C
	0	65	Brush, Good, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	72	Woods/grass comb., Good, HSG C
	9,076	79	Weighted Average
	7,027		77.42% Pervious Area
	2,049		22.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, DIRECT <7**

Subcatchment 14-R: 45 Campus to West



Summary for Subcatchment 103 E: 45 Campus to North

[49] Hint: Tc<2dt may require smaller dt

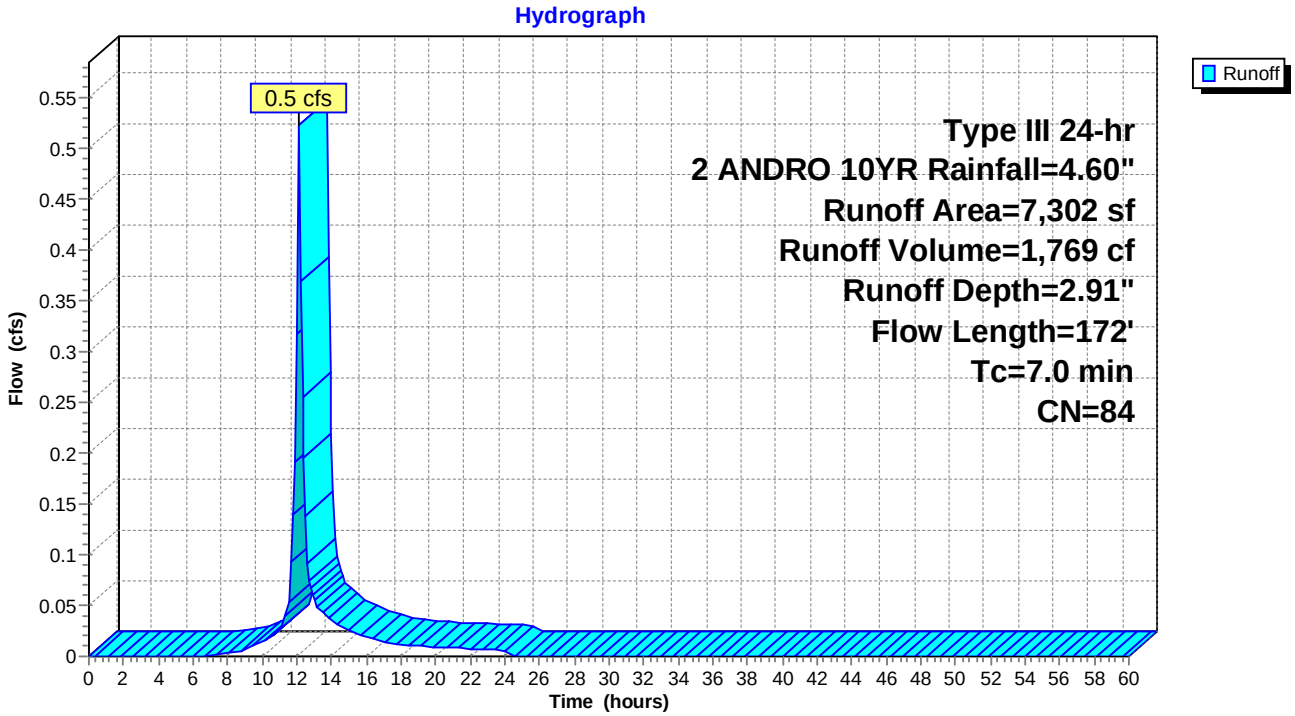
Runoff = 0.5 cfs @ 12.11 hrs, Volume= 1,769 cf, Depth= 2.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs
Type III 24-hr 2 ANDRO 10YR Rainfall=4.60"

	Area (sf)	CN	Description
*	2,957	98	Pavement
*	0	98	Roofs
	4,345	74	>75% Grass cover, Good, HSG C
	7,302	84	Weighted Average
	4,345		59.50% Pervious Area
	2,957		40.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	58	0.0050	0.7		**Sheet Flow, SF 1**
					Smooth surfaces n= 0.011 P2= 3.00"
1.0	114	0.0090	1.9		**Shallow Concentrated Flow, SCF 1**
					Paved Kv= 20.3 fps
4.6					**Direct Entry, DIRECT <7**
7.0	172	Total			

Subcatchment 103 E: 45 Campus to North



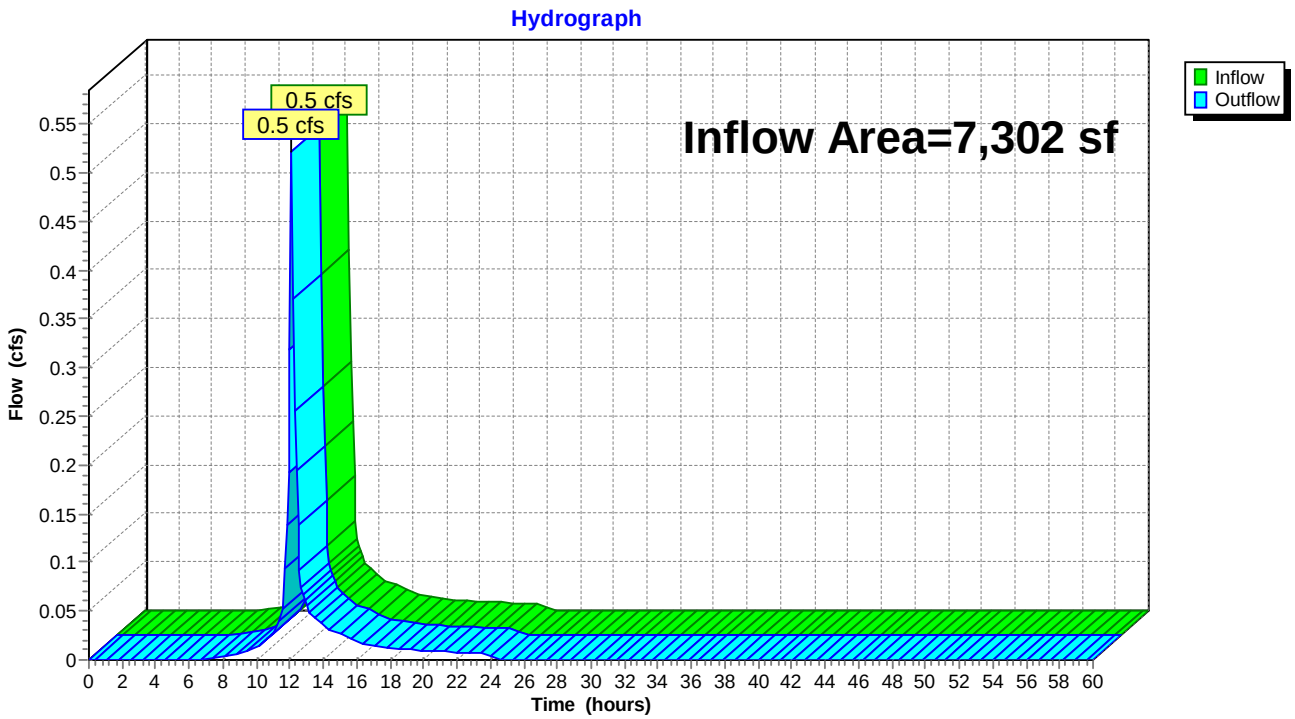
Summary for Reach SP1: SP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 7,302 sf, 40.50% Impervious, Inflow Depth = 2.91" for 2 ANDRO 10YR event
Inflow = 0.5 cfs @ 12.11 hrs, Volume= 1,769 cf
Outflow = 0.5 cfs @ 12.11 hrs, Volume= 1,769 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs / 2

Reach SP1: SP1



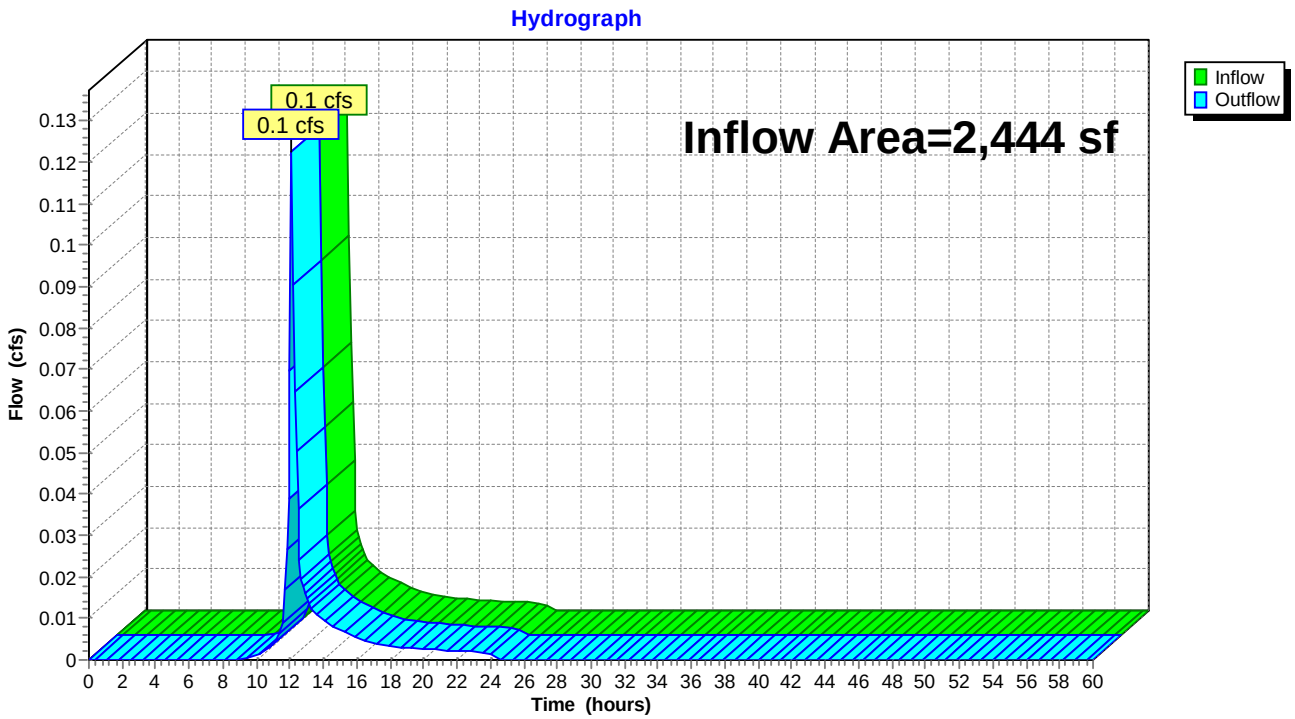
Summary for Reach SP2: SP2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2,444 sf, 1.64% Impervious, Inflow Depth = 2.05" for 2 ANDRO 10YR event
Inflow = 0.1 cfs @ 12.11 hrs, Volume= 417 cf
Outflow = 0.1 cfs @ 12.11 hrs, Volume= 417 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs / 2

Reach SP2: SP2



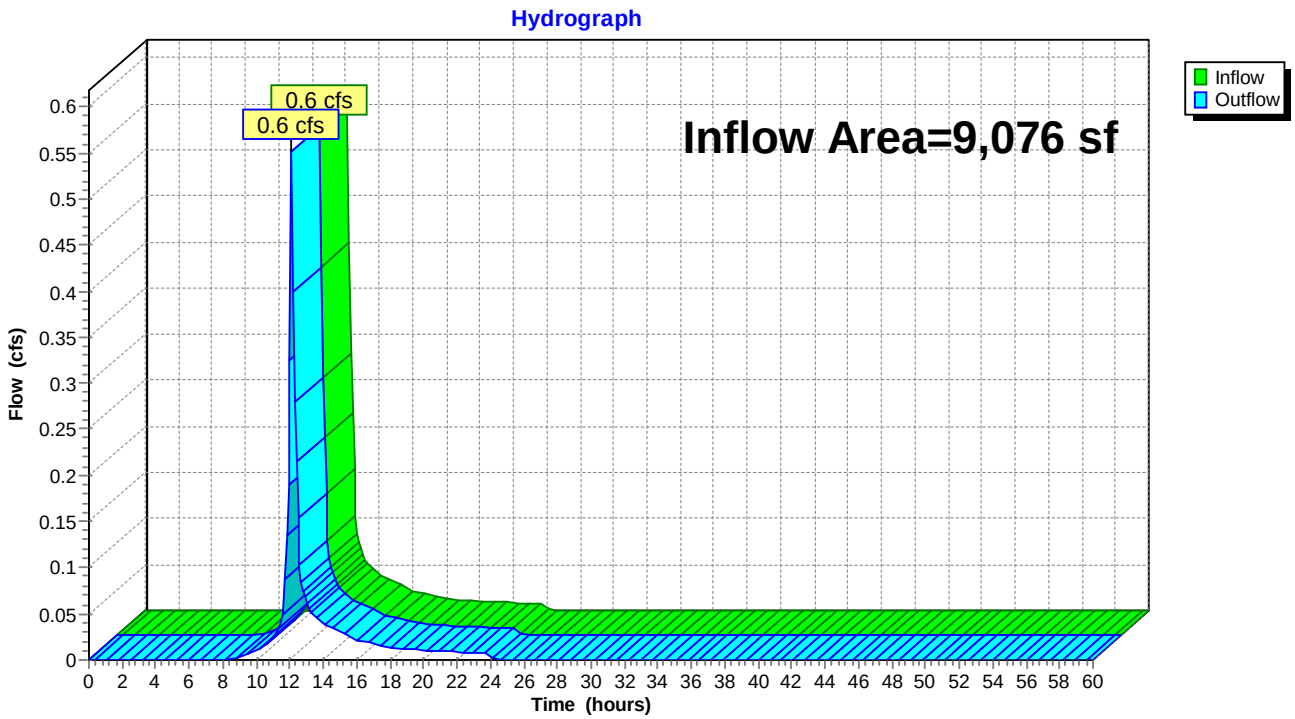
Summary for Reach SP3: SP3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9,076 sf, 22.58% Impervious, Inflow Depth = 2.46" for 2 ANDRO 10YR event
Inflow = 0.6 cfs @ 12.11 hrs, Volume= 1,861 cf
Outflow = 0.6 cfs @ 12.11 hrs, Volume= 1,861 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs / 2

Reach SP3: SP3



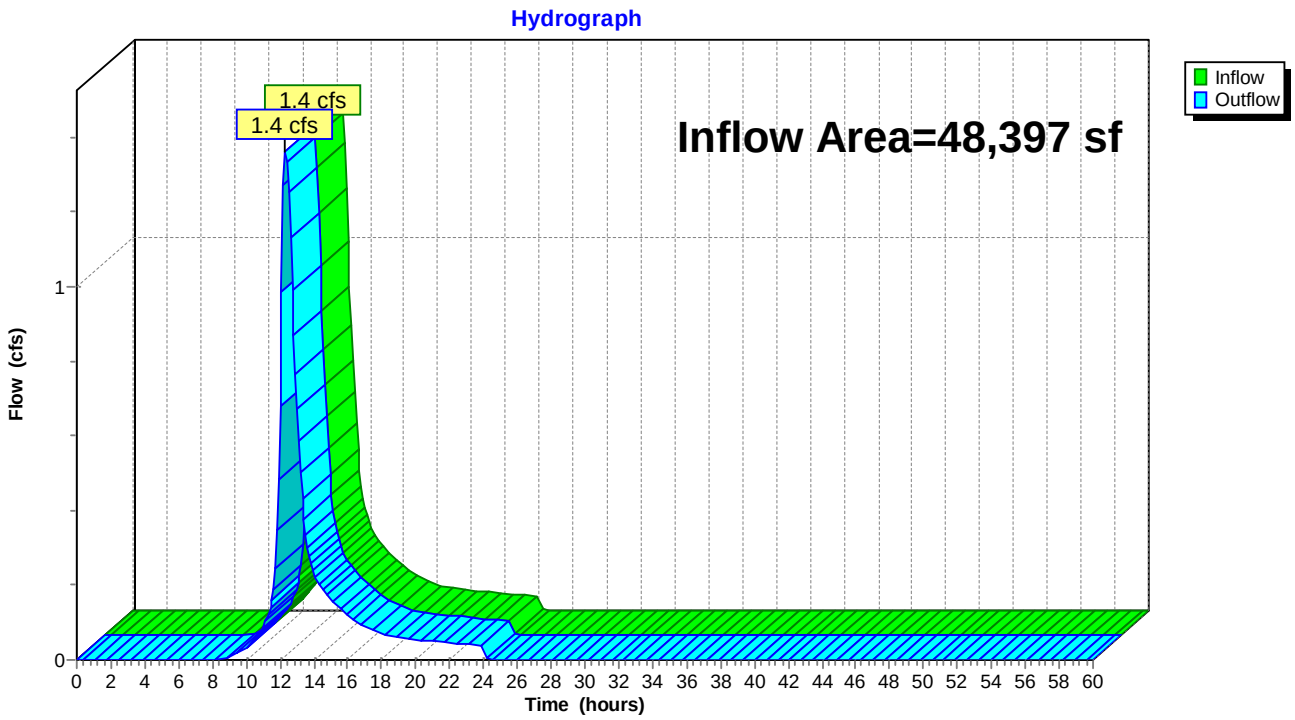
Summary for Reach SP4: SP4

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	48,397 sf,	5.68% Impervious,	Inflow Depth =	2.29"	for 2 ANDRO 10YR event
Inflow =	1.4 cfs @	12.33 hrs,	Volume=	9,245 cf	
Outflow =	1.4 cfs @	12.33 hrs,	Volume=	9,245 cf,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs / 2

Reach SP4: SP4



Summary for Pond PW: Wetlands

Inflow Area = 48,397 sf, 5.68% Impervious, Inflow Depth = 2.29" for 2 ANDRO 10YR event
Inflow = 2.7 cfs @ 12.11 hrs, Volume= 9,244 cf
Outflow = 1.4 cfs @ 12.33 hrs, Volume= 9,245 cf, Atten= 50%, Lag= 13.1 min
Primary = 1.4 cfs @ 12.33 hrs, Volume= 9,245 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs / 2
Peak Elev= 227.37' @ 12.33 hrs Surf.Area= 3,868 sf Storage= 1,650 cf

Plug-Flow detention time= 11.9 min calculated for 9,229 cf (100% of inflow)
Center-of-Mass det. time= 12.0 min (846.5 - 834.5)

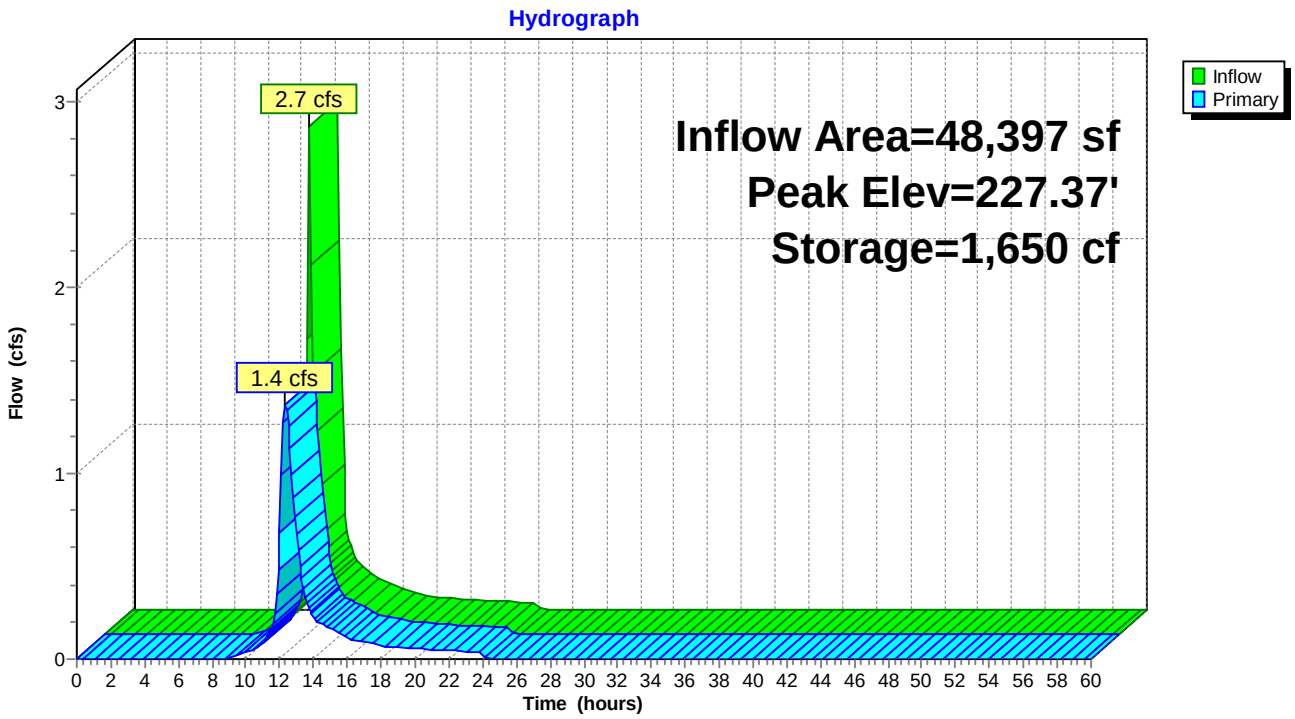
Volume	Invert	Avail.Storage	Storage Description
#1	226.50'	14,403 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
226.50	5	0	0
227.00	2,135	535	535
228.00	6,800	4,468	5,003
229.00	12,000	9,400	14,403

Device	Routing	Invert	Outlet Devices
#1	Primary	227.73'	**4.0" x 4.0" Horiz. Orifice/Grate X 16.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	226.43'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 226.43' / 225.73' S= 0.0280 '/' Cc= 0.900 n= 0.013, Flow Area= 0.35 sf
#3	Primary	227.00'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 227.00' / 225.73' S= 0.0508 '/' Cc= 0.900 n= 0.013, Flow Area= 0.35 sf

Primary OutFlow Max=1.4 cfs @ 12.33 hrs HW=227.37' TW=224.71' (Dynamic Tailwater)
- **1=Orifice/Grate** (Controls 0.0 cfs)
- **2=Culvert** (Inlet Controls 1.0 cfs @ 3.0 fps)
- **3=Culvert** (Inlet Controls 0.3 cfs @ 1.6 fps)

Pond PW: Wetlands



Summary for Pond PWC: CB (Wetlands)

[57] Hint: Peaked at 224.72' (Flood elevation advised)

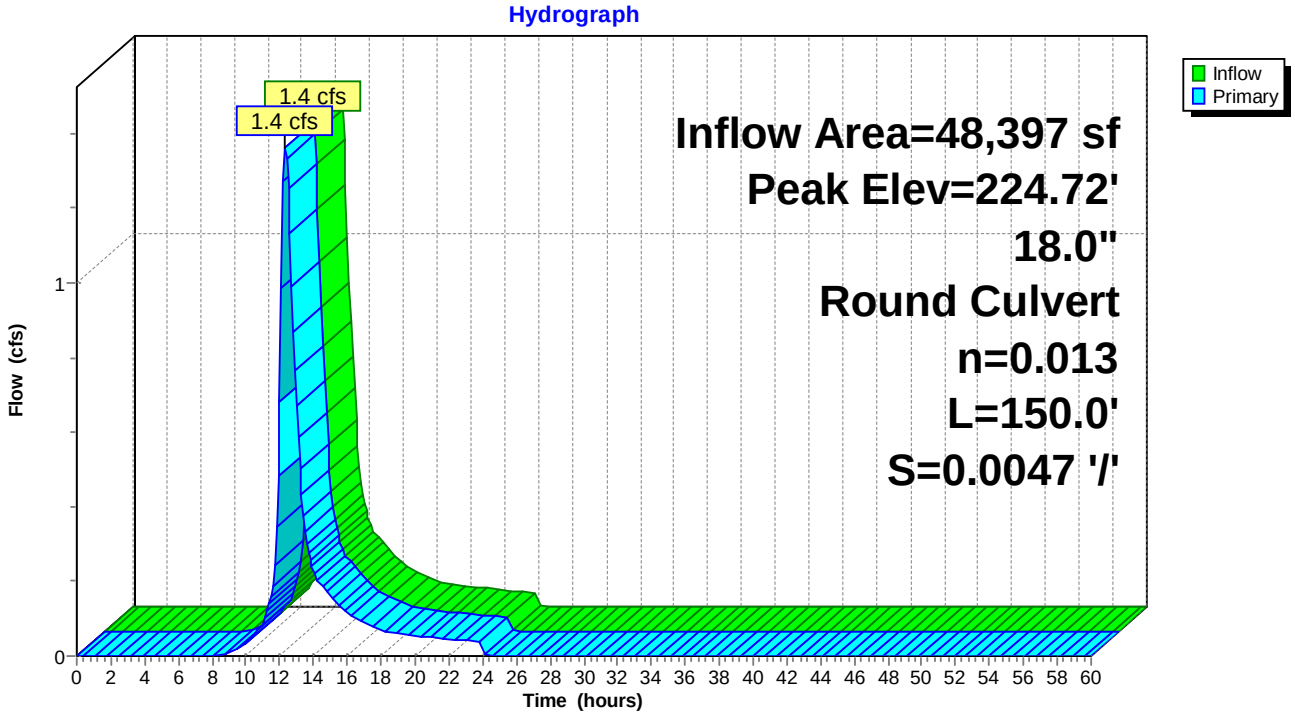
Inflow Area =	48,397 sf,	5.68% Impervious,	Inflow Depth =	2.29"	for 2 ANDRO 10YR event
Inflow =	1.4 cfs @	12.33 hrs,	Volume=	9,245 cf	
Outflow =	1.4 cfs @	12.33 hrs,	Volume=	9,245 cf,	Atten= 0%, Lag= 0.0 min
Primary =	1.4 cfs @	12.33 hrs,	Volume=	9,245 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs / 2
Peak Elev= 224.72' @ 12.33 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	224.10'	**18.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 224.10' / 223.40' S= 0.0047 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.4 cfs @ 12.33 hrs HW=224.71' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 1.4 cfs @ 2.9 fps)

Pond PWC: CB (Wetlands)



Time span=0.00-60.00 hrs, dt=0.10 hrs, 601 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 12-R: 45 Campus to East Runoff Area=2,444 sf 1.64% Impervious Runoff Depth=2.69"
Tc=7.0 min CN=74 Runoff=0.2 cfs 547 cf

Subcatchment 13-R: 45 Campus to wetland Runoff Area=48,397 sf 5.68% Impervious Runoff Depth=2.96"
Flow Length=300' Tc=7.0 min CN=77 Runoff=3.5 cfs 11,942 cf

Subcatchment 14-R: 45 Campus to West Runoff Area=9,076 sf 22.58% Impervious Runoff Depth=3.15"
Tc=7.0 min CN=79 Runoff=0.7 cfs 2,382 cf

Subcatchment 103 E: 45 Campus to North Runoff Area=7,302 sf 40.50% Impervious Runoff Depth=3.64"
Flow Length=172' Tc=7.0 min CN=84 Runoff=0.6 cfs 2,214 cf

Reach SP1: SP1 Inflow=0.6 cfs 2,214 cf
Outflow=0.6 cfs 2,214 cf

Reach SP2: SP2 Inflow=0.2 cfs 547 cf
Outflow=0.2 cfs 547 cf

Reach SP3: SP3 Inflow=0.7 cfs 2,382 cf
Outflow=0.7 cfs 2,382 cf

Reach SP4: SP4 Inflow=1.7 cfs 11,944 cf
Outflow=1.7 cfs 11,944 cf

Pond PW: Wetlands Peak Elev=227.52' Storage=2,253 cf Inflow=3.5 cfs 11,942 cf
Outflow=1.7 cfs 11,944 cf

Pond PWC: CB (Wetlands) Peak Elev=224.80' Inflow=1.7 cfs 11,944 cf
18.0" Round Culvert n=0.013 L=150.0' S=0.0047 '/' Outflow=1.7 cfs 11,944 cf

Total Runoff Area = 67,219 sf Runoff Volume = 17,085 cf Average Runoff Depth = 3.05"
88.40% Pervious = 59,423 sf 11.60% Impervious = 7,796 sf

Summary for Subcatchment 12-R: 45 Campus to East

[49] Hint: Tc<2dt may require smaller dt

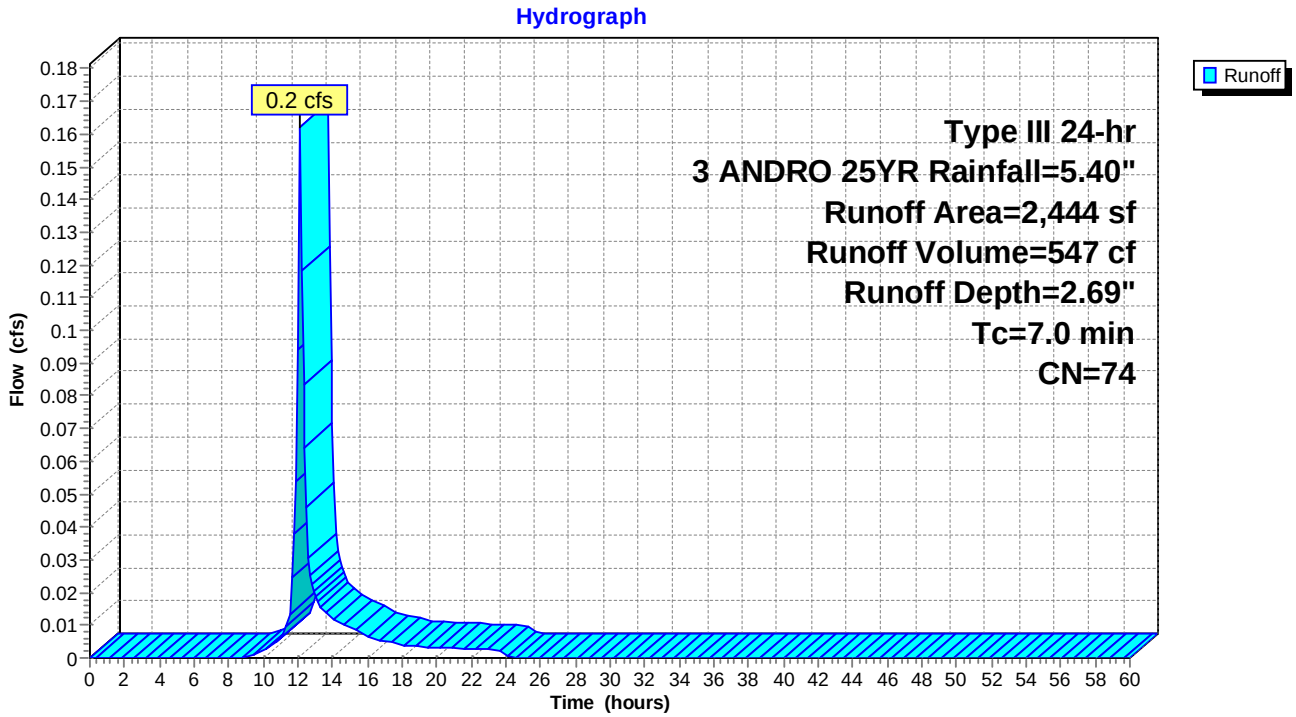
Runoff = 0.2 cfs @ 12.11 hrs, Volume= 547 cf, Depth= 2.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs
Type III 24-hr 3 ANDRO 25YR Rainfall=5.40"

	Area (sf)	CN	Description
*	0	98	Pavement
*	40	98	Roofs
	2,404	74	>75% Grass cover, Good, HSG C
	0	65	Brush, Good, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	72	Woods/grass comb., Good, HSG C
	2,444	74	Weighted Average
	2,404		98.36% Pervious Area
	40		1.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, DIRECT <7**

Subcatchment 12-R: 45 Campus to East



Summary for Subcatchment 13-R: 45 Campus to wetland

[49] Hint: Tc<2dt may require smaller dt

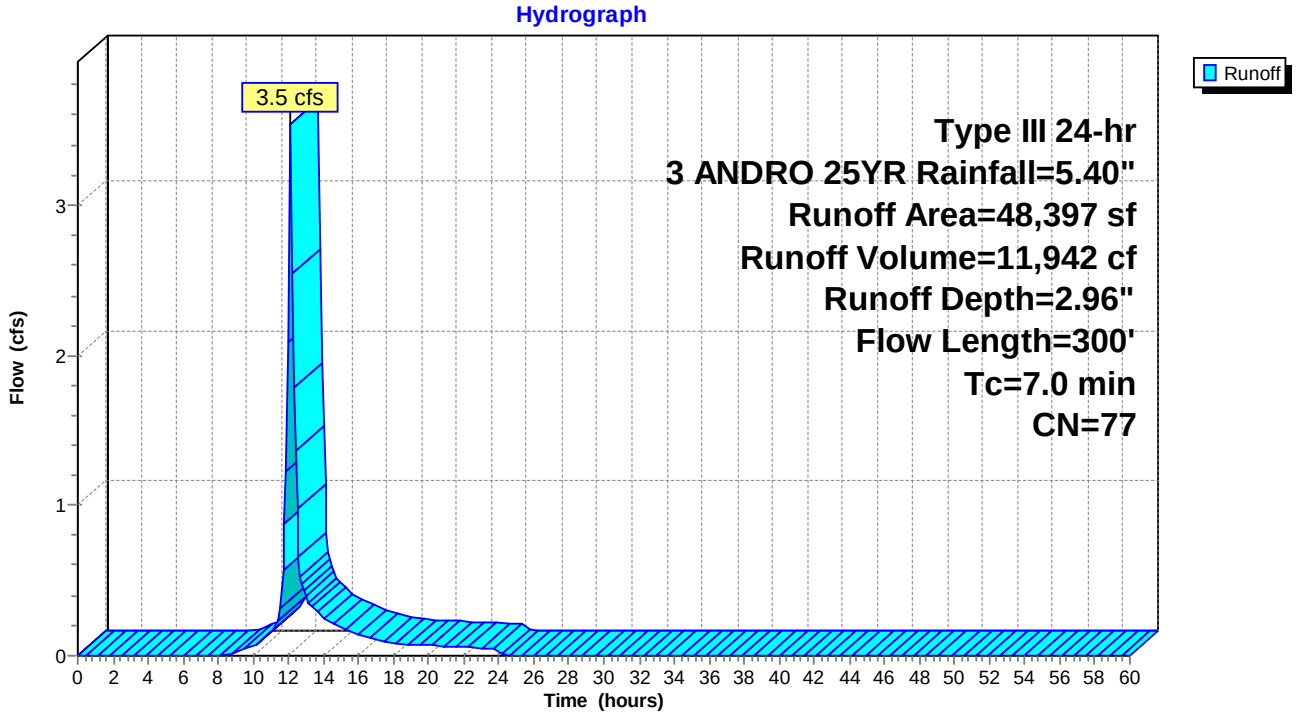
Runoff = 3.5 cfs @ 12.11 hrs, Volume= 11,942 cf, Depth= 2.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs
Type III 24-hr 3 ANDRO 25YR Rainfall=5.40"

	Area (sf)	CN	Description
*	2,750	98	Roofs, pavment, ramps
	25,475	74	>75% Grass cover, Good, HSG C
	18,776	78	Meadow, non-grazed, HSG D
	1,396	72	Woods/grass comb., Good, HSG C
	48,397	77	Weighted Average
	45,647		94.32% Pervious Area
	2,750		5.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	30	0.0330	0.1		**Sheet Flow, SF 1**
					Grass: Dense n= 0.240 P2= 3.00"
1.3	270	0.0460	3.5		**Shallow Concentrated Flow, SCF 1**
					Unpaved Kv= 16.1 fps
1.1					**Direct Entry, DIRECT TO 7**
7.0	300	Total			

Subcatchment 13-R: 45 Campus to wetland



Summary for Subcatchment 14-R: 45 Campus to West

[49] Hint: Tc<2dt may require smaller dt

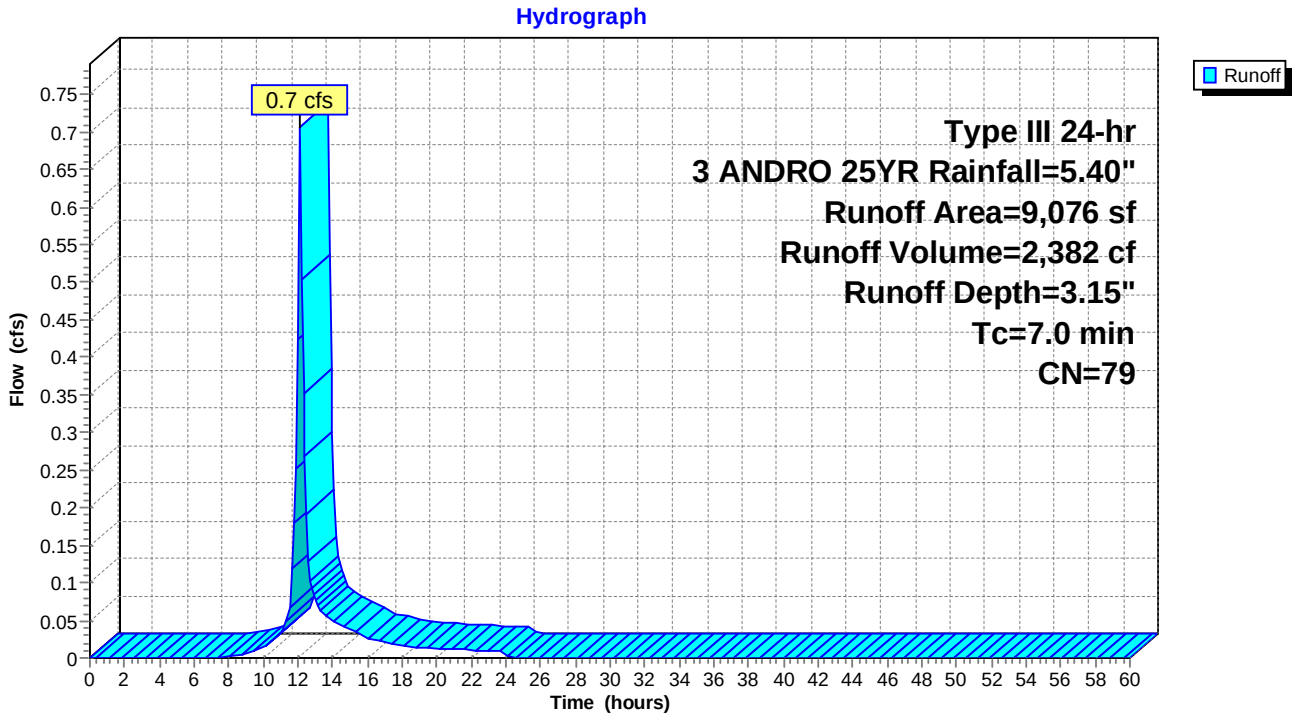
Runoff = 0.7 cfs @ 12.11 hrs, Volume= 2,382 cf, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs
Type III 24-hr 3 ANDRO 25YR Rainfall=5.40"

	Area (sf)	CN	Description
*	1,200	98	Pavement
*	849	98	Roofs
	7,027	74	>75% Grass cover, Good, HSG C
	0	65	Brush, Good, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	72	Woods/grass comb., Good, HSG C
	9,076	79	Weighted Average
	7,027		77.42% Pervious Area
	2,049		22.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, DIRECT <7**

Subcatchment 14-R: 45 Campus to West



Summary for Subcatchment 103 E: 45 Campus to North

[49] Hint: Tc<2dt may require smaller dt

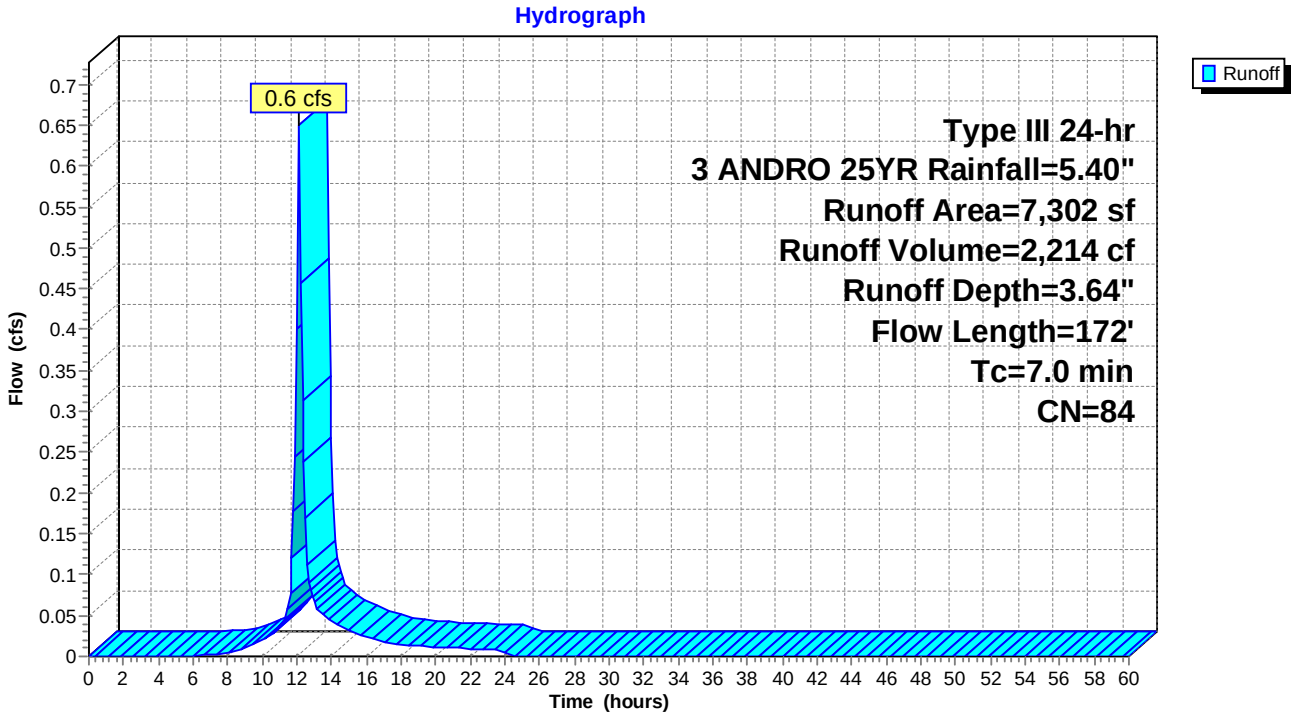
Runoff = 0.6 cfs @ 12.11 hrs, Volume= 2,214 cf, Depth= 3.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs
Type III 24-hr 3 ANDRO 25YR Rainfall=5.40"

	Area (sf)	CN	Description
*	2,957	98	Pavement
*	0	98	Roofs
	4,345	74	>75% Grass cover, Good, HSG C
	7,302	84	Weighted Average
	4,345		59.50% Pervious Area
	2,957		40.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	58	0.0050	0.7		**Sheet Flow, SF 1**
					Smooth surfaces n= 0.011 P2= 3.00"
1.0	114	0.0090	1.9		**Shallow Concentrated Flow, SCF 1**
					Paved Kv= 20.3 fps
4.6					**Direct Entry, DIRECT <7**
7.0	172	Total			

Subcatchment 103 E: 45 Campus to North



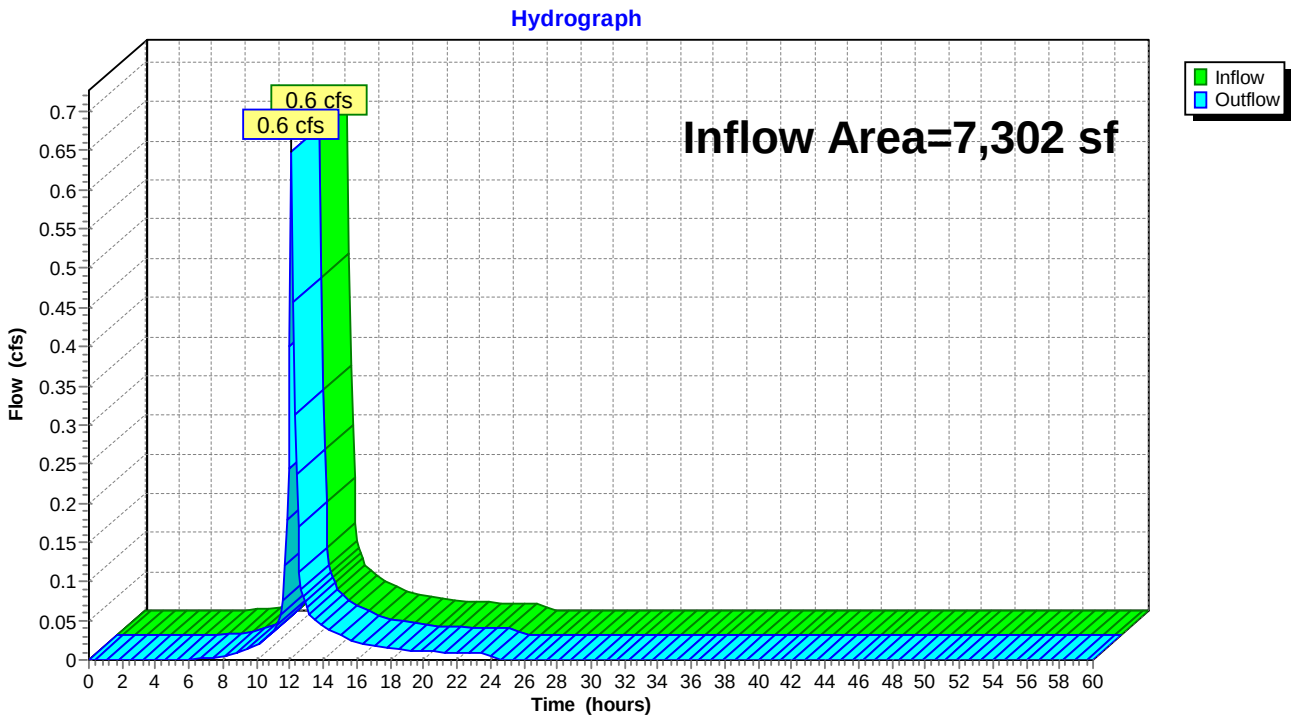
Summary for Reach SP1: SP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 7,302 sf, 40.50% Impervious, Inflow Depth = 3.64" for 3 ANDRO 25YR event
Inflow = 0.6 cfs @ 12.11 hrs, Volume= 2,214 cf
Outflow = 0.6 cfs @ 12.11 hrs, Volume= 2,214 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs / 2

Reach SP1: SP1



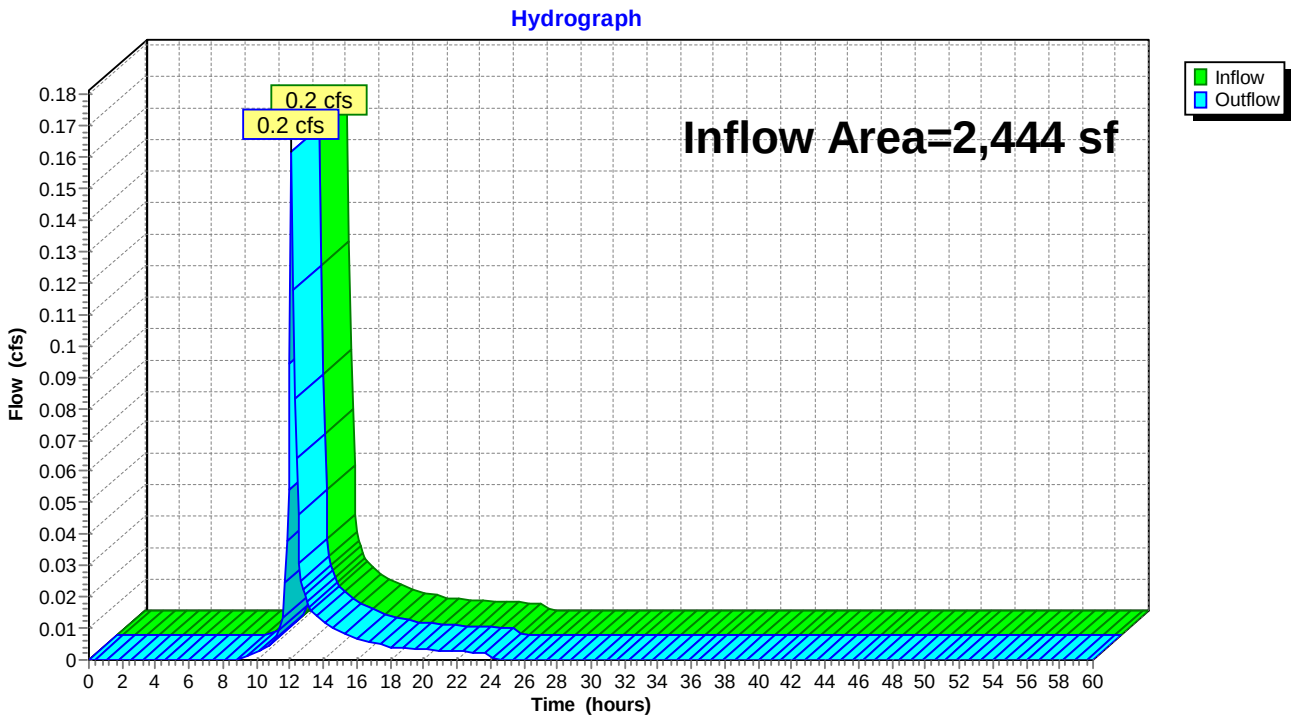
Summary for Reach SP2: SP2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2,444 sf, 1.64% Impervious, Inflow Depth = 2.69" for 3 ANDRO 25YR event
Inflow = 0.2 cfs @ 12.11 hrs, Volume= 547 cf
Outflow = 0.2 cfs @ 12.11 hrs, Volume= 547 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs / 2

Reach SP2: SP2



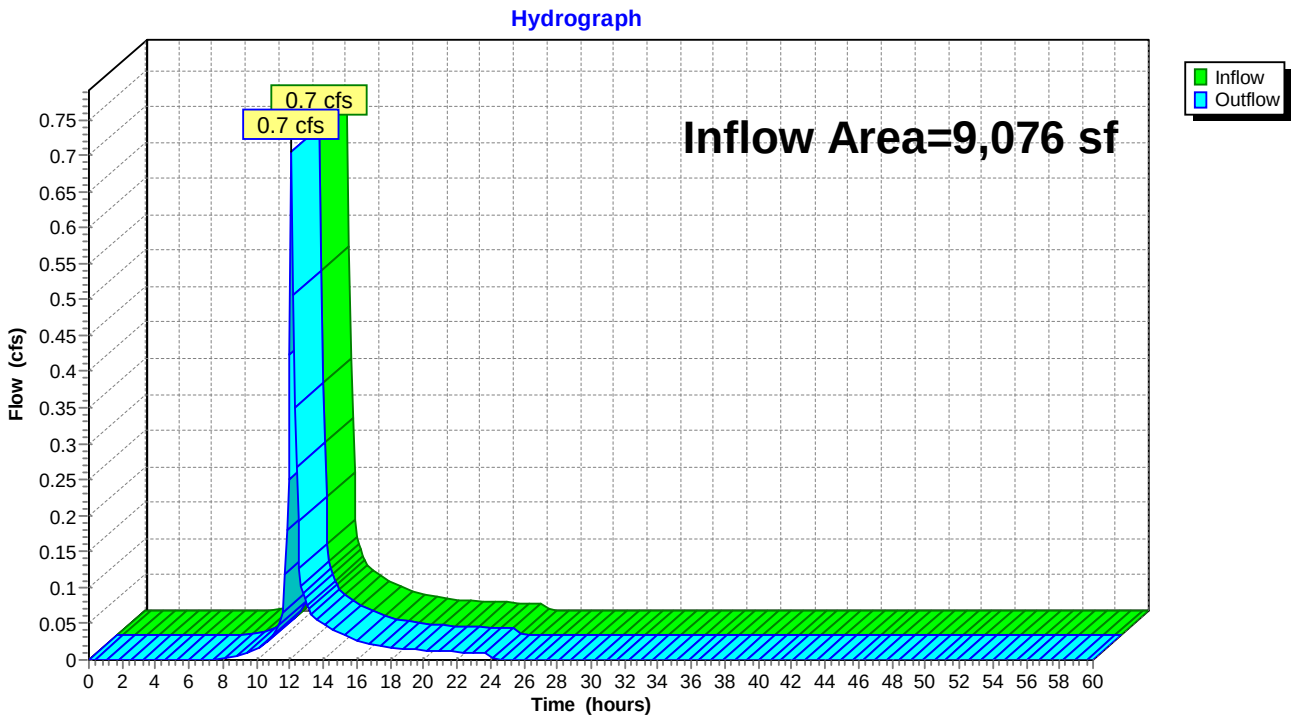
Summary for Reach SP3: SP3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 9,076 sf, 22.58% Impervious, Inflow Depth = 3.15" for 3 ANDRO 25YR event
Inflow = 0.7 cfs @ 12.11 hrs, Volume= 2,382 cf
Outflow = 0.7 cfs @ 12.11 hrs, Volume= 2,382 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs / 2

Reach SP3: SP3



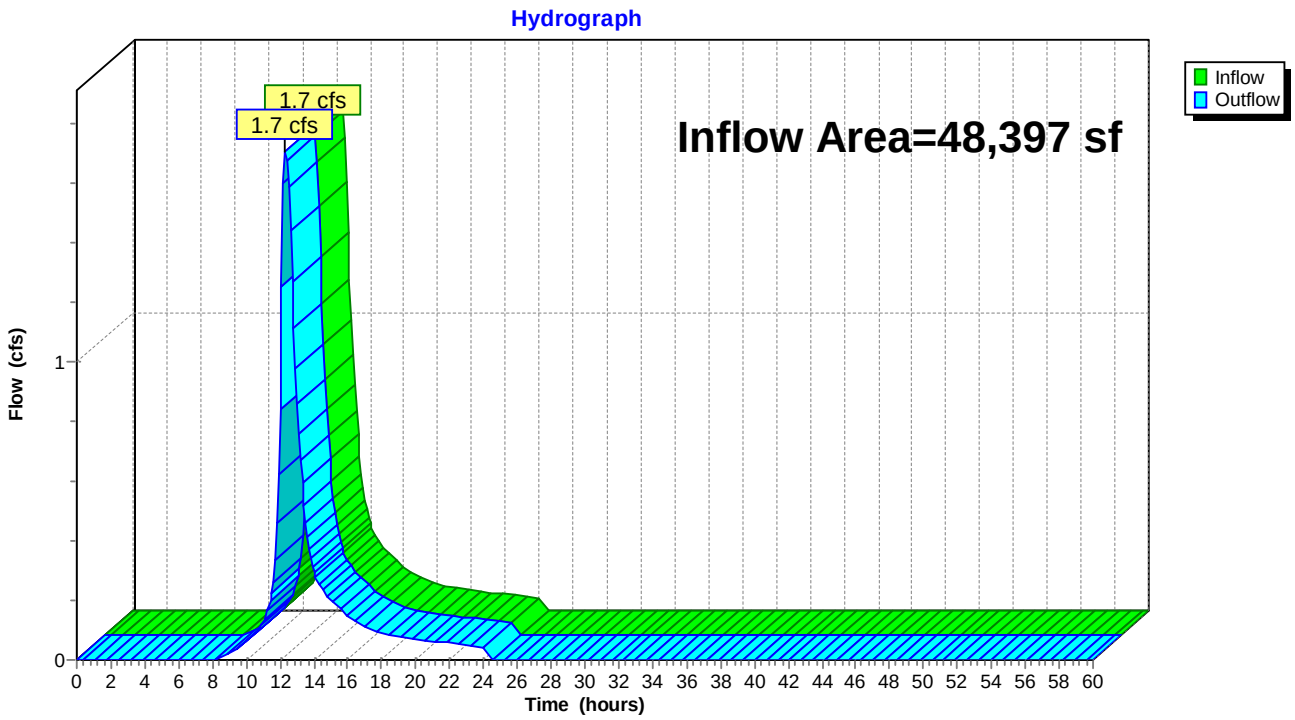
Summary for Reach SP4: SP4

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	48,397 sf,	5.68% Impervious,	Inflow Depth =	2.96"	for 3 ANDRO 25YR event
Inflow =	1.7 cfs @	12.33 hrs,	Volume=	11,944 cf	
Outflow =	1.7 cfs @	12.33 hrs,	Volume=	11,944 cf,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs / 2

Reach SP4: SP4



Summary for Pond PW: Wetlands

Inflow Area = 48,397 sf, 5.68% Impervious, Inflow Depth = 2.96" for 3 ANDRO 25YR event
Inflow = 3.5 cfs @ 12.11 hrs, Volume= 11,942 cf
Outflow = 1.7 cfs @ 12.33 hrs, Volume= 11,944 cf, Atten= 52%, Lag= 13.4 min
Primary = 1.7 cfs @ 12.33 hrs, Volume= 11,944 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs / 2
Peak Elev= 227.52' @ 12.33 hrs Surf.Area= 4,538 sf Storage= 2,253 cf

Plug-Flow detention time= 13.3 min calculated for 11,924 cf (100% of inflow)
Center-of-Mass det. time= 13.4 min (840.5 - 827.2)

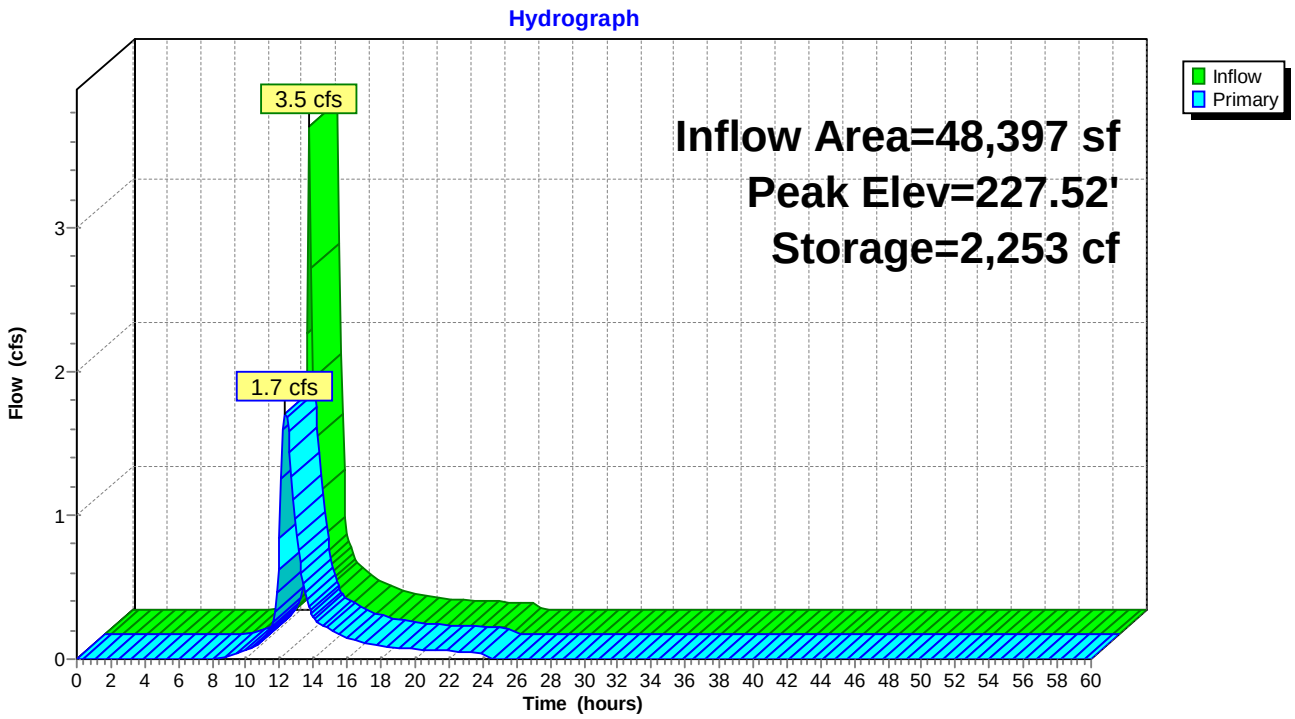
Volume	Invert	Avail.Storage	Storage Description
#1	226.50'	14,403 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
226.50	5	0	0
227.00	2,135	535	535
228.00	6,800	4,468	5,003
229.00	12,000	9,400	14,403

Device	Routing	Invert	Outlet Devices
#1	Primary	227.73'	**4.0" x 4.0" Horiz. Orifice/Grate X 16.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	226.43'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 226.43' / 225.73' S= 0.0280 '/' Cc= 0.900 n= 0.013, Flow Area= 0.35 sf
#3	Primary	227.00'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 227.00' / 225.73' S= 0.0508 '/' Cc= 0.900 n= 0.013, Flow Area= 0.35 sf

Primary OutFlow Max=1.7 cfs @ 12.33 hrs HW=227.51' TW=224.79' (Dynamic Tailwater)
- **1=Orifice/Grate** (Controls 0.0 cfs)
- **2=Culvert** (Inlet Controls 1.1 cfs @ 3.3 fps)
- **3=Culvert** (Inlet Controls 0.5 cfs @ 1.9 fps)

Pond PW: Wetlands



Summary for Pond PWC: CB (Wetlands)

[57] Hint: Peaked at 224.80' (Flood elevation advised)

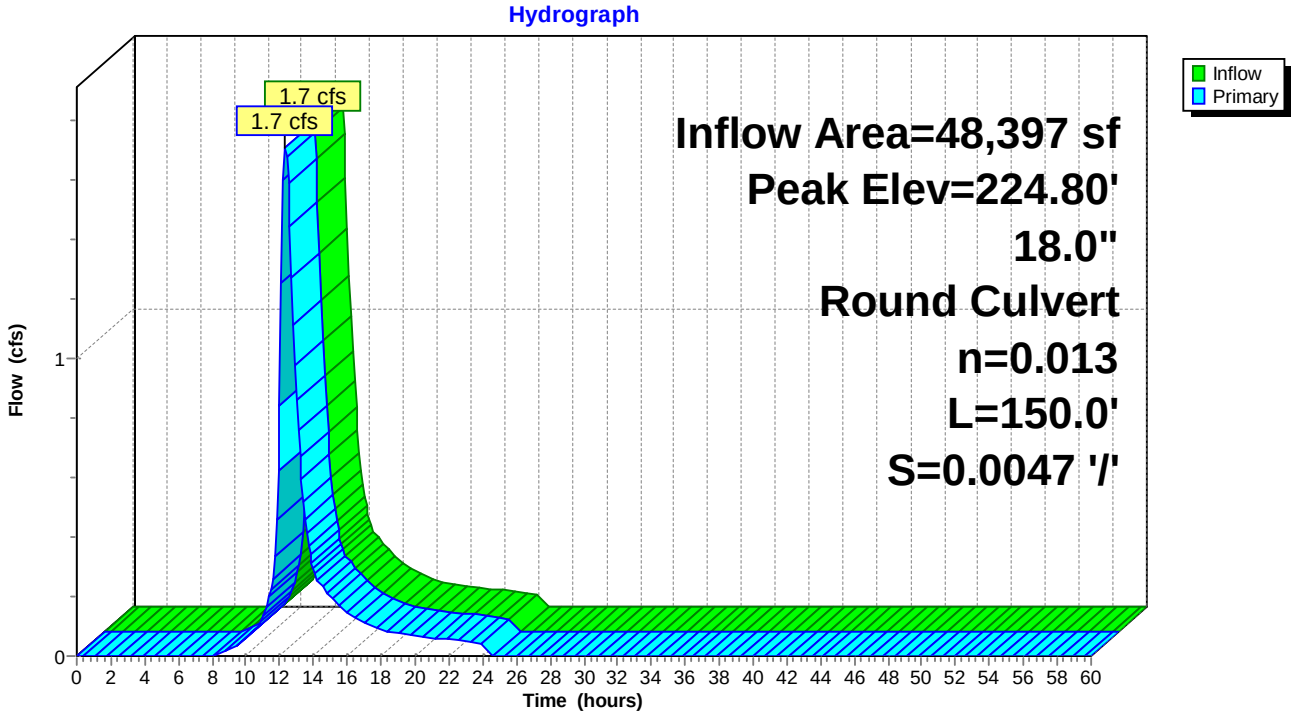
Inflow Area =	48,397 sf,	5.68% Impervious,	Inflow Depth =	2.96"	for 3 ANDRO 25YR event
Inflow =	1.7 cfs @	12.33 hrs, Volume=	11,944 cf		
Outflow =	1.7 cfs @	12.33 hrs, Volume=	11,944 cf,	Atten= 0%,	Lag= 0.0 min
Primary =	1.7 cfs @	12.33 hrs, Volume=	11,944 cf		

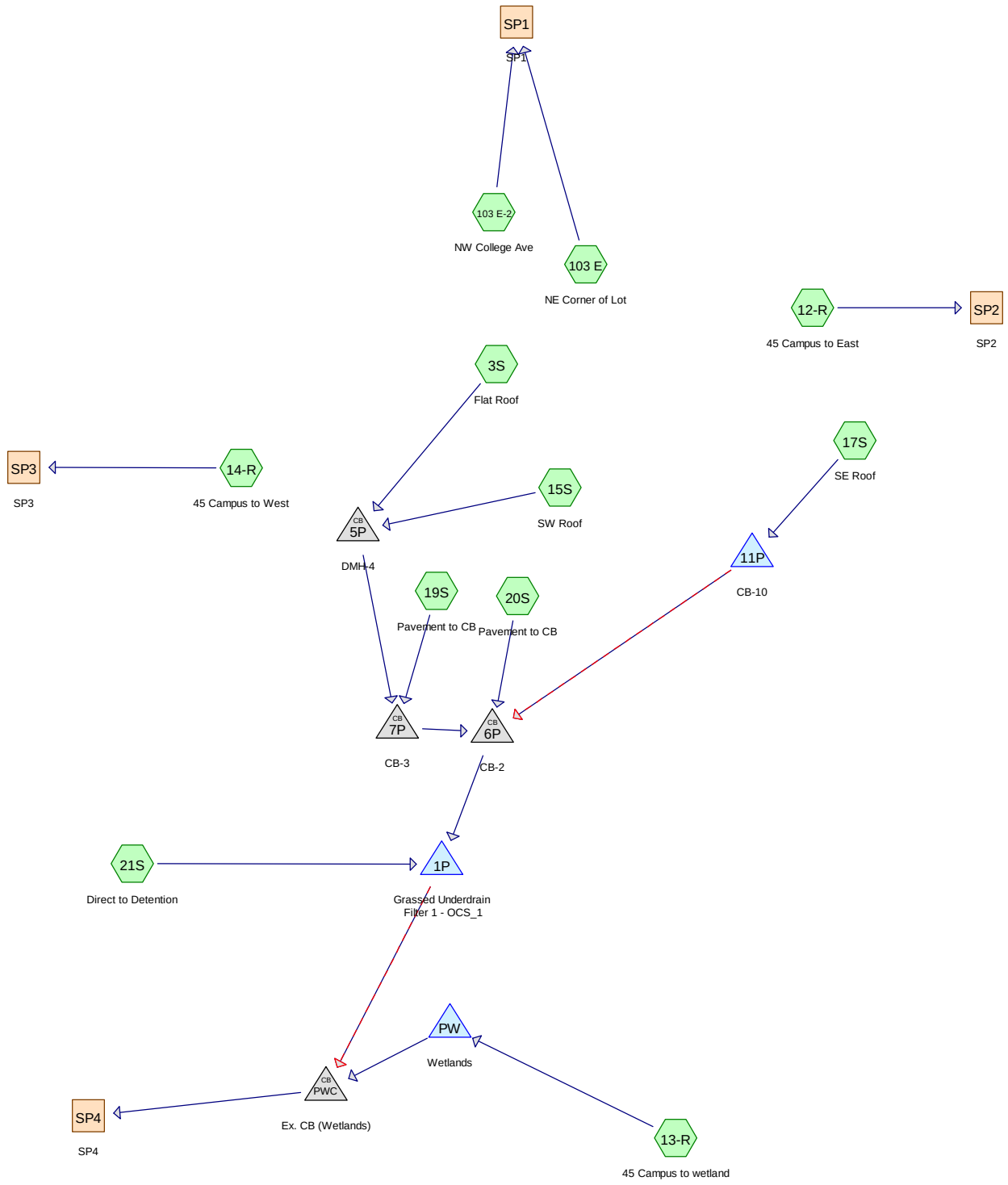
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.10 hrs / 2
Peak Elev= 224.80' @ 12.33 hrs

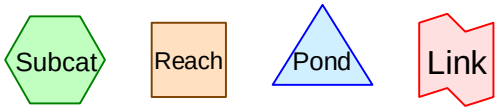
Device	Routing	Invert	Outlet Devices
#1	Primary	224.10'	**18.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 224.10' / 223.40' S= 0.0047 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.7 cfs @ 12.33 hrs HW=224.79' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 1.7 cfs @ 3.1 fps)

Pond PWC: CB (Wetlands)







Routing Diagram for April Bates POST 6-18-2018
Prepared by {enter your company name here}, Printed 6/19/2018
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.118	74	>75% Grass cover, Good, HSG C (12-R, 13-R, 14-R, 19S, 103 E)
0.035	73	Grass - C (17S, 20S)
0.028	73	Landscape (103 E-2)
0.431	78	Meadow, non-grazed, HSG D (13-R)
0.083	98	Other Impervious (17S, 103 E, 103 E-2)
0.314	98	Pavement (12-R, 14-R, 19S, 20S)
0.344	98	Roof (3S, 15S, 17S)
0.158	73	Type C Grassed (21S)
0.032	72	Woods/grass comb., Good, HSG C (13-R)
1.543	**86**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.150	HSG C	12-R, 13-R, 14-R, 19S, 103 E
0.431	HSG D	13-R
0.962	Other	3S, 12-R, 14-R, 15S, 17S, 19S, 20S, 21S, 103 E, 103 E-2
1.543		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.118	0.000	0.000	0.118	>75% Grass cover, Good	12-R, 13-R, 14-R, 19S, 103 E
0.000	0.000	0.000	0.000	0.035	0.035	Grass - C	17S, 20S
0.000	0.000	0.000	0.000	0.028	0.028	Landscape	103 E-2
0.000	0.000	0.000	0.431	0.000	0.431	Meadow, non-grazed	13-R
0.000	0.000	0.000	0.000	0.083	0.083	Other Impervious	17S, 103 E, 103 E-2
0.000	0.000	0.000	0.000	0.314	0.314	Pavement	12-R, 14-R, 19S, 20S
0.000	0.000	0.000	0.000	0.344	0.344	Roof	3S, 15S, 17S
0.000	0.000	0.000	0.000	0.158	0.158	Type C Grassed	21S
0.000	0.000	0.032	0.000	0.000	0.032	Woods/grass comb., Good	13-R
0.000	**0.000**	**0.150**	**0.431**	**0.962**	**1.543**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	226.13	225.13	100.0	0.0100	0.012	12.0	0.0	0.0
2	1P	227.00	226.80	25.0	0.0080	0.012	4.0	0.0	0.0
3	5P	231.10	230.60	80.0	0.0063	0.012	15.0	0.0	0.0
4	6P	229.75	229.50	45.0	0.0056	0.012	15.0	0.0	0.0
5	7P	230.60	230.35	50.0	0.0050	0.012	15.0	0.0	0.0
6	11P	231.90	229.85	125.0	0.0164	0.012	12.0	0.0	0.0
7	PW	226.43	225.73	25.0	0.0280	0.013	8.0	0.0	0.0
8	PW	227.00	225.73	25.0	0.0508	0.013	8.0	0.0	0.0
9	PWC	224.10	223.40	150.0	0.0047	0.013	18.0	0.0	0.0

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3S: Flat Roof Runoff Area=8,953 sf 100.00% Impervious Runoff Depth=2.77"
Tc=7.0 min CN=98 Runoff=0.6 cfs 0.047 af

Subcatchment 12-R: 45 Campus to East Runoff Area=206 sf 44.17% Impervious Runoff Depth=1.59"
Tc=7.0 min CN=85 Runoff=0.0 cfs 0.001 af

Subcatchment 13-R: 45 Campus to wetland Runoff Area=21,850 sf 0.00% Impervious Runoff Depth=1.07"
Flow Length=300' Tc=7.0 min CN=77 Runoff=0.6 cfs 0.045 af

Subcatchment 14-R: 45 Campus to West Runoff Area=6,092 sf 52.40% Impervious Runoff Depth=1.74"
Tc=7.0 min CN=87 Runoff=0.3 cfs 0.020 af

Subcatchment 15S: SW Roof Runoff Area=4,014 sf 100.00% Impervious Runoff Depth=2.77"
Tc=7.0 min CN=98 Runoff=0.3 cfs 0.021 af

Subcatchment 17S: SE Roof Runoff Area=3,138 sf 79.03% Impervious Runoff Depth=2.25"
Tc=7.0 min CN=93 Runoff=0.2 cfs 0.014 af

Subcatchment 19S: Pavement to CB Runoff Area=3,256 sf 94.63% Impervious Runoff Depth=2.66"
Tc=7.0 min CN=97 Runoff=0.2 cfs 0.017 af

Subcatchment 20S: Pavement to CB Runoff Area=8,174 sf 89.65% Impervious Runoff Depth=2.45"
Tc=7.0 min CN=95 Runoff=0.5 cfs 0.038 af

Subcatchment 21S: Direct to Detention Runoff Area=6,898 sf 0.00% Impervious Runoff Depth=0.86"
Tc=7.0 min CN=73 Runoff=0.1 cfs 0.011 af

Subcatchment 103 E: NE Corner of Lot Runoff Area=2,826 sf 90.02% Impervious Runoff Depth=2.55"
Flow Length=172' Tc=7.0 min CN=96 Runoff=0.2 cfs 0.014 af

Subcatchment 103 E-2: NW College Ave Runoff Area=1,815 sf 33.55% Impervious Runoff Depth=1.31"
Tc=7.0 min CN=81 Runoff=0.1 cfs 0.005 af

Reach SP1: SP1 Inflow=0.2 cfs 0.018 af
Outflow=0.2 cfs 0.018 af

Reach SP2: SP2 Inflow=0.0 cfs 0.001 af
Outflow=0.0 cfs 0.001 af

Reach SP3: SP3 Inflow=0.3 cfs 0.020 af
Outflow=0.3 cfs 0.020 af

Reach SP4: SP4 Inflow=0.5 cfs 0.183 af
Outflow=0.5 cfs 0.183 af

Pond 1P: Grassed Underdrain Filter 1 - OCS_1 Peak Elev=229.73' Storage=3,277 cf Inflow=1.9 cfs 0.147 af
Primary=0.1 cfs 0.138 af Secondary=0.0 cfs 0.000 af Outflow=0.1 cfs 0.138 af

Pond 5P: DMH-4 Peak Elev=231.62' Inflow=0.8 cfs 0.069 af
15.0" Round Culvert n=0.012 L=80.0' S=0.0063 '/' Outflow=0.8 cfs 0.069 af

Pond 6P: CB-2 Peak Elev=230.51' Inflow=1.7 cfs 0.135 af
15.0" Round Culvert n=0.012 L=45.0' S=0.0056 '/' Outflow=1.7 cfs 0.135 af

Pond 7P: CB-3 Peak Elev=231.18' Inflow=1.0 cfs 0.085 af
15.0" Round Culvert n=0.012 L=50.0' S=0.0050 '/' Outflow=1.0 cfs 0.085 af

Pond 11P: CB-10 Peak Elev=238.02' Storage=81 cf Inflow=0.2 cfs 0.014 af
Outflow=0.2 cfs 0.012 af

Pond PW: Wetlands Peak Elev=226.82' Storage=224 cf Inflow=0.6 cfs 0.045 af
Outflow=0.4 cfs 0.045 af

Pond PWC: Ex. CB (Wetlands) Peak Elev=224.46' Inflow=0.5 cfs 0.183 af
18.0" Round Culvert n=0.013 L=150.0' S=0.0047 '/' Outflow=0.5 cfs 0.183 af

Total Runoff Area = 1.543 ac Runoff Volume = 0.232 af Average Runoff Depth = 1.81"
51.96% Pervious = 0.802 ac 48.04% Impervious = 0.741 ac

Summary for Subcatchment 3S: Flat Roof

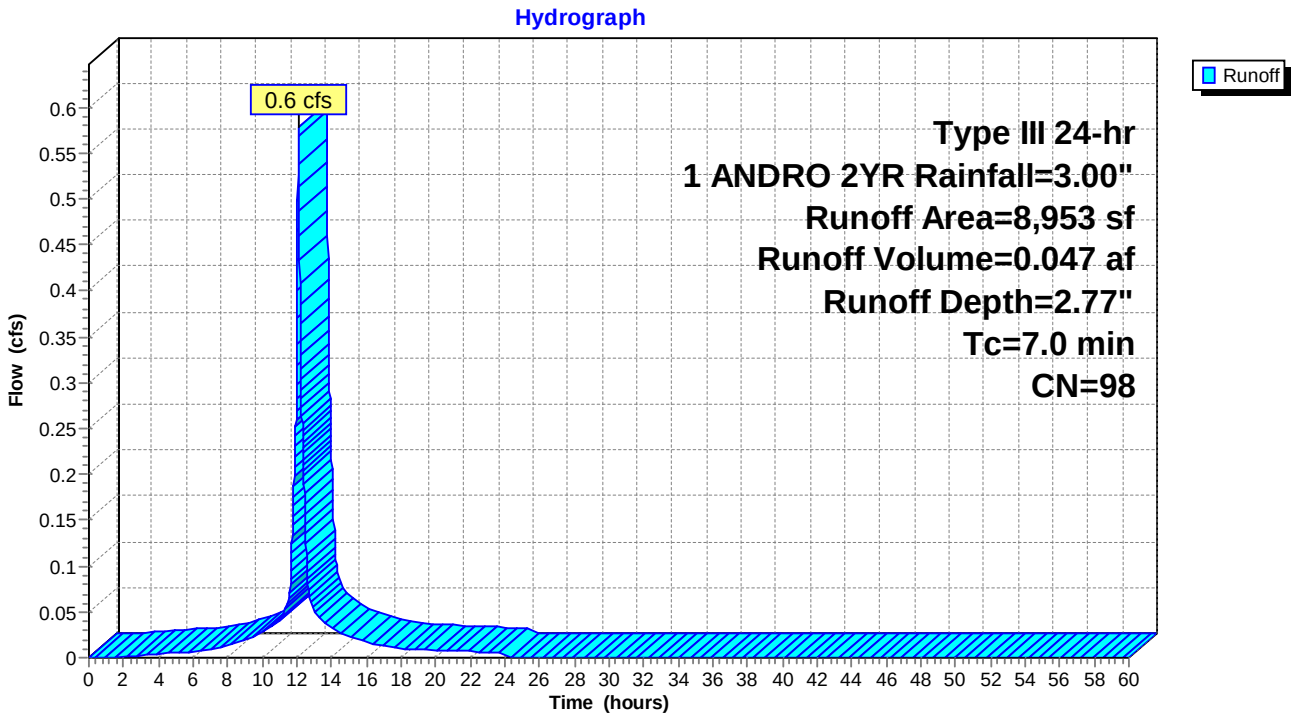
Runoff = 0.6 cfs @ 12.10 hrs, Volume= 0.047 af, Depth= 2.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 ANDRO 2YR Rainfall=3.00"

	Area (sf)	CN	Description
*	8,953	98	Roof
	8,953		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, Min 7**

Subcatchment 3S: Flat Roof



Summary for Subcatchment 12-R: 45 Campus to East

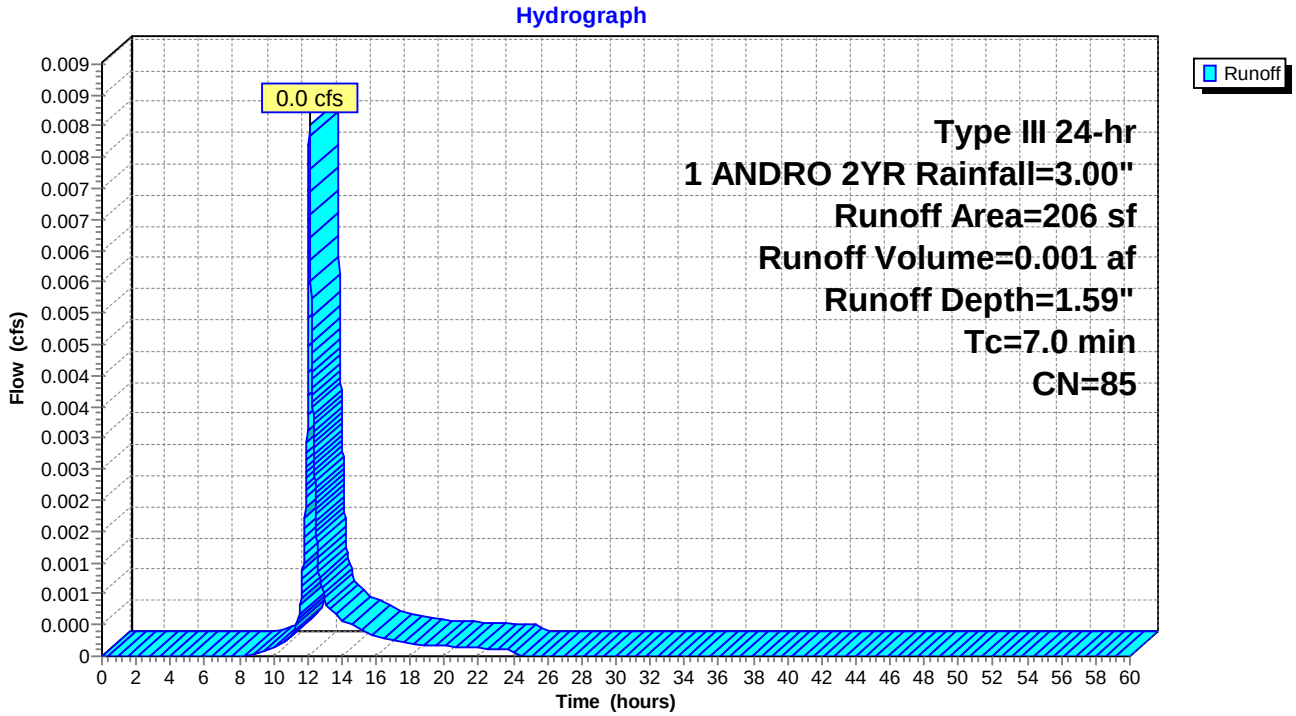
Runoff = 0.0 cfs @ 12.10 hrs, Volume= 0.001 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 ANDRO 2YR Rainfall=3.00"

	Area (sf)	CN	Description
*	91	98	Pavement
*	0	98	Roofs
	115	74	>75% Grass cover, Good, HSG C
	0	65	Brush, Good, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	72	Woods/grass comb., Good, HSG C
	206	85	Weighted Average
	115		55.83% Pervious Area
	91		44.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, DIRECT <7**

Subcatchment 12-R: 45 Campus to East



Summary for Subcatchment 13-R: 45 Campus to wetland

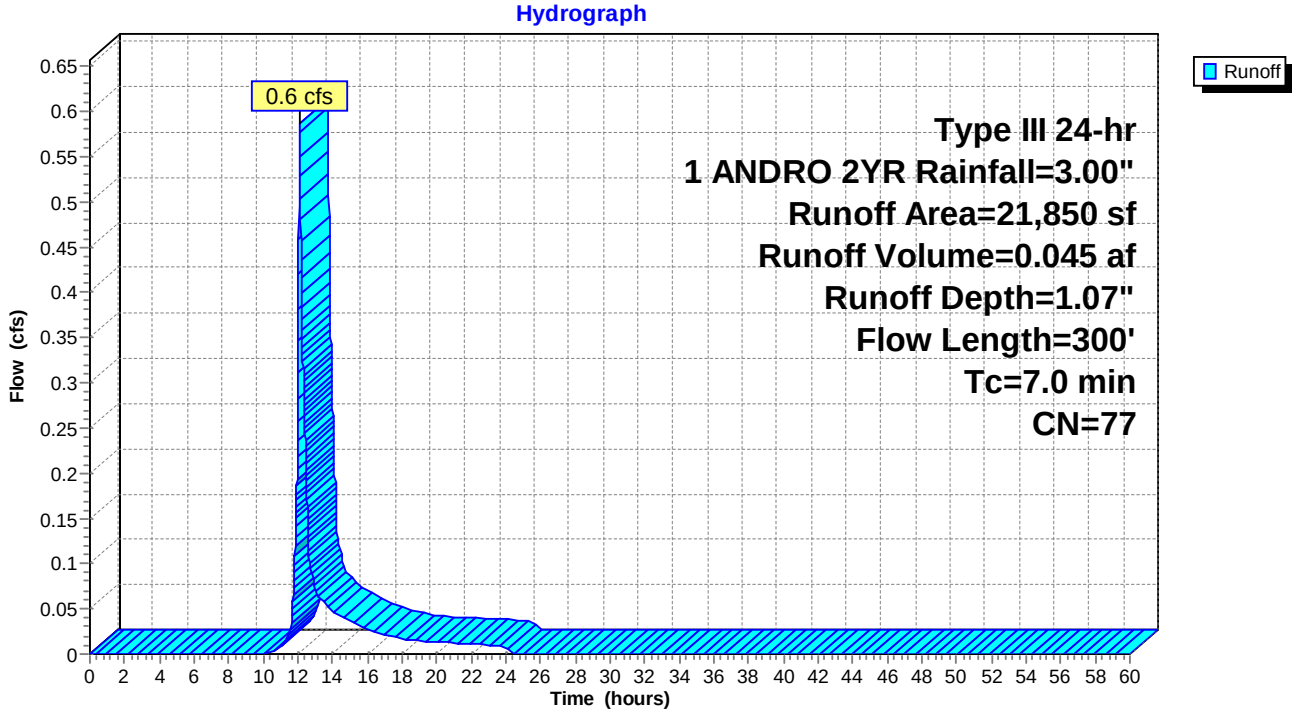
Runoff = 0.6 cfs @ 12.11 hrs, Volume= 0.045 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 ANDRO 2YR Rainfall=3.00"

	Area (sf)	CN	Description
*	0	98	Roofs, pavment, ramps
	1,678	74	>75% Grass cover, Good, HSG C
	18,776	78	Meadow, non-grazed, HSG D
	1,396	72	Woods/grass comb., Good, HSG C
	21,850	77	Weighted Average
	21,850		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	30	0.0330	0.11		**Sheet Flow, SF 1**
					Grass: Dense n= 0.240 P2= 3.00"
1.3	270	0.0460	3.45		**Shallow Concentrated Flow, SCF 1**
					Unpaved Kv= 16.1 fps
1.1					**Direct Entry, DIRECT TO 7**
7.0	300	Total			

Subcatchment 13-R: 45 Campus to wetland



Summary for Subcatchment 14-R: 45 Campus to West

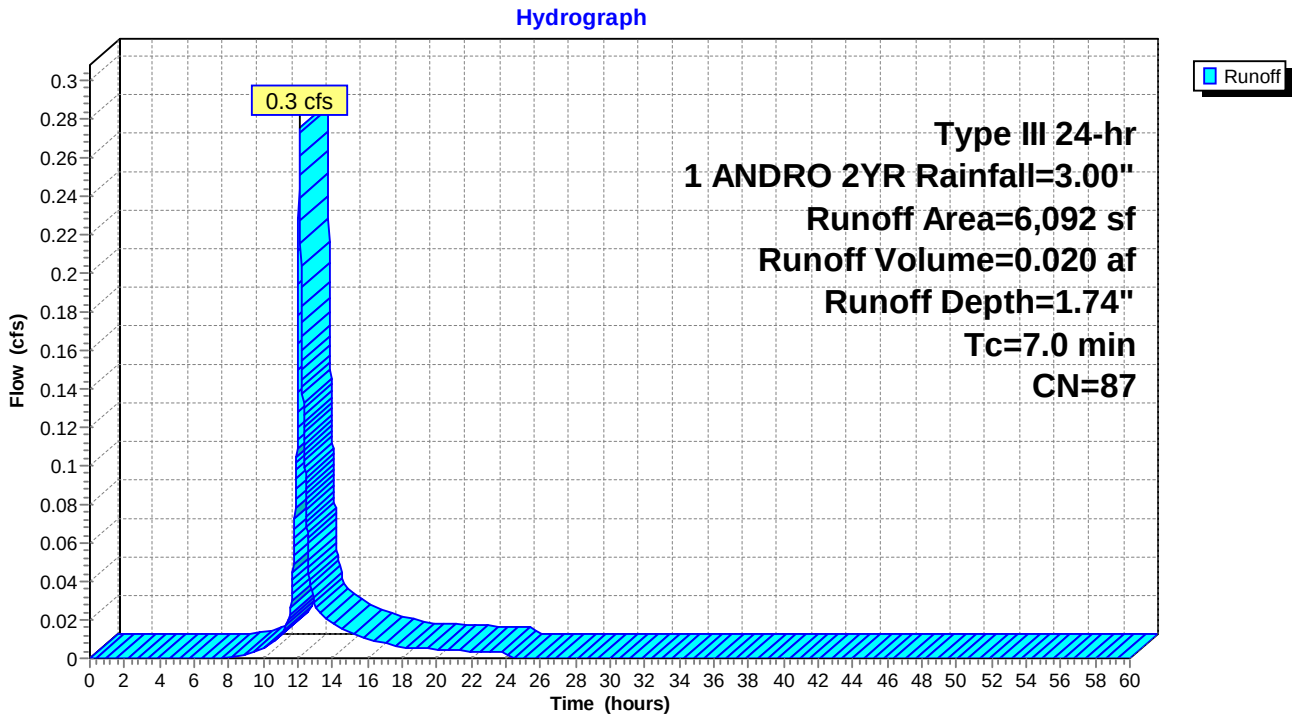
Runoff = 0.3 cfs @ 12.10 hrs, Volume= 0.020 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 ANDRO 2YR Rainfall=3.00"

	Area (sf)	CN	Description
*	3,192	98	Pavement
	2,900	74	>75% Grass cover, Good, HSG C
	0	65	Brush, Good, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	72	Woods/grass comb., Good, HSG C
	6,092	87	Weighted Average
	2,900		47.60% Pervious Area
	3,192		52.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, DIRECT <7**

Subcatchment 14-R: 45 Campus to West



Summary for Subcatchment 15S: SW Roof

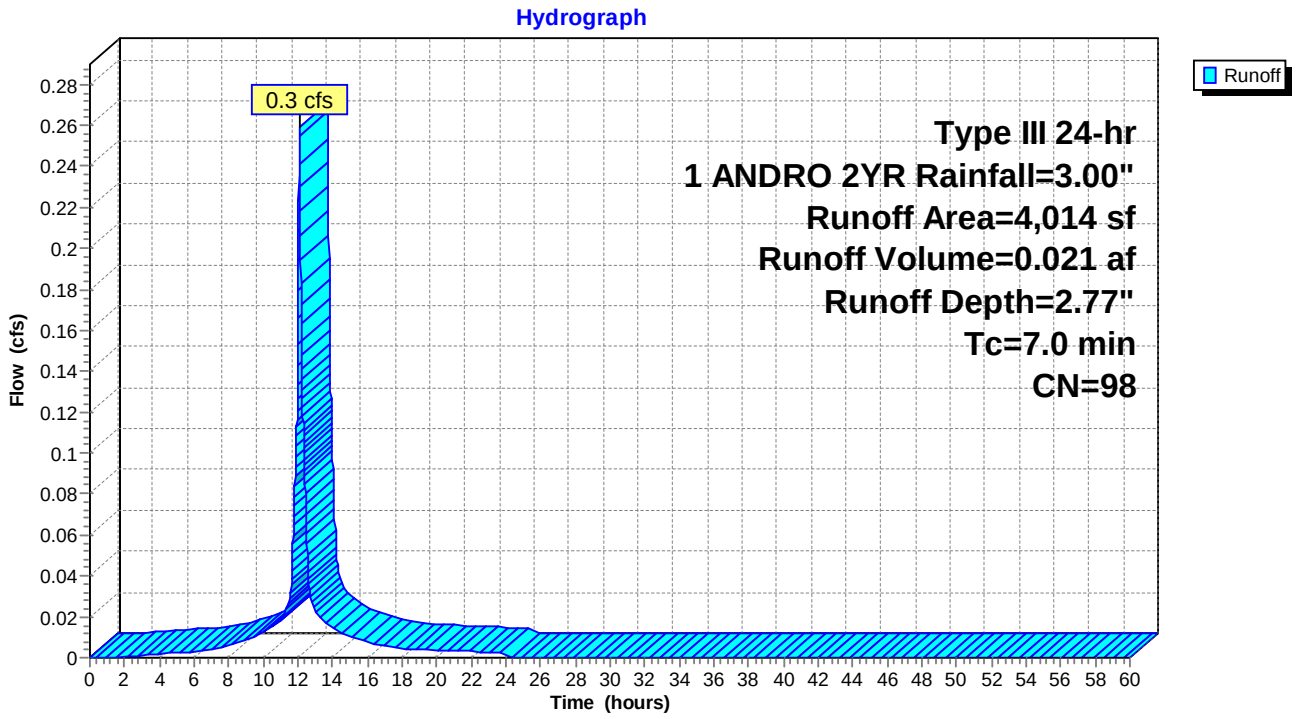
Runoff = 0.3 cfs @ 12.10 hrs, Volume= 0.021 af, Depth= 2.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 ANDRO 2YR Rainfall=3.00"

	Area (sf)	CN	Description
*	4,014	98	Roof
	4,014		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, Direct <7**

Subcatchment 15S: SW Roof



Summary for Subcatchment 17S: SE Roof

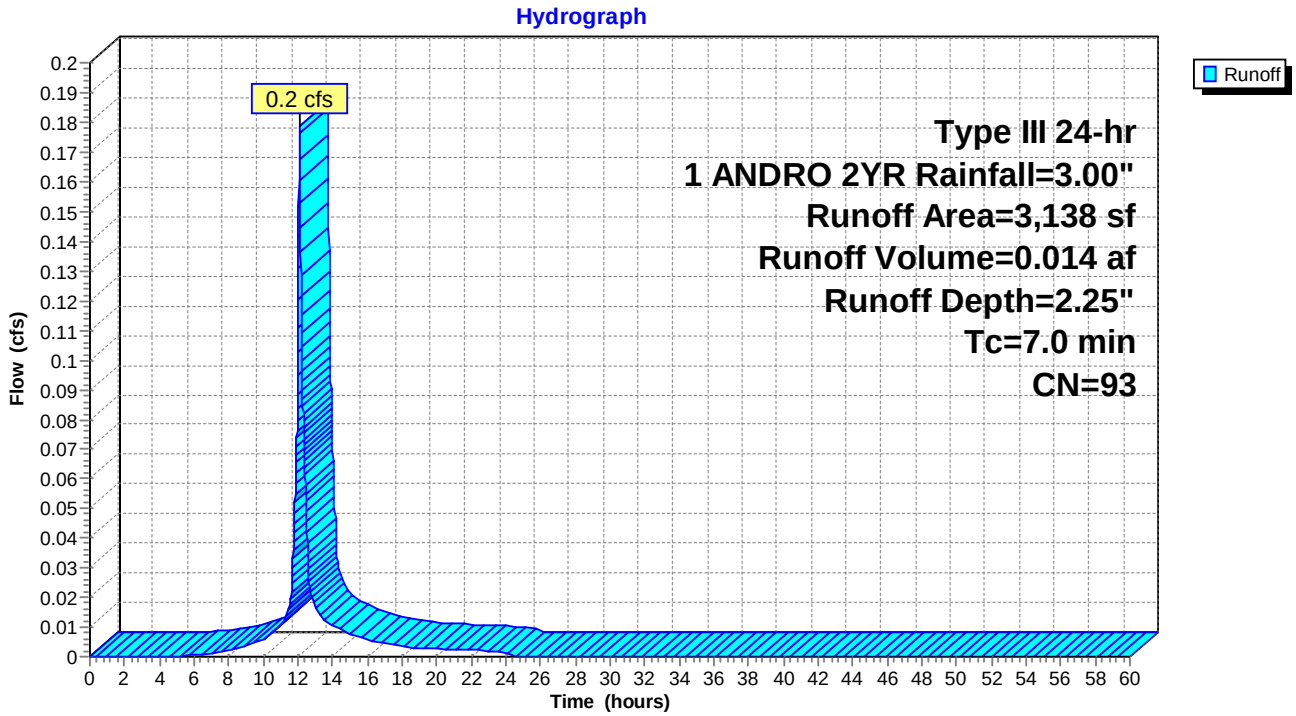
Runoff = 0.2 cfs @ 12.10 hrs, Volume= 0.014 af, Depth= 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 ANDRO 2YR Rainfall=3.00"

	Area (sf)	CN	Description
*	2,033	98	Roof
*	658	73	Grass - C
*	447	98	Other Impervious
	3,138	93	Weighted Average
	658		20.97% Pervious Area
	2,480		79.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, DIRECT <7**

Subcatchment 17S: SE Roof



Summary for Subcatchment 19S: Pavement to CB

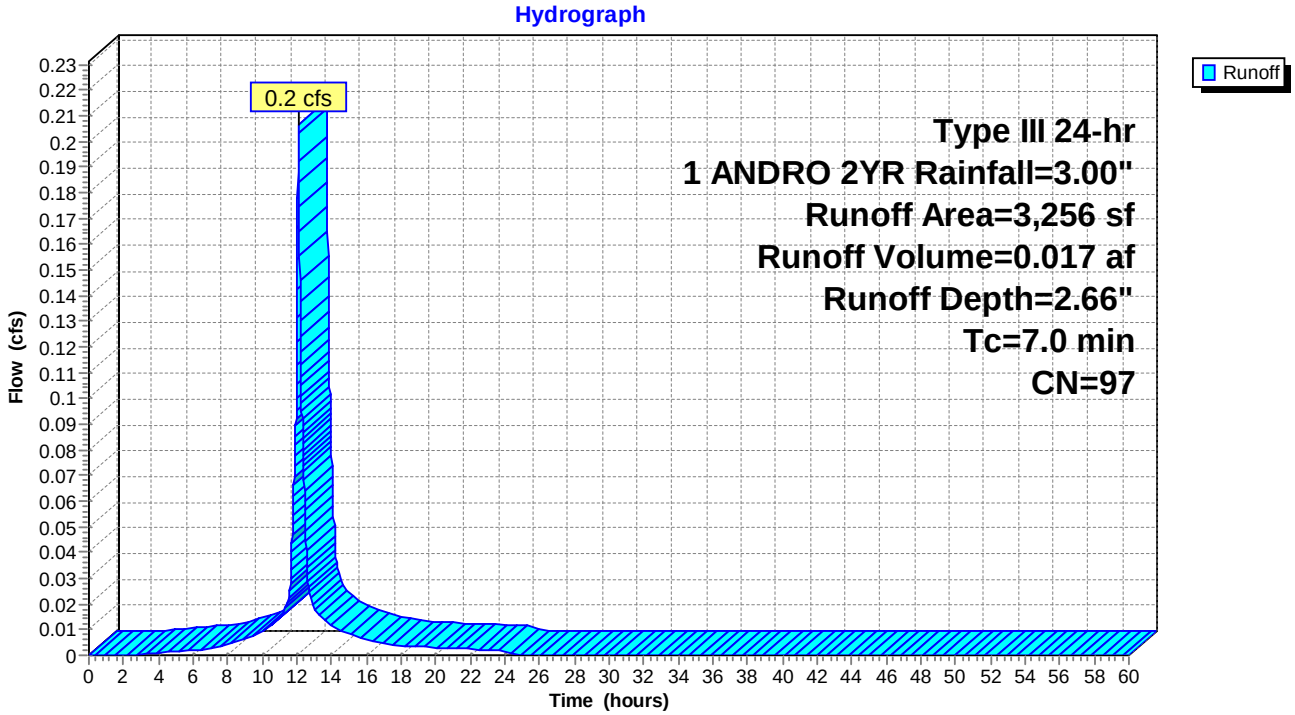
Runoff = 0.2 cfs @ 12.10 hrs, Volume= 0.017 af, Depth= 2.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 ANDRO 2YR Rainfall=3.00"

	Area (sf)	CN	Description
*	3,081	98	Pavement
	175	74	>75% Grass cover, Good, HSG C
	3,256	97	Weighted Average
	175		5.37% Pervious Area
	3,081		94.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, Direct to 7**

Subcatchment 19S: Pavement to CB



Summary for Subcatchment 20S: Pavement to CB

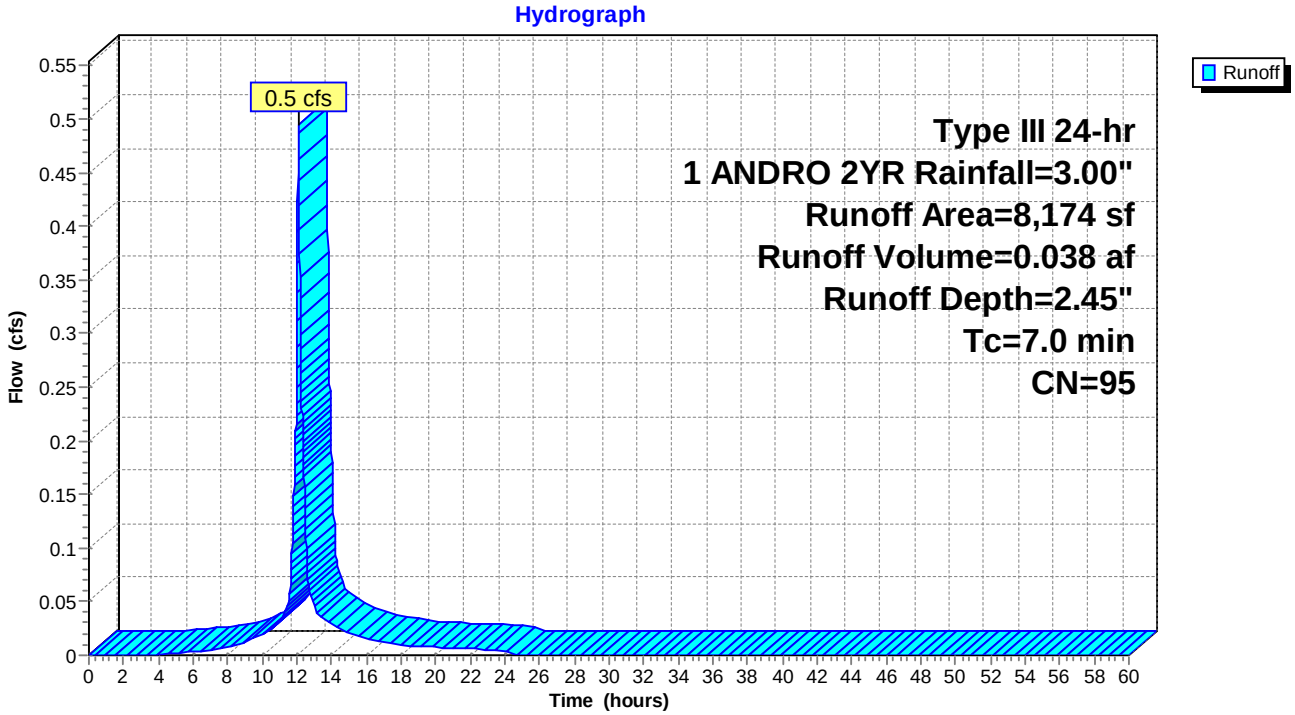
Runoff = 0.5 cfs @ 12.10 hrs, Volume= 0.038 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 ANDRO 2YR Rainfall=3.00"

	Area (sf)	CN	Description
*	7,328	98	Pavement
*	846	73	Grass - C
	8,174	95	Weighted Average
	846		10.35% Pervious Area
	7,328		89.65% Impervious Area

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

Subcatchment 20S: Pavement to CB



Summary for Subcatchment 21S: Direct to Detention

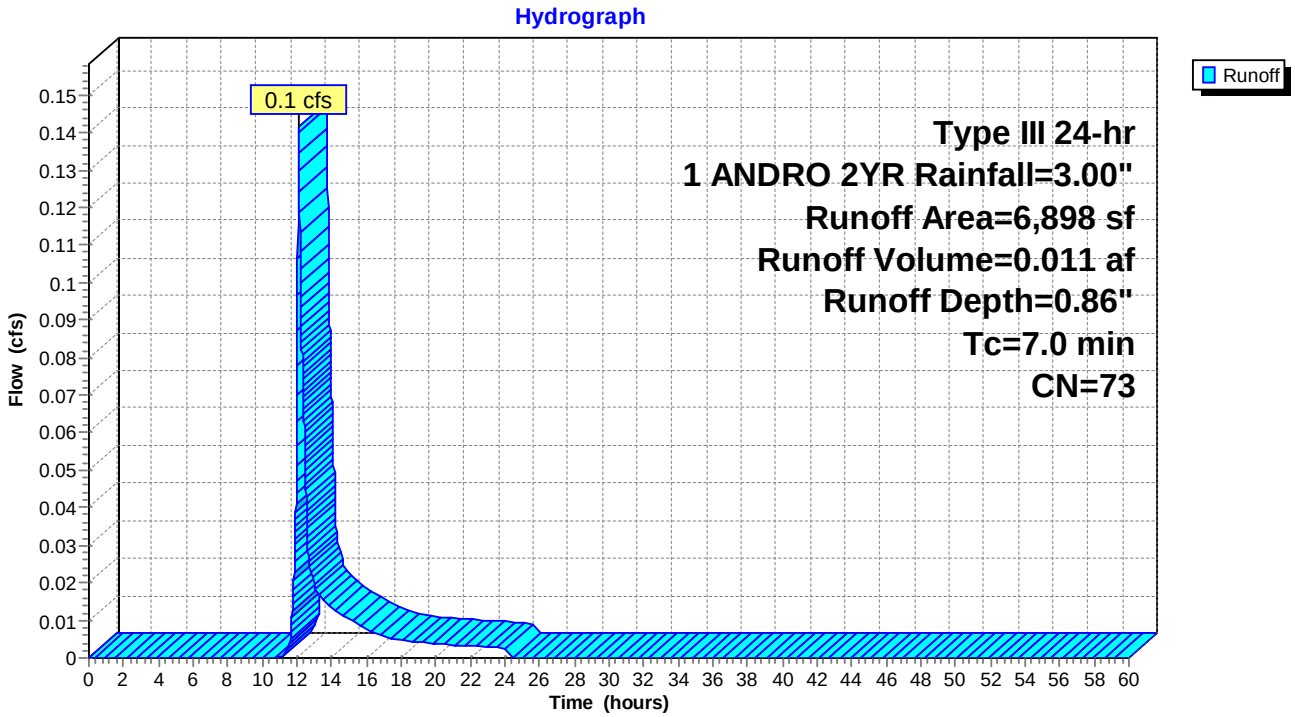
Runoff = 0.1 cfs @ 12.11 hrs, Volume= 0.011 af, Depth= 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 ANDRO 2YR Rainfall=3.00"

	Area (sf)	CN	Description
*	6,898	73	Type C Grassed
*	0	98	Generator Housing/Pad
	6,898	73	Weighted Average
	6,898		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, Direct - 7**

Subcatchment 21S: Direct to Detention



Summary for Subcatchment 103 E: NE Corner of Lot

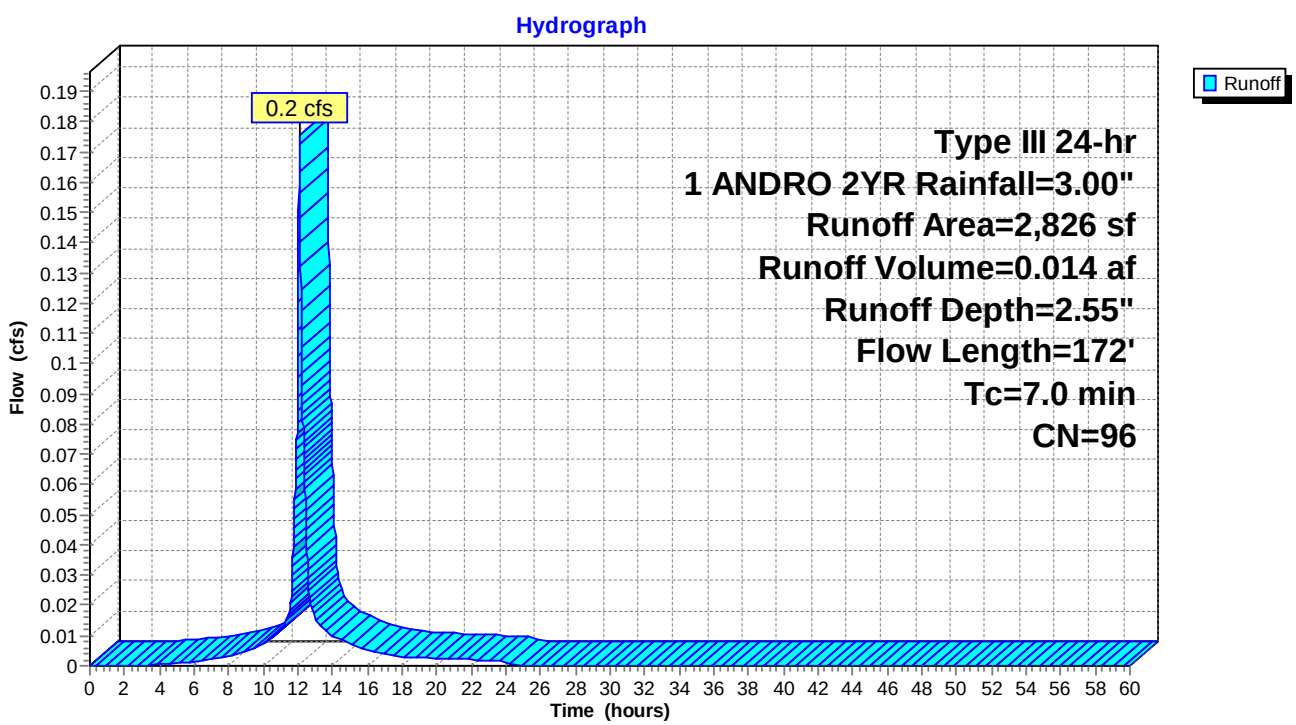
Runoff = 0.2 cfs @ 12.10 hrs, Volume= 0.014 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 ANDRO 2YR Rainfall=3.00"

	Area (sf)	CN	Description
*	2,544	98	Other Impervious
	282	74	>75% Grass cover, Good, HSG C
	2,826	96	Weighted Average
	282		9.98% Pervious Area
	2,544		90.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	58	0.0050	0.69		**Sheet Flow, SF 1**
					Smooth surfaces n= 0.011 P2= 3.00"
1.0	114	0.0090	1.93		**Shallow Concentrated Flow, SCF 1**
					Paved Kv= 20.3 fps
4.6					**Direct Entry, DIRECT <7**
7.0	172	Total			

Subcatchment 103 E: NE Corner of Lot



Summary for Subcatchment 103 E-2: NW College Ave

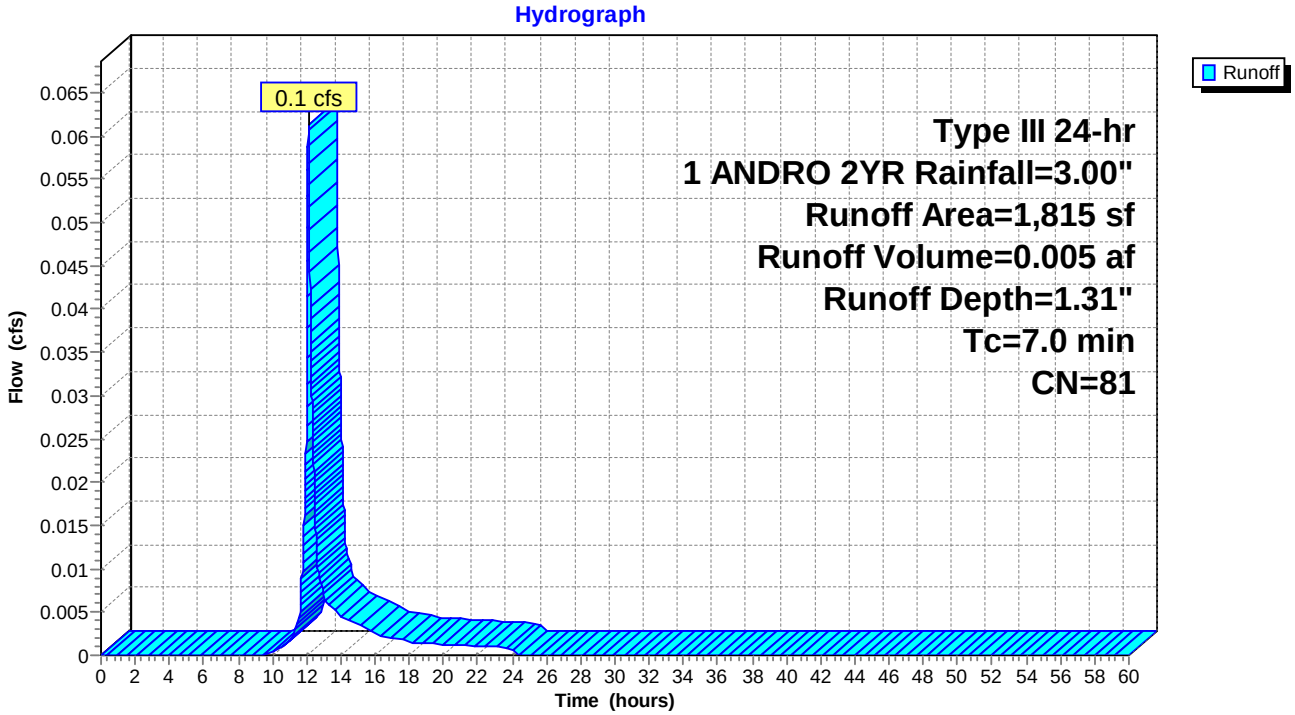
Runoff = 0.1 cfs @ 12.11 hrs, Volume= 0.005 af, Depth= 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 ANDRO 2YR Rainfall=3.00"

	Area (sf)	CN	Description
*	609	98	Other Impervious
*	1,206	73	Landscape
	1,815	81	Weighted Average
	1,206		66.45% Pervious Area
	609		33.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, DIRECT <7**

Subcatchment 103 E-2: NW College Ave



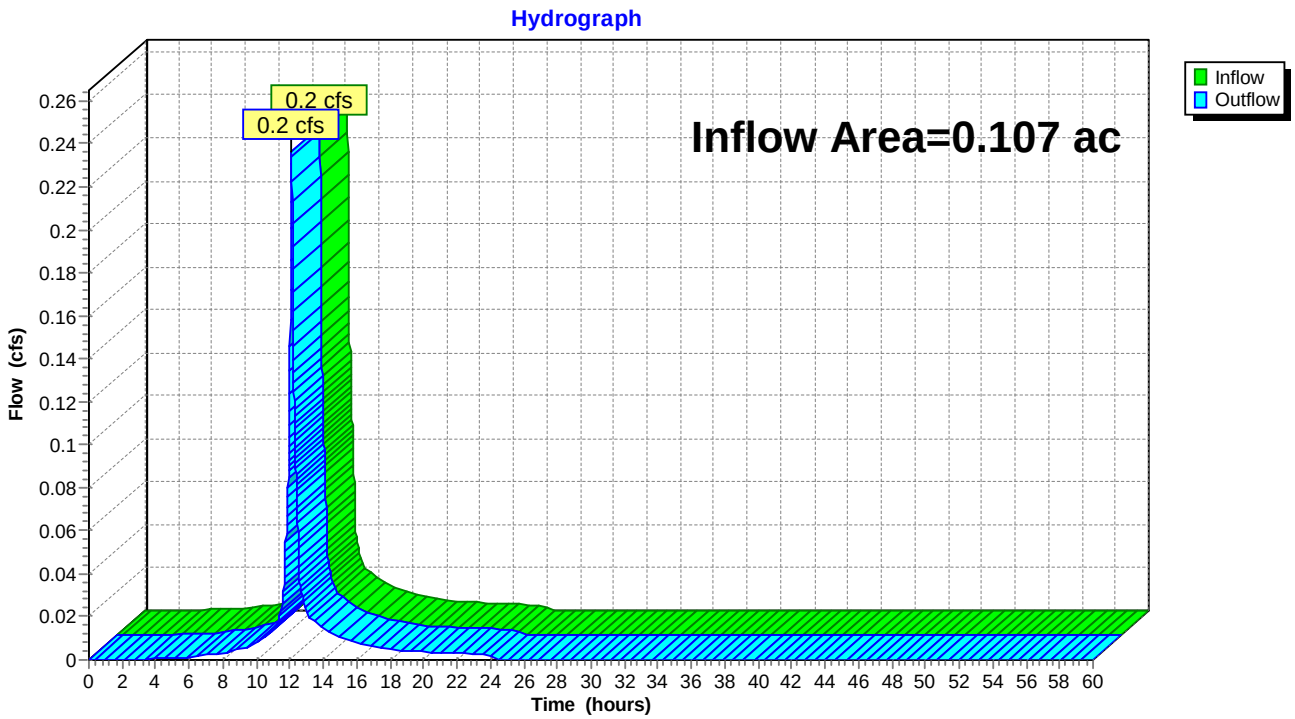
Summary for Reach SP1: SP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.107 ac, 67.94% Impervious, Inflow Depth = 2.07" for 1 ANDRO 2YR event
Inflow = 0.2 cfs @ 12.10 hrs, Volume= 0.018 af
Outflow = 0.2 cfs @ 12.10 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2

Reach SP1: SP1



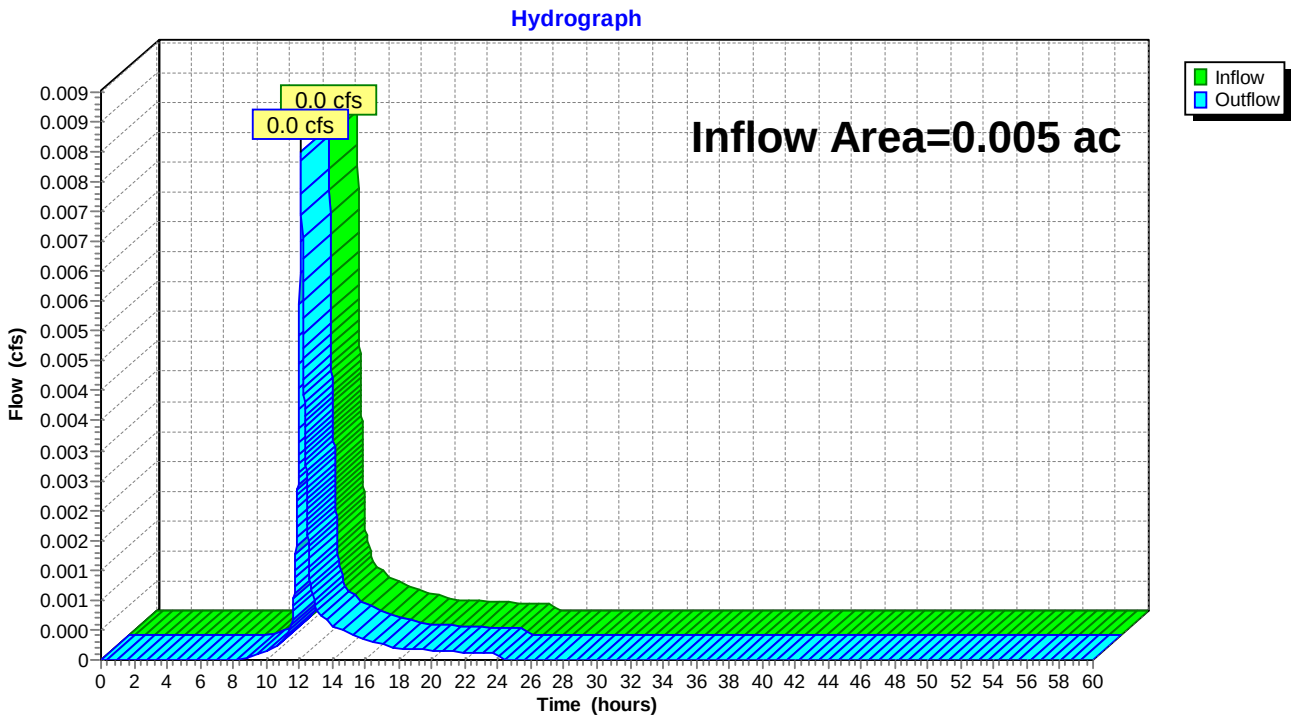
Summary for Reach SP2: SP2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.005 ac, 44.17% Impervious, Inflow Depth = 1.59" for 1 ANDRO 2YR event
Inflow = 0.0 cfs @ 12.10 hrs, Volume= 0.001 af
Outflow = 0.0 cfs @ 12.10 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2

Reach SP2: SP2



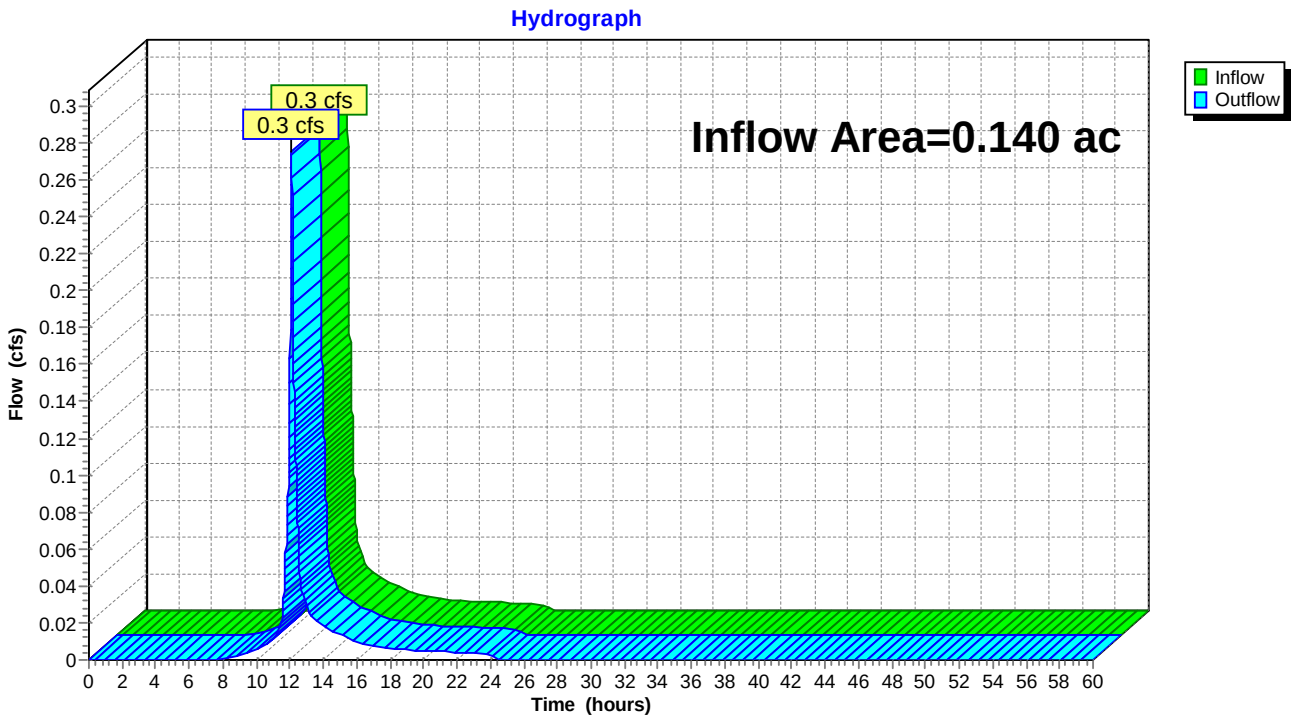
Summary for Reach SP3: SP3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.140 ac, 52.40% Impervious, Inflow Depth = 1.74" for 1 ANDRO 2YR event
Inflow = 0.3 cfs @ 12.10 hrs, Volume= 0.020 af
Outflow = 0.3 cfs @ 12.10 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2

Reach SP3: SP3



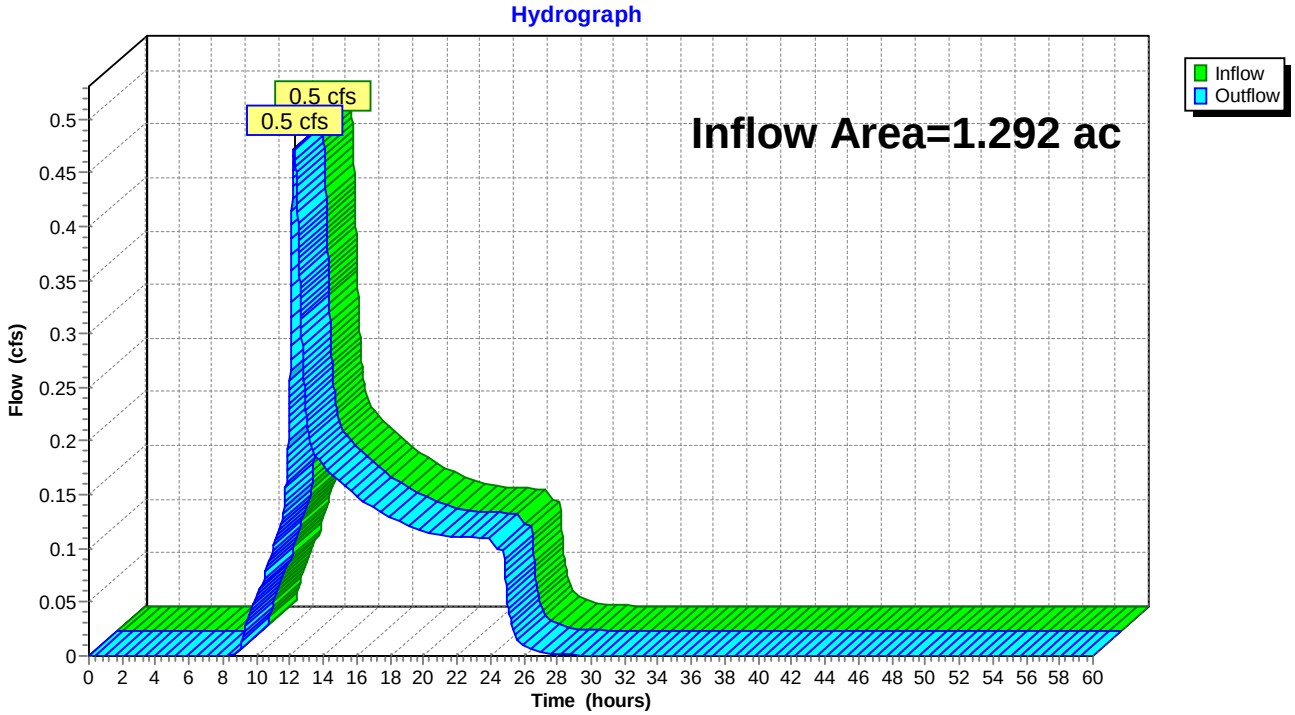
Summary for Reach SP4: SP4

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.292 ac, 45.94% Impervious, Inflow Depth = 1.70" for 1 ANDRO 2YR event
Inflow = 0.5 cfs @ 12.25 hrs, Volume= 0.183 af
Outflow = 0.5 cfs @ 12.25 hrs, Volume= 0.183 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2

Reach SP4: SP4



Summary for Pond 1P: Grassed Underdrain Filter 1 - OCS_1

Inflow Area =	0.790 ac, 75.09% Impervious, Inflow Depth = 2.23" for 1 ANDRO 2YR event				
Inflow =	1.9 cfs @	12.10 hrs,	Volume=	0.147 af	
Outflow =	0.1 cfs @	13.68 hrs,	Volume=	0.138 af,	Atten= 93%, Lag= 94.8 min
Primary =	0.1 cfs @	13.68 hrs,	Volume=	0.138 af	
Secondary =	0.0 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 229.73' @ 13.68 hrs Surf.Area= 2,252 sf Storage= 3,277 cf

Plug-Flow detention time= 298.5 min calculated for 0.138 af (94% of inflow)
Center-of-Mass det. time= 266.3 min (1,046.9 - 780.6)

Volume	Invert	Avail.Storage	Storage Description
#1	226.49'	8,045 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

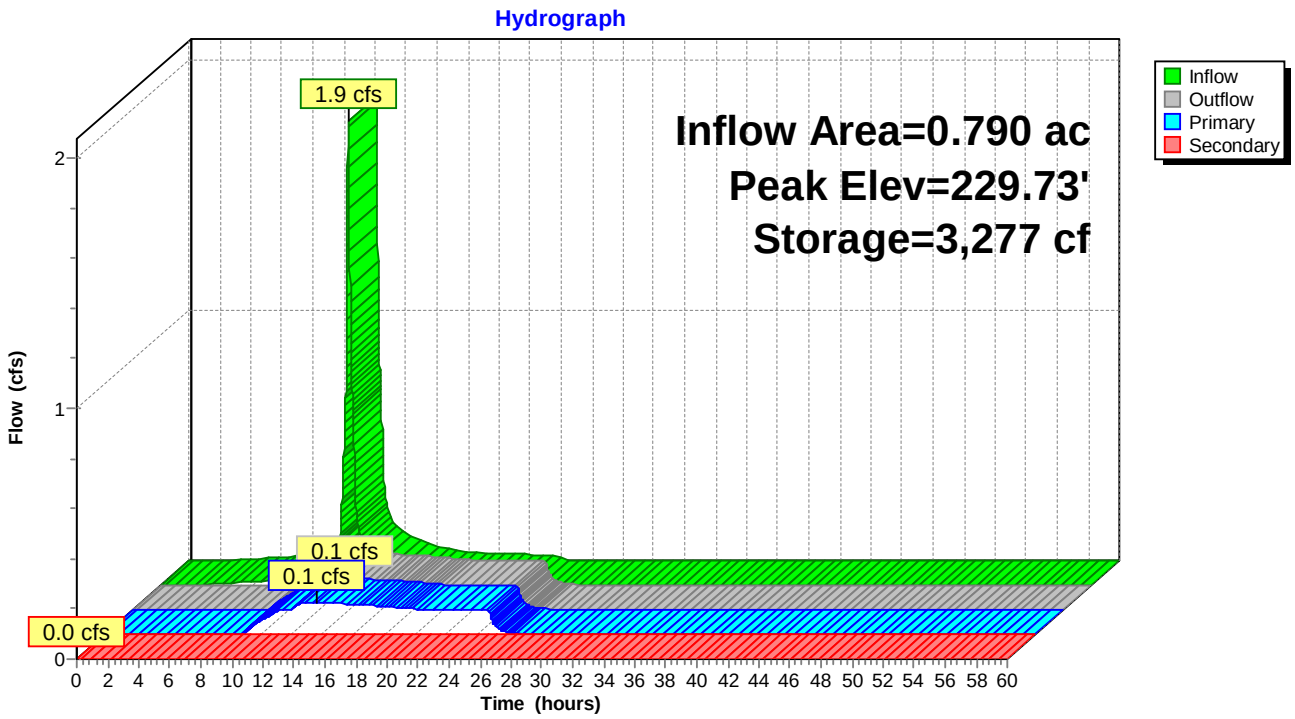
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
226.49	1,790	0.0	0	0
226.50	1,790	40.0	7	7
228.99	1,790	40.0	1,783	1,790
229.00	1,790	100.0	18	1,808
230.00	2,425	100.0	2,108	3,915
231.00	2,823	100.0	2,624	6,539
231.50	3,200	100.0	1,506	8,045

Device	Routing	Invert	Outlet Devices
#1	Secondary	231.00'	**15.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Primary	226.13'	**12.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 226.13' / 225.13' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 2	227.00'	**4.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 227.00' / 226.80' S= 0.0080 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf
#4	Device 3	226.49'	**2.410 in/hr Exfiltration over Horizontal area**
#5	Device 2	230.50'	**18.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.1 cfs @ 13.68 hrs HW=229.73' TW=224.32' (Dynamic Tailwater)
- **2=Culvert** (Passes 0.1 cfs of 5.3 cfs potential flow)
  - **3=Culvert** (Passes 0.1 cfs of 0.5 cfs potential flow)
    - **4=Exfiltration** (Exfiltration Controls 0.1 cfs)
  - **5=Orifice/Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=226.49' TW=224.10' (Dynamic Tailwater)
- **1=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 1P: Grassed Underdrain Filter 1 - OCS_1



Summary for Pond 5P: DMH-4

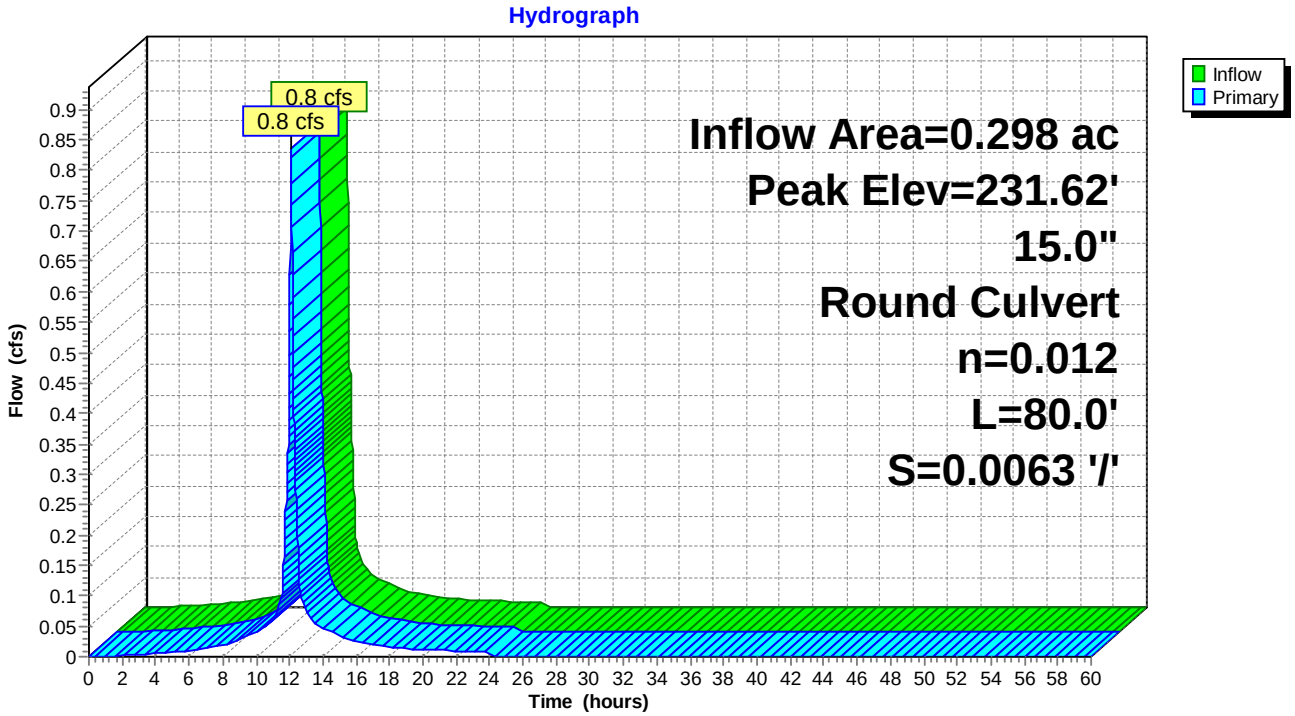
Inflow Area = 0.298 ac,100.00% Impervious, Inflow Depth = 2.77" for 1 ANDRO 2YR event
Inflow = 0.8 cfs @ 12.10 hrs, Volume= 0.069 af
Outflow = 0.8 cfs @ 12.10 hrs, Volume= 0.069 af, Atten= 0%, Lag= 0.0 min
Primary = 0.8 cfs @ 12.10 hrs, Volume= 0.069 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 231.62' @ 12.10 hrs
Flood Elev= 237.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	231.10'	**15.0" Round Culvert** L= 80.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 231.10' / 230.60' S= 0.0063 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.8 cfs @ 12.10 hrs HW=231.62' TW=231.18' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.8 cfs @ 2.55 fps)

Pond 5P: DMH-4



Summary for Pond 6P: CB-2

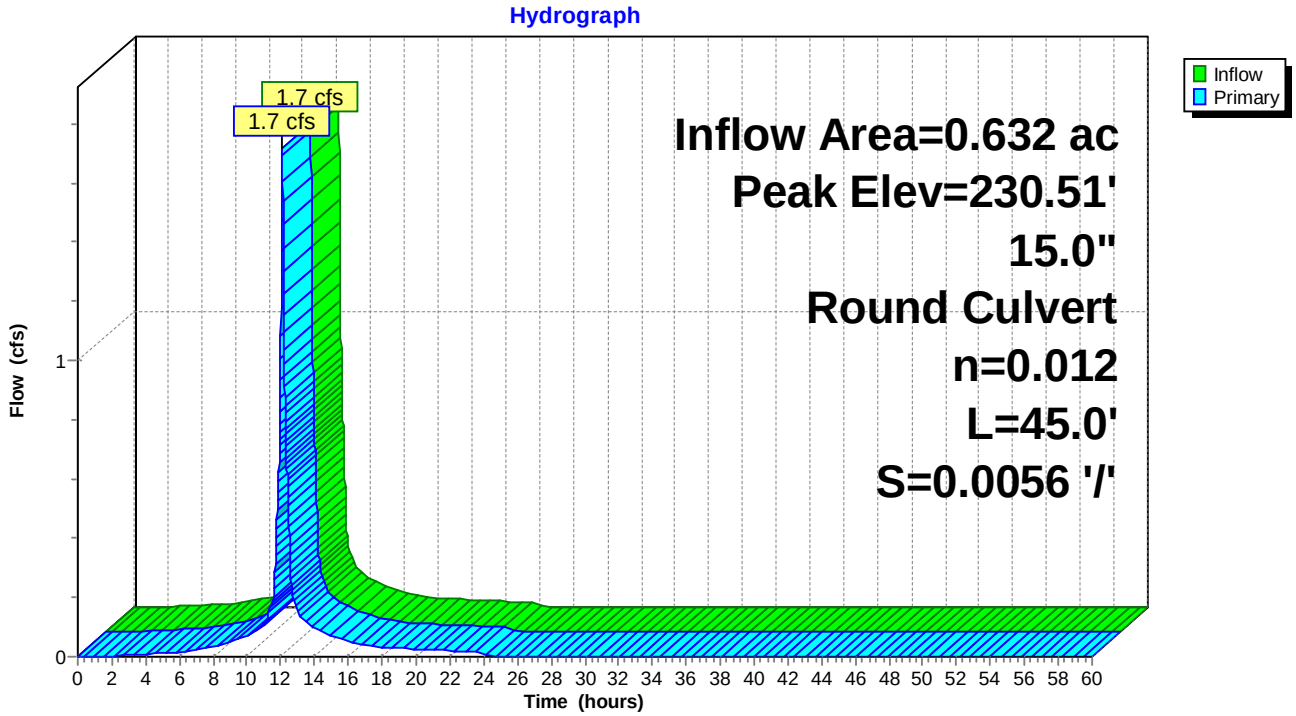
Inflow Area = 0.632 ac, 93.90% Impervious, Inflow Depth = 2.57" for 1 ANDRO 2YR event
Inflow = 1.7 cfs @ 12.10 hrs, Volume= 0.135 af
Outflow = 1.7 cfs @ 12.10 hrs, Volume= 0.135 af, Atten= 0%, Lag= 0.0 min
Primary = 1.7 cfs @ 12.10 hrs, Volume= 0.135 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 230.51' @ 12.10 hrs
Flood Elev= 234.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	229.75'	**15.0" Round Culvert** L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 229.75' / 229.50' S= 0.0056 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.7 cfs @ 12.10 hrs HW=230.51' TW=228.98' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 1.7 cfs @ 3.14 fps)

Pond 6P: CB-2



Summary for Pond 7P: CB-3

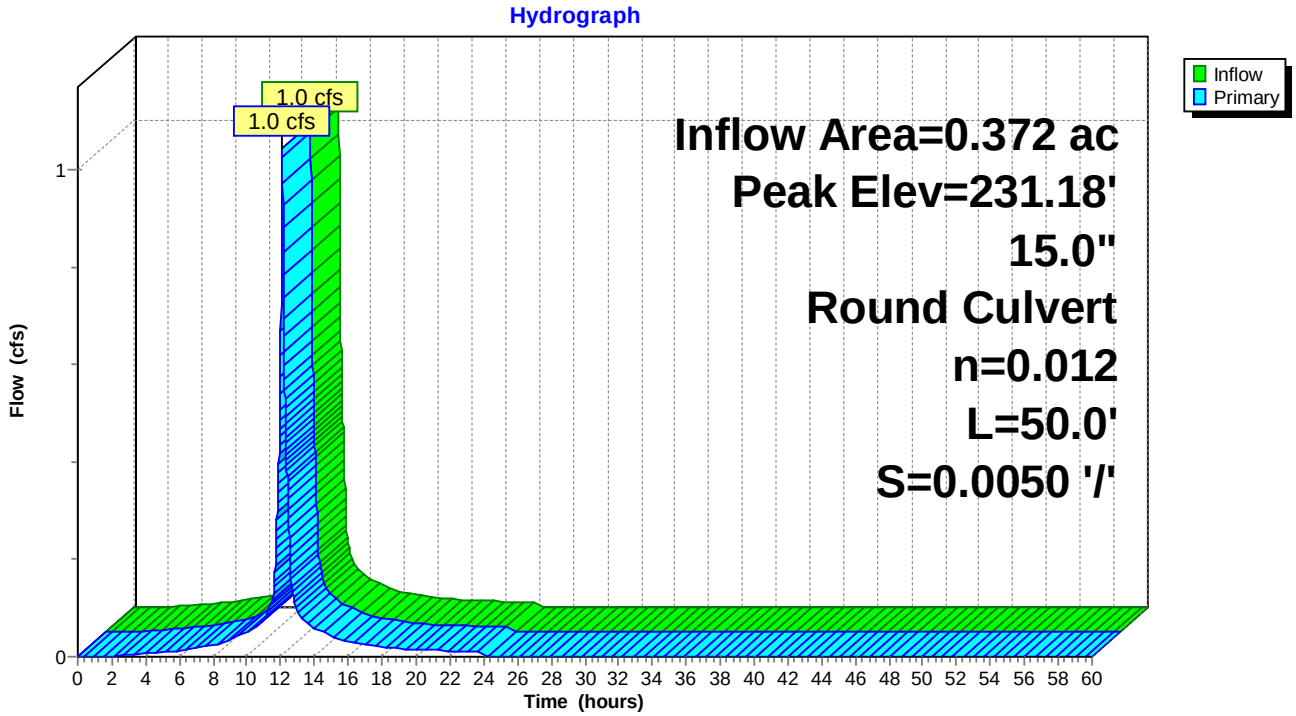
Inflow Area = 0.372 ac, 98.92% Impervious, Inflow Depth = 2.75" for 1 ANDRO 2YR event
Inflow = 1.0 cfs @ 12.10 hrs, Volume= 0.085 af
Outflow = 1.0 cfs @ 12.10 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min
Primary = 1.0 cfs @ 12.10 hrs, Volume= 0.085 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 231.18' @ 12.10 hrs
Flood Elev= 234.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	230.60'	**15.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 230.60' / 230.35' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.0 cfs @ 12.10 hrs HW=231.18' TW=230.51' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 1.0 cfs @ 2.77 fps)

Pond 7P: CB-3



Summary for Pond 11P: CB-10

Inflow Area = 0.072 ac, 79.03% Impervious, Inflow Depth = 2.25" for 1 ANDRO 2YR event
Inflow = 0.2 cfs @ 12.10 hrs, Volume= 0.014 af
Outflow = 0.2 cfs @ 12.10 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.4 min
Secondary = 0.2 cfs @ 12.10 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 238.02' @ 12.10 hrs Surf.Area= 0 sf Storage= 81 cf

Plug-Flow detention time= 89.7 min calculated for 0.012 af (87% of inflow)
Center-of-Mass det. time= 32.4 min (828.2 - 795.8)

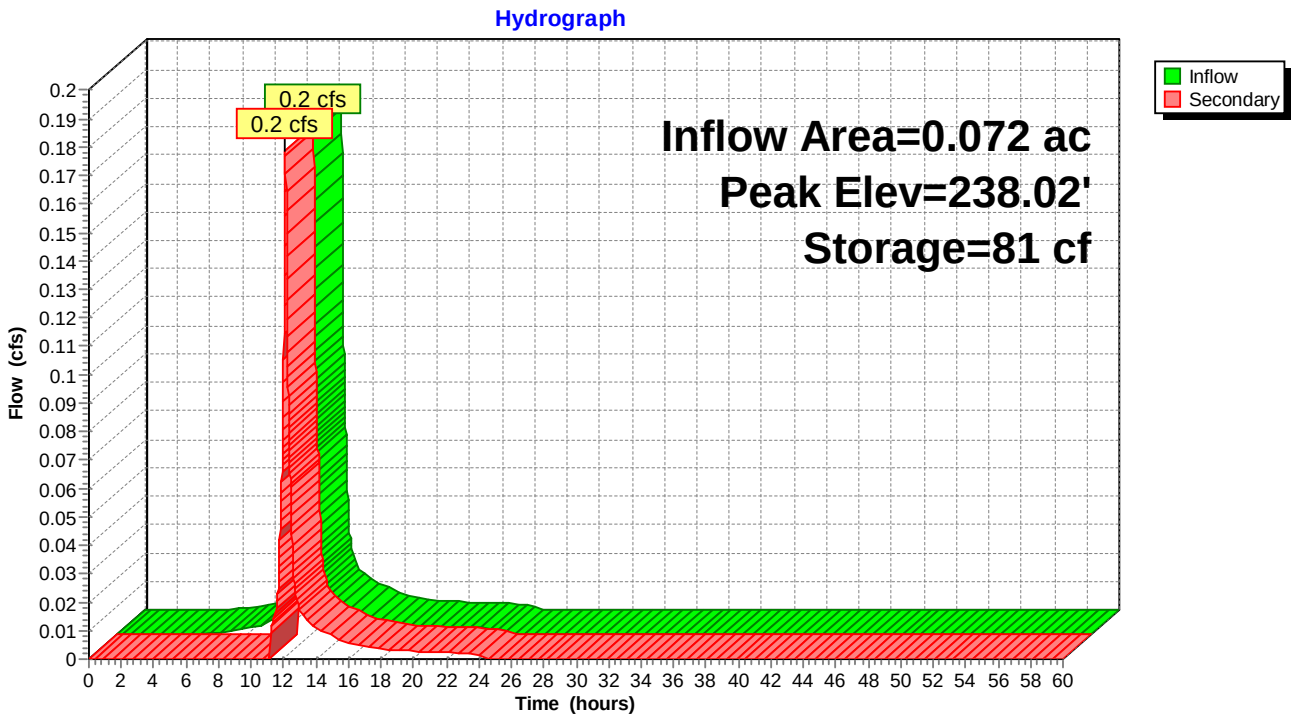
Volume	Invert	Avail.Storage	Storage Description
#1	235.00'	725 cf	**Custom Stage Data** Listed below

Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
235.00	0	0
238.00	75	75
238.50	150	225
240.00	500	725

Device	Routing	Invert	Outlet Devices
#1	Secondary	231.90'	**12.0" Round Culvert** L= 125.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 231.90' / 229.85' S= 0.0164 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	238.00'	**4.0" x 4.0" Horiz. Orifice/Grate X 16.00** C= 0.600 Limited to weir flow at low heads

Secondary OutFlow Max=0.2 cfs @ 12.10 hrs HW=238.02' TW=230.51' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.2 cfs of 7.1 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 0.2 cfs @ 0.45 fps)

Pond 11P: CB-10



Summary for Pond PW: Wetlands

Inflow Area = 0.502 ac, 0.00% Impervious, Inflow Depth = 1.07" for 1 ANDRO 2YR event
Inflow = 0.6 cfs @ 12.11 hrs, Volume= 0.045 af
Outflow = 0.4 cfs @ 12.24 hrs, Volume= 0.045 af, Atten= 38%, Lag= 7.8 min
Primary = 0.4 cfs @ 12.24 hrs, Volume= 0.045 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 226.82' @ 12.24 hrs Surf.Area= 1,382 sf Storage= 224 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 5.1 min (862.1 - 857.0)

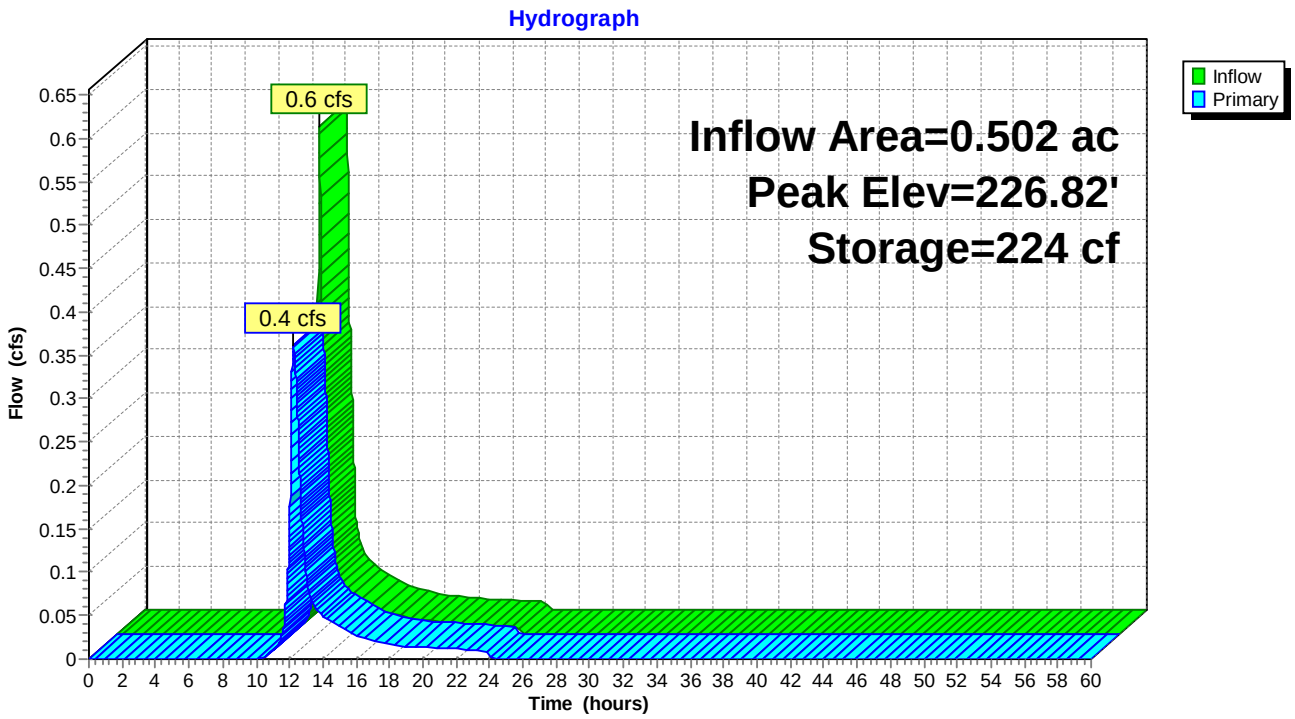
Volume	Invert	Avail.Storage	Storage Description
#1	226.50'	14,403 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
226.50	5	0	0
227.00	2,135	535	535
228.00	6,800	4,468	5,003
229.00	12,000	9,400	14,403

Device	Routing	Invert	Outlet Devices
#1	Primary	227.73'	**4.0" x 4.0" Horiz. Orifice/Grate X 16.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	226.43'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 226.43' / 225.73' S= 0.0280 '/' Cc= 0.900 n= 0.013, Flow Area= 0.35 sf
#3	Primary	227.00'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 227.00' / 225.73' S= 0.0508 '/' Cc= 0.900 n= 0.013, Flow Area= 0.35 sf

Primary OutFlow Max=0.4 cfs @ 12.24 hrs HW=226.82' TW=224.46' (Dynamic Tailwater)
- **1=Orifice/Grate** (Controls 0.0 cfs)
- **2=Culvert** (Inlet Controls 0.4 cfs @ 1.69 fps)
- **3=Culvert** (Controls 0.0 cfs)

Pond PW: Wetlands



Summary for Pond PWC: Ex. CB (Wetlands)

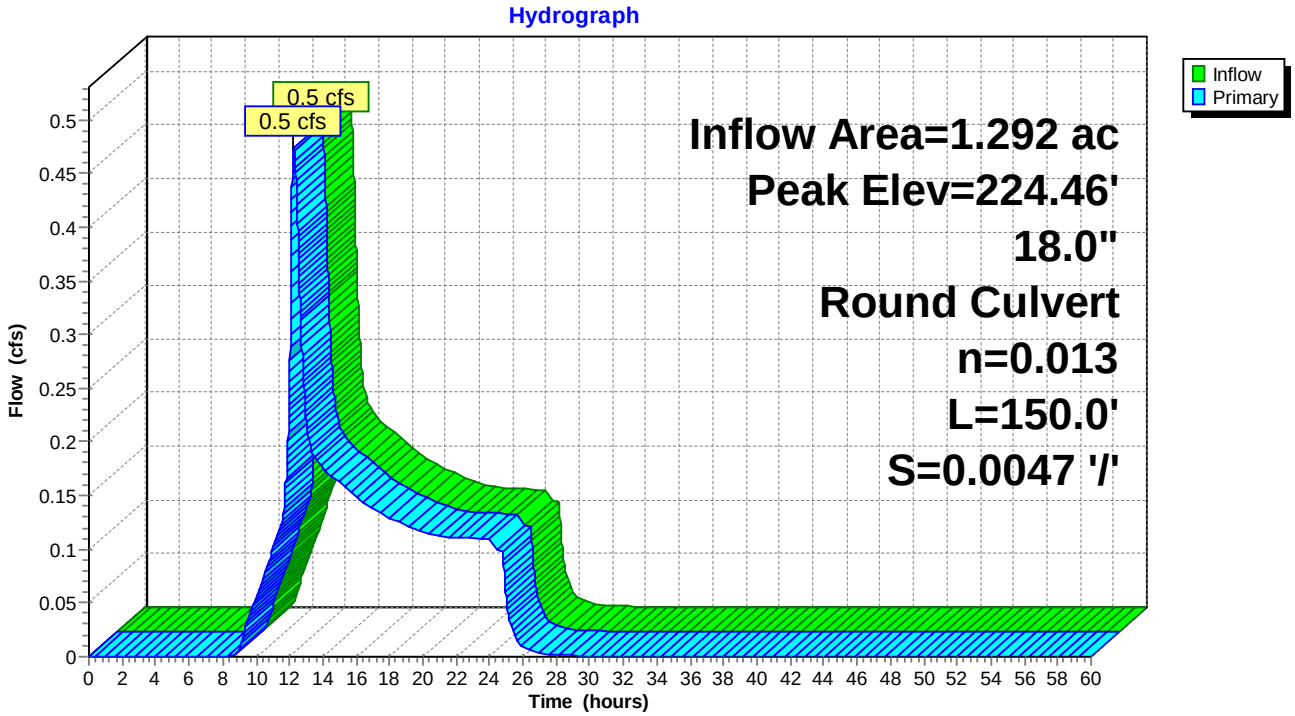
Inflow Area = 1.292 ac, 45.94% Impervious, Inflow Depth = 1.70" for 1 ANDRO 2YR event
Inflow = 0.5 cfs @ 12.25 hrs, Volume= 0.183 af
Outflow = 0.5 cfs @ 12.25 hrs, Volume= 0.183 af, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.25 hrs, Volume= 0.183 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 224.46' @ 12.25 hrs
Flood Elev= 228.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	224.10'	**18.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 224.10' / 223.40' S= 0.0047 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.5 cfs @ 12.25 hrs HW=224.46' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.5 cfs @ 2.23 fps)

Pond PWC: Ex. CB (Wetlands)



Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3S: Flat Roof Runoff Area=8,953 sf 100.00% Impervious Runoff Depth=4.36"
Tc=7.0 min CN=98 Runoff=0.9 cfs 0.075 af

Subcatchment 12-R: 45 Campus to East Runoff Area=206 sf 44.17% Impervious Runoff Depth=3.00"
Tc=7.0 min CN=85 Runoff=0.0 cfs 0.001 af

Subcatchment 13-R: 45 Campus to wetland Runoff Area=21,850 sf 0.00% Impervious Runoff Depth=2.29"
Flow Length=300' Tc=7.0 min CN=77 Runoff=1.3 cfs 0.096 af

Subcatchment 14-R: 45 Campus to West Runoff Area=6,092 sf 52.40% Impervious Runoff Depth=3.19"
Tc=7.0 min CN=87 Runoff=0.5 cfs 0.037 af

Subcatchment 15S: SW Roof Runoff Area=4,014 sf 100.00% Impervious Runoff Depth=4.36"
Tc=7.0 min CN=98 Runoff=0.4 cfs 0.034 af

Subcatchment 17S: SE Roof Runoff Area=3,138 sf 79.03% Impervious Runoff Depth=3.81"
Tc=7.0 min CN=93 Runoff=0.3 cfs 0.023 af

Subcatchment 19S: Pavement to CB Runoff Area=3,256 sf 94.63% Impervious Runoff Depth=4.25"
Tc=7.0 min CN=97 Runoff=0.3 cfs 0.026 af

Subcatchment 20S: Pavement to CB Runoff Area=8,174 sf 89.65% Impervious Runoff Depth=4.02"
Tc=7.0 min CN=95 Runoff=0.8 cfs 0.063 af

Subcatchment 21S: Direct to Detention Runoff Area=6,898 sf 0.00% Impervious Runoff Depth=1.97"
Tc=7.0 min CN=73 Runoff=0.3 cfs 0.026 af

Subcatchment 103 E: NE Corner of Lot Runoff Area=2,826 sf 90.02% Impervious Runoff Depth=4.14"
Flow Length=172' Tc=7.0 min CN=96 Runoff=0.3 cfs 0.022 af

Subcatchment 103 E-2: NW College Ave Runoff Area=1,815 sf 33.55% Impervious Runoff Depth=2.63"
Tc=7.0 min CN=81 Runoff=0.1 cfs 0.009 af

Reach SP1: SP1 Inflow=0.4 cfs 0.032 af
Outflow=0.4 cfs 0.032 af

Reach SP2: SP2 Inflow=0.0 cfs 0.001 af
Outflow=0.0 cfs 0.001 af

Reach SP3: SP3 Inflow=0.5 cfs 0.037 af
Outflow=0.5 cfs 0.037 af

Reach SP4: SP4 Inflow=0.8 cfs 0.332 af
Outflow=0.8 cfs 0.332 af

Pond 1P: Grassed Underdrain Filter 1 - OCS_1 Peak Elev=230.60' Storage=5,443 cf Inflow=3.0 cfs 0.245 af
Primary=0.3 cfs 0.236 af Secondary=0.0 cfs 0.000 af Outflow=0.3 cfs 0.236 af

Pond 5P: DMH-4 Peak Elev=231.78' Inflow=1.3 cfs 0.108 af
15.0" Round Culvert n=0.012 L=80.0' S=0.0063 '/' Outflow=1.3 cfs 0.108 af

Pond 6P: CB-2 Peak Elev=230.76' Inflow=2.7 cfs 0.219 af
15.0" Round Culvert n=0.012 L=45.0' S=0.0056 '/' Outflow=2.7 cfs 0.219 af

Pond 7P: CB-3 Peak Elev=231.34' Inflow=1.6 cfs 0.135 af
15.0" Round Culvert n=0.012 L=50.0' S=0.0050 '/' Outflow=1.6 cfs 0.135 af

Pond 11P: CB-10 Peak Elev=238.03' Storage=83 cf Inflow=0.3 cfs 0.023 af
Outflow=0.3 cfs 0.021 af

Pond PW: Wetlands Peak Elev=227.04' Storage=616 cf Inflow=1.3 cfs 0.096 af
Outflow=0.7 cfs 0.096 af

Pond PWC: Ex. CB (Wetlands) Peak Elev=224.58' Inflow=0.8 cfs 0.332 af
18.0" Round Culvert n=0.013 L=150.0' S=0.0047 '/' Outflow=0.8 cfs 0.332 af

Total Runoff Area = 1.543 ac Runoff Volume = 0.412 af Average Runoff Depth = 3.21"
51.96% Pervious = 0.802 ac 48.04% Impervious = 0.741 ac

Summary for Subcatchment 3S: Flat Roof

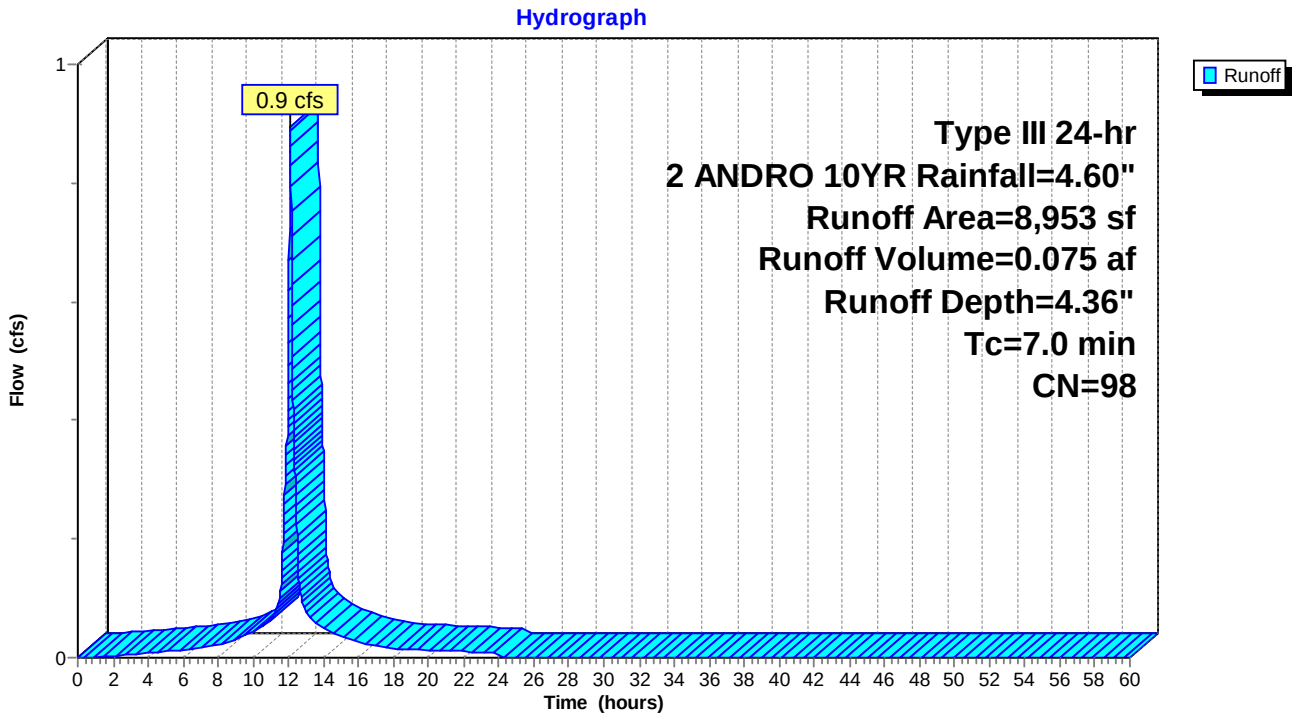
Runoff = 0.9 cfs @ 12.10 hrs, Volume= 0.075 af, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 ANDRO 10YR Rainfall=4.60"

	Area (sf)	CN	Description
*	8,953	98	Roof
	8,953		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, Min 7**

Subcatchment 3S: Flat Roof



Summary for Subcatchment 12-R: 45 Campus to East

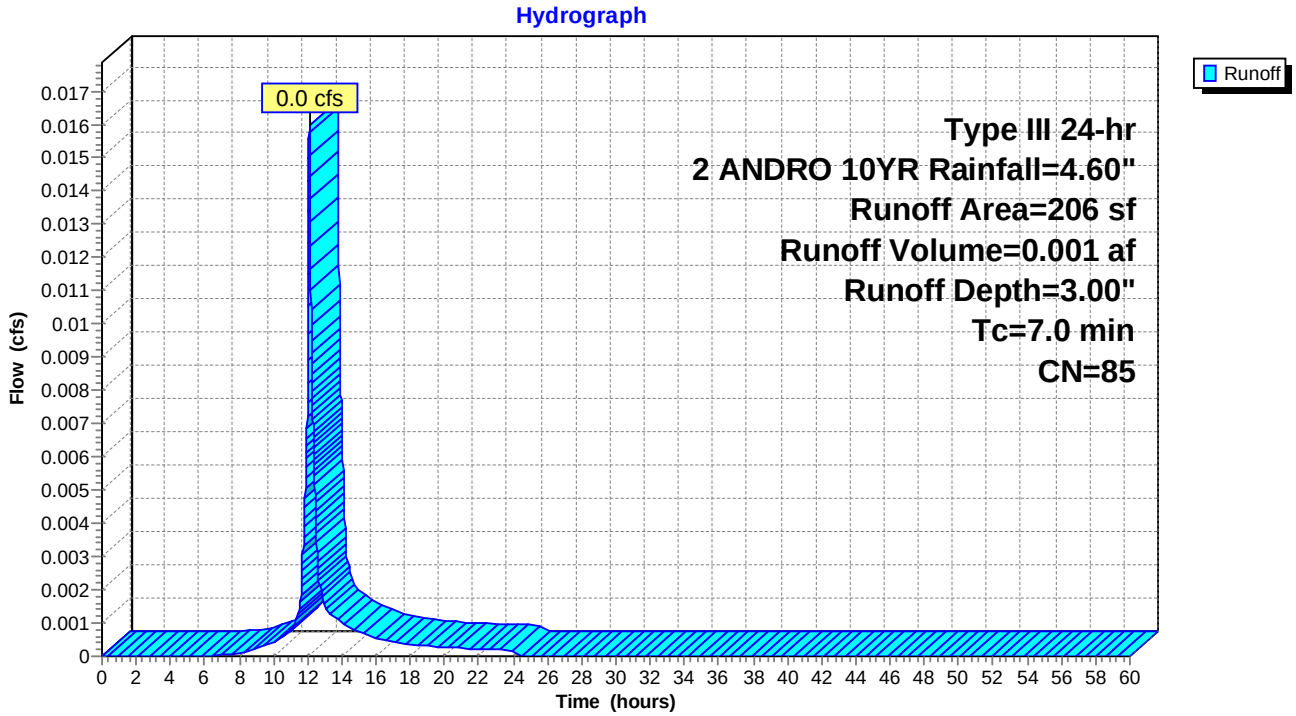
Runoff = 0.0 cfs @ 12.10 hrs, Volume= 0.001 af, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 ANDRO 10YR Rainfall=4.60"

	Area (sf)	CN	Description
*	91	98	Pavement
*	0	98	Roofs
	115	74	>75% Grass cover, Good, HSG C
	0	65	Brush, Good, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	72	Woods/grass comb., Good, HSG C
	206	85	Weighted Average
	115		55.83% Pervious Area
	91		44.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, DIRECT <7**

Subcatchment 12-R: 45 Campus to East



Summary for Subcatchment 13-R: 45 Campus to wetland

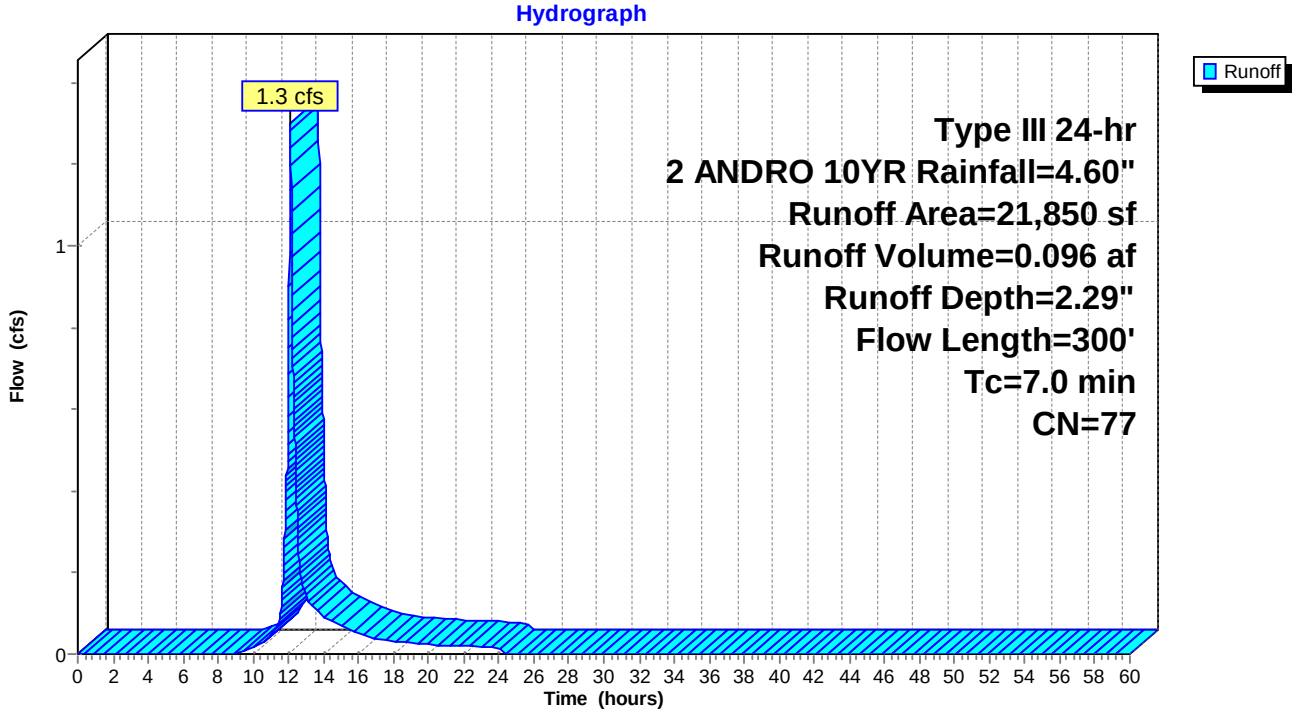
Runoff = 1.3 cfs @ 12.10 hrs, Volume= 0.096 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 ANDRO 10YR Rainfall=4.60"

	Area (sf)	CN	Description
*	0	98	Roofs, pavment, ramps
	1,678	74	>75% Grass cover, Good, HSG C
	18,776	78	Meadow, non-grazed, HSG D
	1,396	72	Woods/grass comb., Good, HSG C
	21,850	77	Weighted Average
	21,850		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	30	0.0330	0.11		**Sheet Flow, SF 1**
					Grass: Dense n= 0.240 P2= 3.00"
1.3	270	0.0460	3.45		**Shallow Concentrated Flow, SCF 1**
					Unpaved Kv= 16.1 fps
1.1					**Direct Entry, DIRECT TO 7**
7.0	300	Total			

Subcatchment 13-R: 45 Campus to wetland



Summary for Subcatchment 14-R: 45 Campus to West

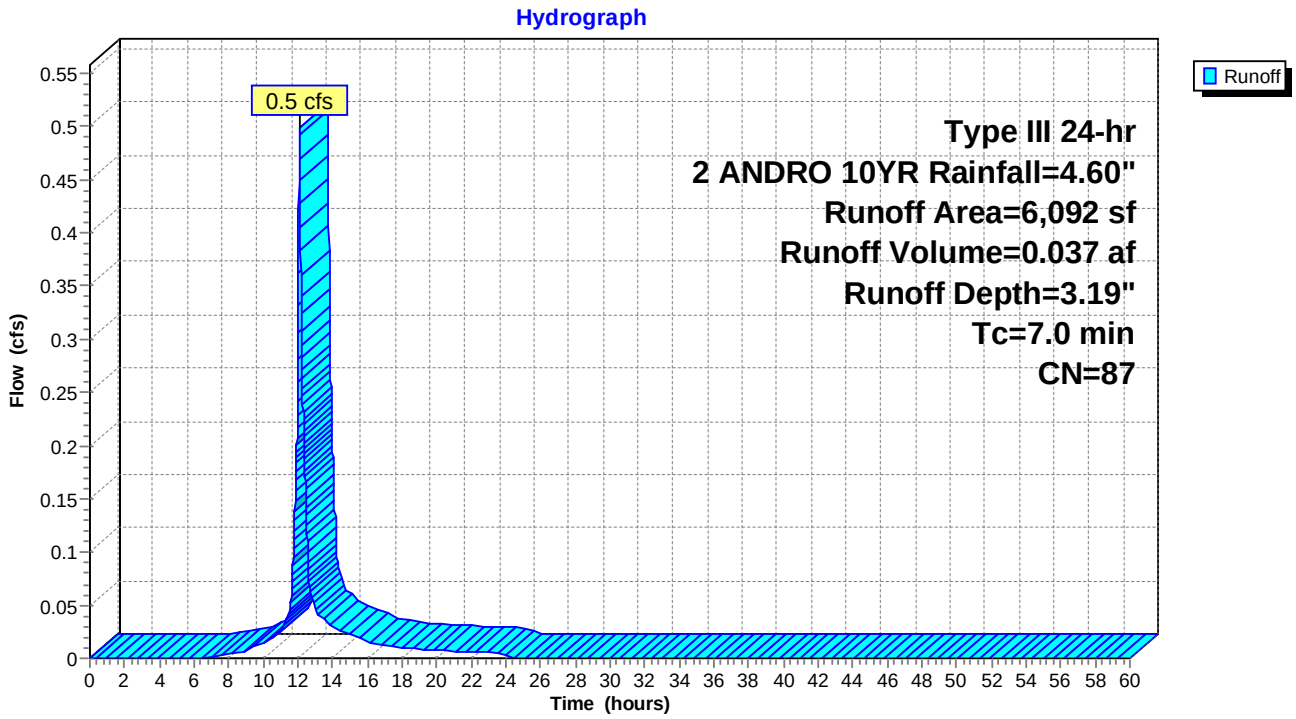
Runoff = 0.5 cfs @ 12.10 hrs, Volume= 0.037 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 ANDRO 10YR Rainfall=4.60"

	Area (sf)	CN	Description
*	3,192	98	Pavement
	2,900	74	>75% Grass cover, Good, HSG C
	0	65	Brush, Good, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	72	Woods/grass comb., Good, HSG C
	6,092	87	Weighted Average
	2,900		47.60% Pervious Area
	3,192		52.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, DIRECT <7**

Subcatchment 14-R: 45 Campus to West



Summary for Subcatchment 15S: SW Roof

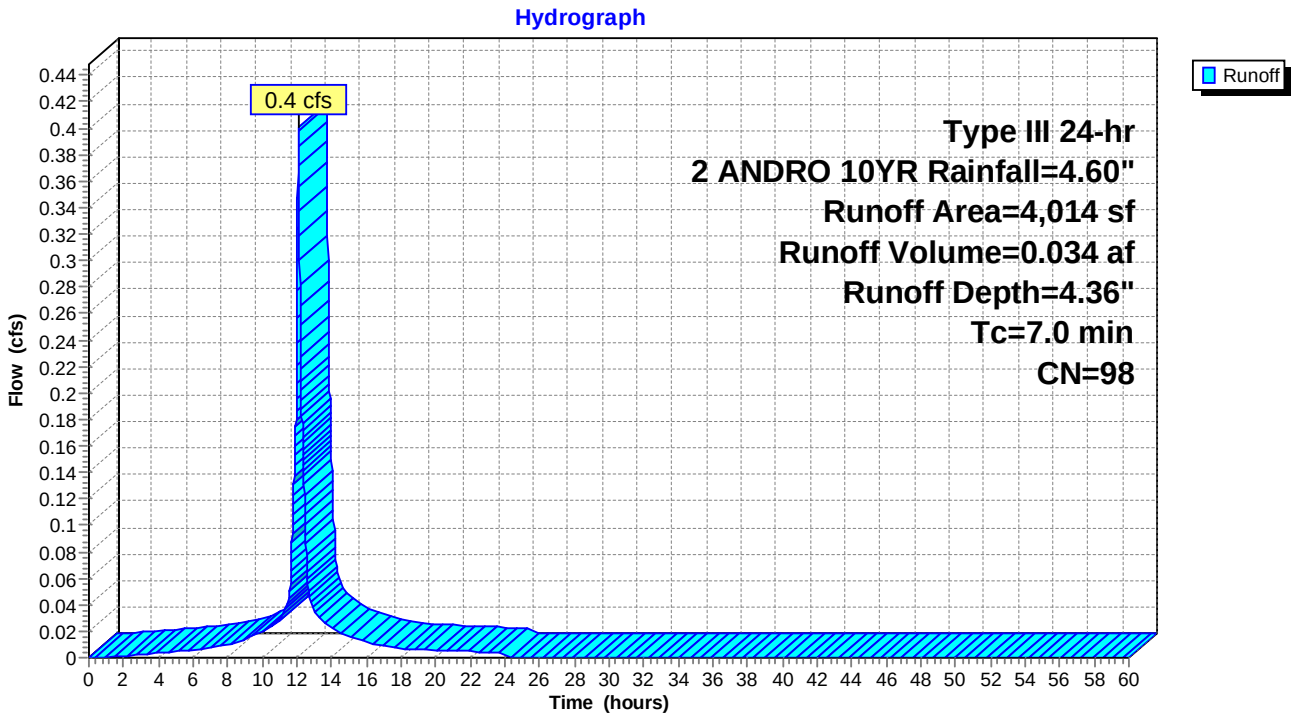
Runoff = 0.4 cfs @ 12.10 hrs, Volume= 0.034 af, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 ANDRO 10YR Rainfall=4.60"

	Area (sf)	CN	Description
*	4,014	98	Roof
	4,014		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, Direct <7**

Subcatchment 15S: SW Roof



Summary for Subcatchment 17S: SE Roof

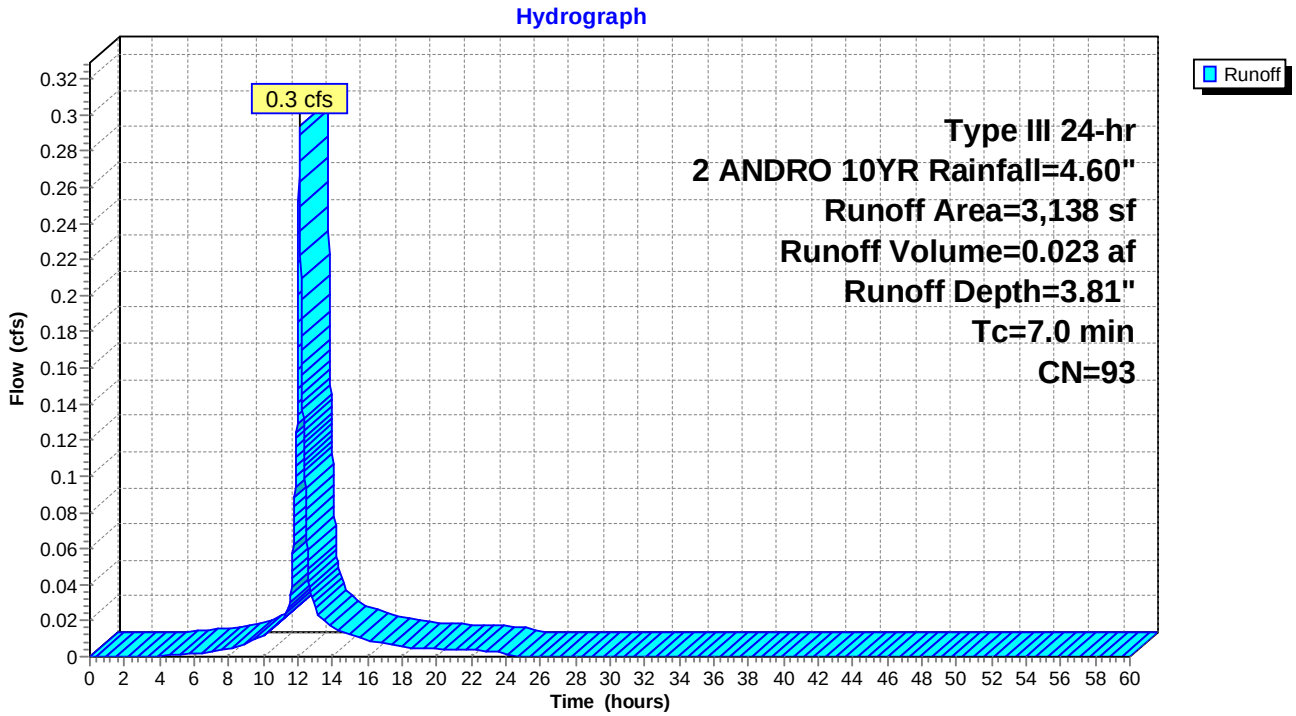
Runoff = 0.3 cfs @ 12.10 hrs, Volume= 0.023 af, Depth= 3.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 ANDRO 10YR Rainfall=4.60"

	Area (sf)	CN	Description
*	2,033	98	Roof
*	658	73	Grass - C
*	447	98	Other Impervious
	3,138	93	Weighted Average
	658		20.97% Pervious Area
	2,480		79.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, DIRECT <7**

Subcatchment 17S: SE Roof



Summary for Subcatchment 19S: Pavement to CB

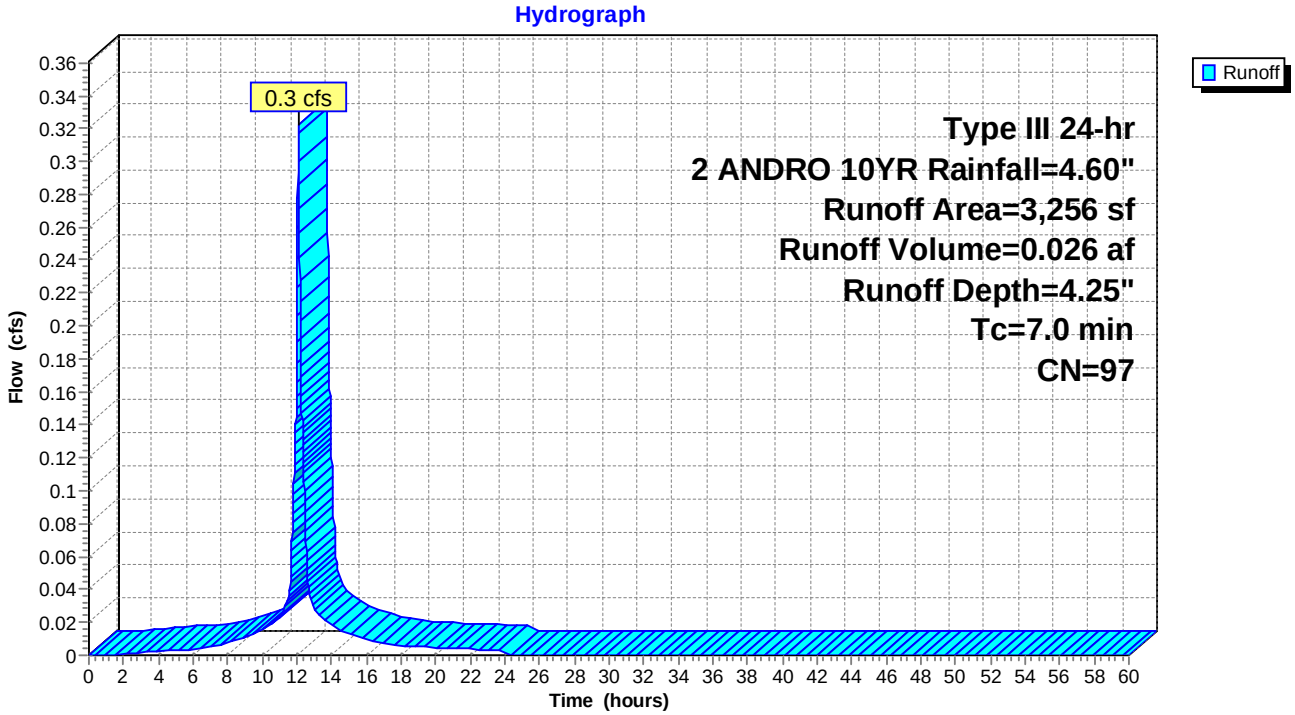
Runoff = 0.3 cfs @ 12.10 hrs, Volume= 0.026 af, Depth= 4.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 ANDRO 10YR Rainfall=4.60"

	Area (sf)	CN	Description
*	3,081	98	Pavement
	175	74	>75% Grass cover, Good, HSG C
	3,256	97	Weighted Average
	175		5.37% Pervious Area
	3,081		94.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, Direct to 7**

Subcatchment 19S: Pavement to CB



Summary for Subcatchment 20S: Pavement to CB

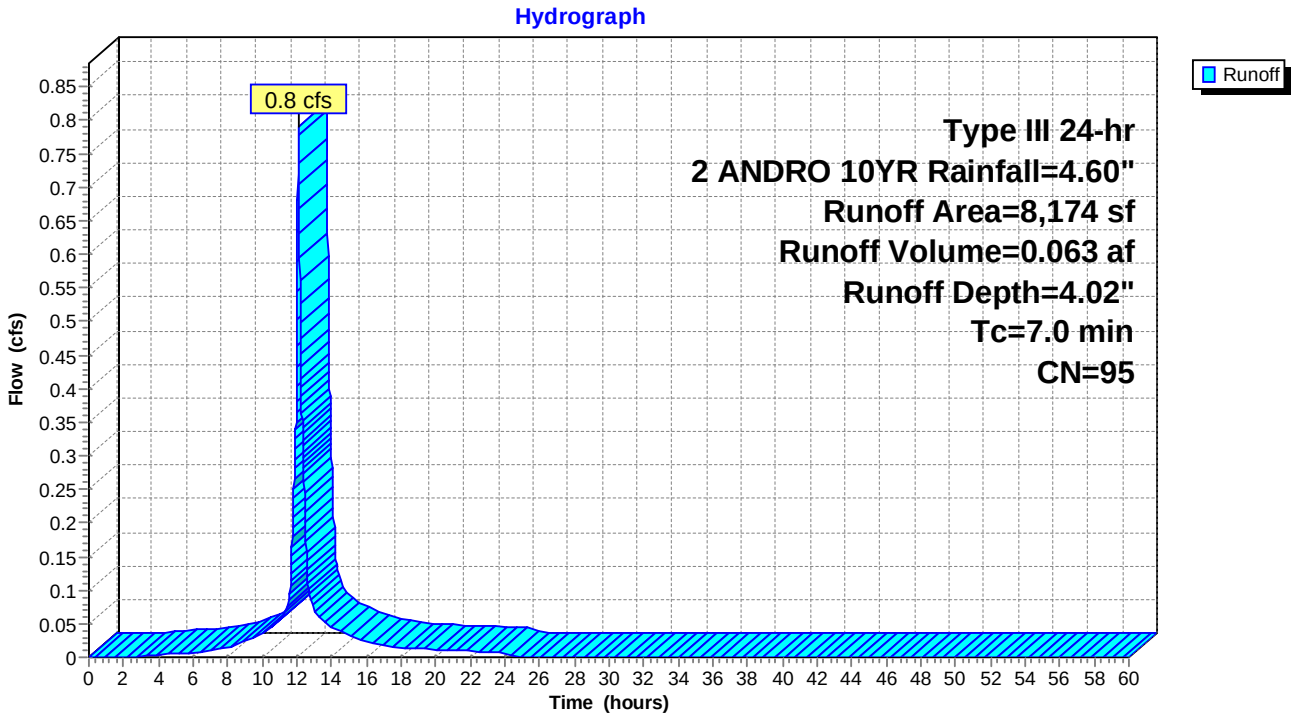
Runoff = 0.8 cfs @ 12.10 hrs, Volume= 0.063 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 ANDRO 10YR Rainfall=4.60"

	Area (sf)	CN	Description
*	7,328	98	Pavement
*	846	73	Grass - C
	8,174	95	Weighted Average
	846		10.35% Pervious Area
	7,328		89.65% Impervious Area

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

Subcatchment 20S: Pavement to CB



Summary for Subcatchment 21S: Direct to Detention

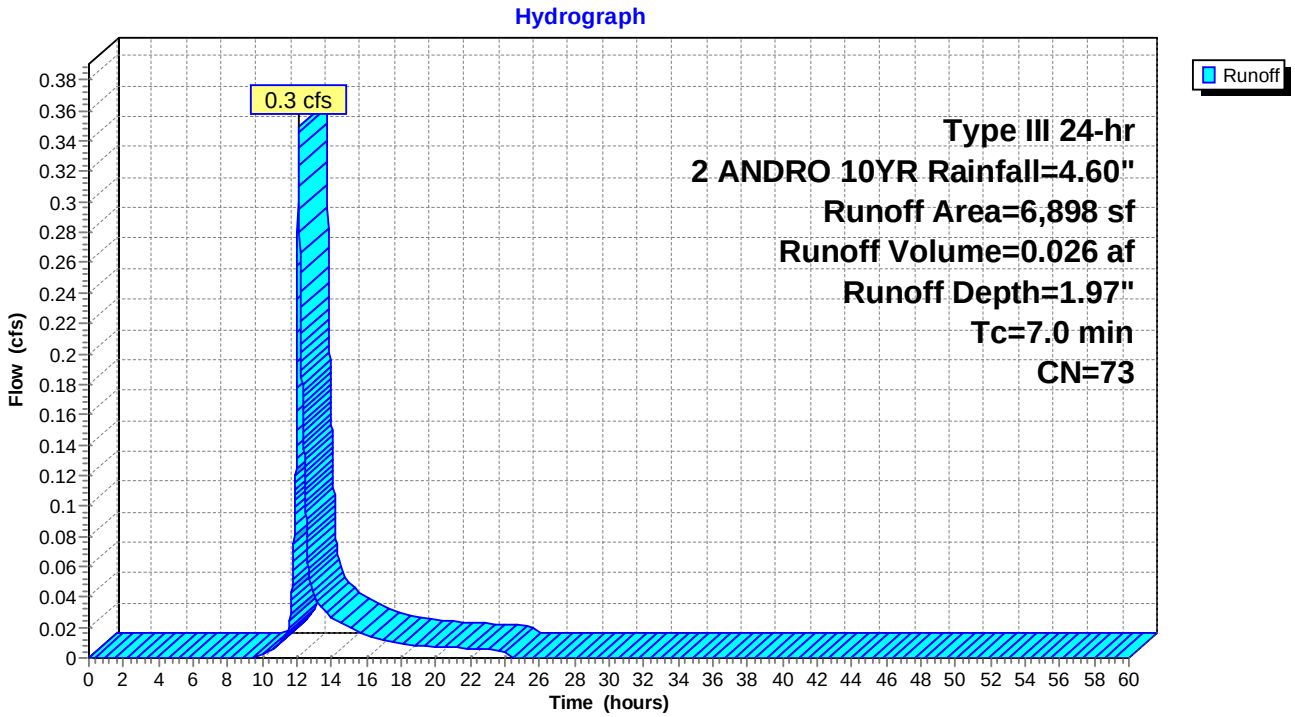
Runoff = 0.3 cfs @ 12.11 hrs, Volume= 0.026 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 ANDRO 10YR Rainfall=4.60"

	Area (sf)	CN	Description
*	6,898	73	Type C Grassed
*	0	98	Generator Housing/Pad
	6,898	73	Weighted Average
	6,898		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, Direct - 7**

Subcatchment 21S: Direct to Detention



Summary for Subcatchment 103 E: NE Corner of Lot

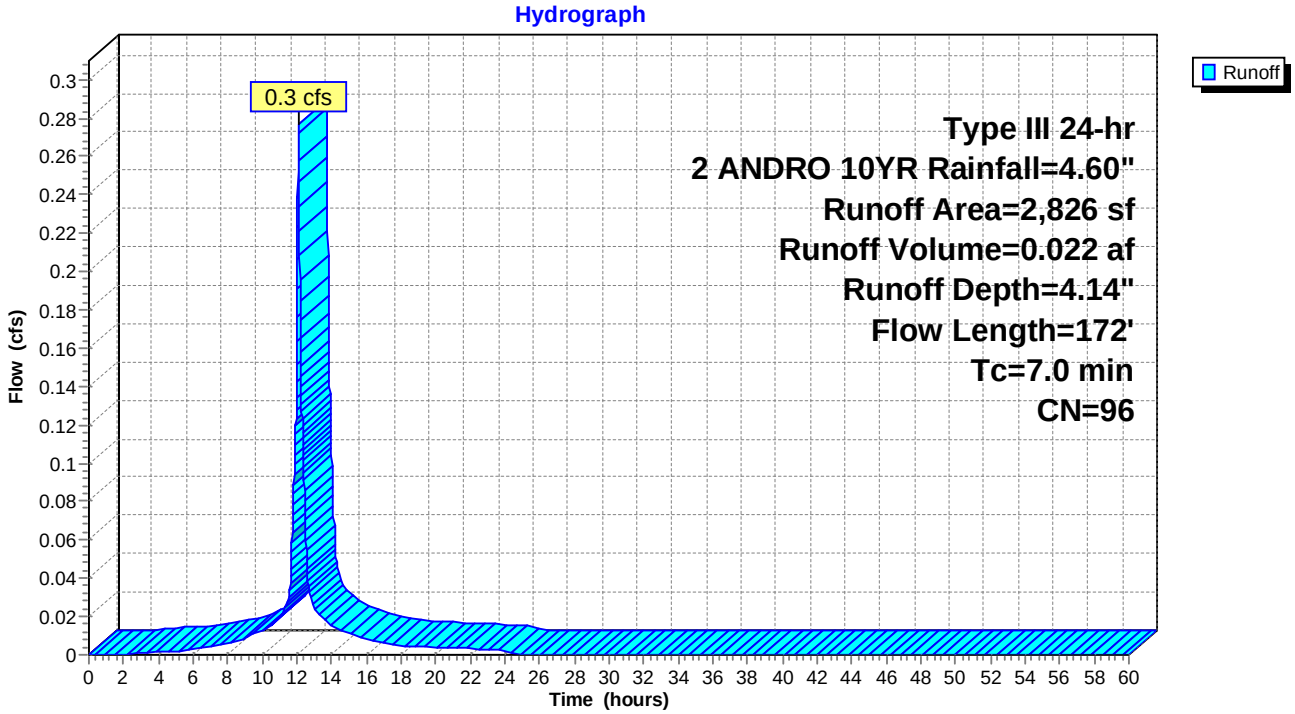
Runoff = 0.3 cfs @ 12.10 hrs, Volume= 0.022 af, Depth= 4.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 ANDRO 10YR Rainfall=4.60"

	Area (sf)	CN	Description
*	2,544	98	Other Impervious
	282	74	>75% Grass cover, Good, HSG C
	2,826	96	Weighted Average
	282		9.98% Pervious Area
	2,544		90.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	58	0.0050	0.69		**Sheet Flow, SF 1**
					Smooth surfaces n= 0.011 P2= 3.00"
1.0	114	0.0090	1.93		**Shallow Concentrated Flow, SCF 1**
					Paved Kv= 20.3 fps
4.6					**Direct Entry, DIRECT <7**
7.0	172	Total			

Subcatchment 103 E: NE Corner of Lot



Summary for Subcatchment 103 E-2: NW College Ave

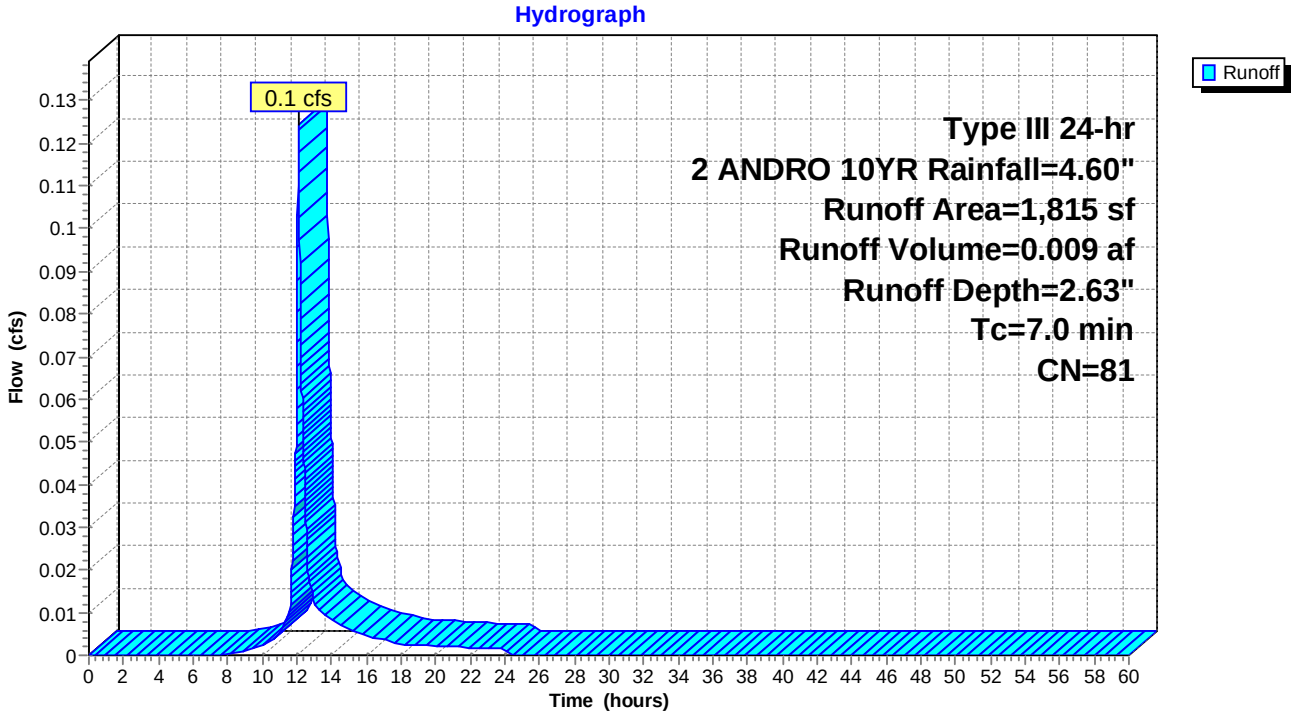
Runoff = 0.1 cfs @ 12.10 hrs, Volume= 0.009 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 ANDRO 10YR Rainfall=4.60"

	Area (sf)	CN	Description
*	609	98	Other Impervious
*	1,206	73	Landscape
	1,815	81	Weighted Average
	1,206		66.45% Pervious Area
	609		33.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, DIRECT <7**

Subcatchment 103 E-2: NW College Ave



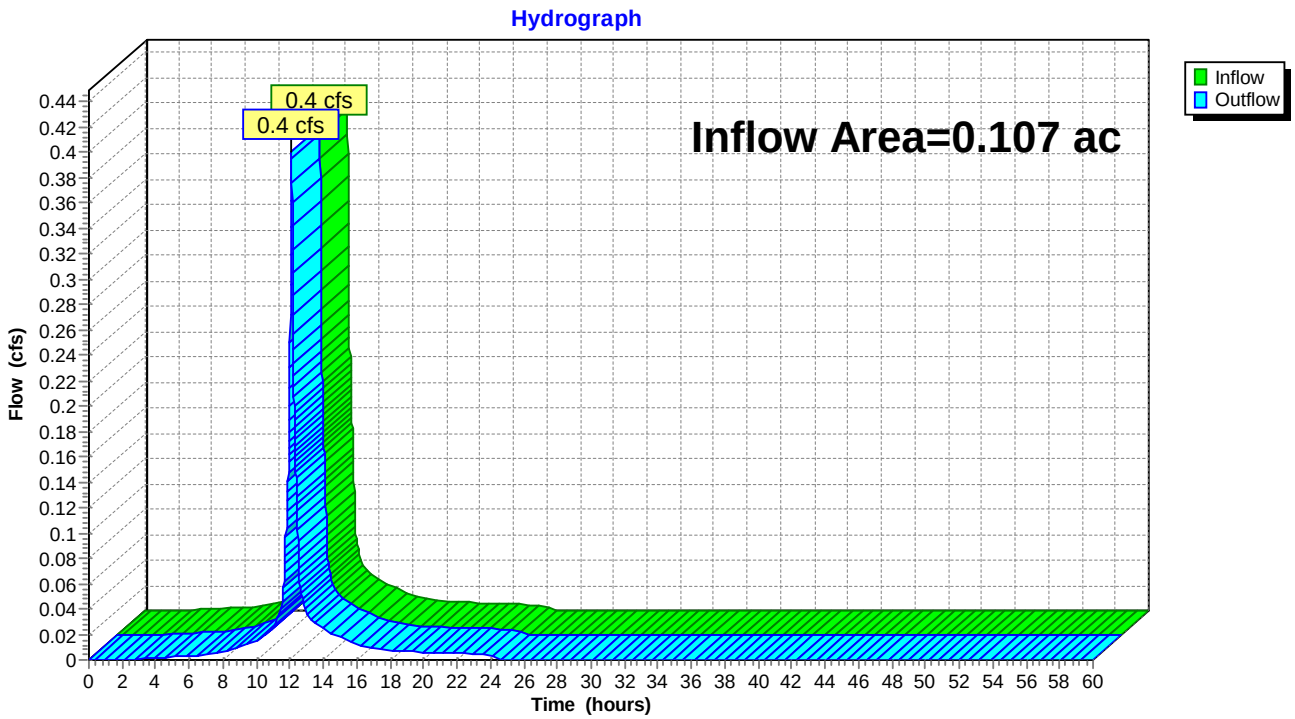
Summary for Reach SP1: SP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.107 ac, 67.94% Impervious, Inflow Depth = 3.55" for 2 ANDRO 10YR event
Inflow = 0.4 cfs @ 12.10 hrs, Volume= 0.032 af
Outflow = 0.4 cfs @ 12.10 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2

Reach SP1: SP1



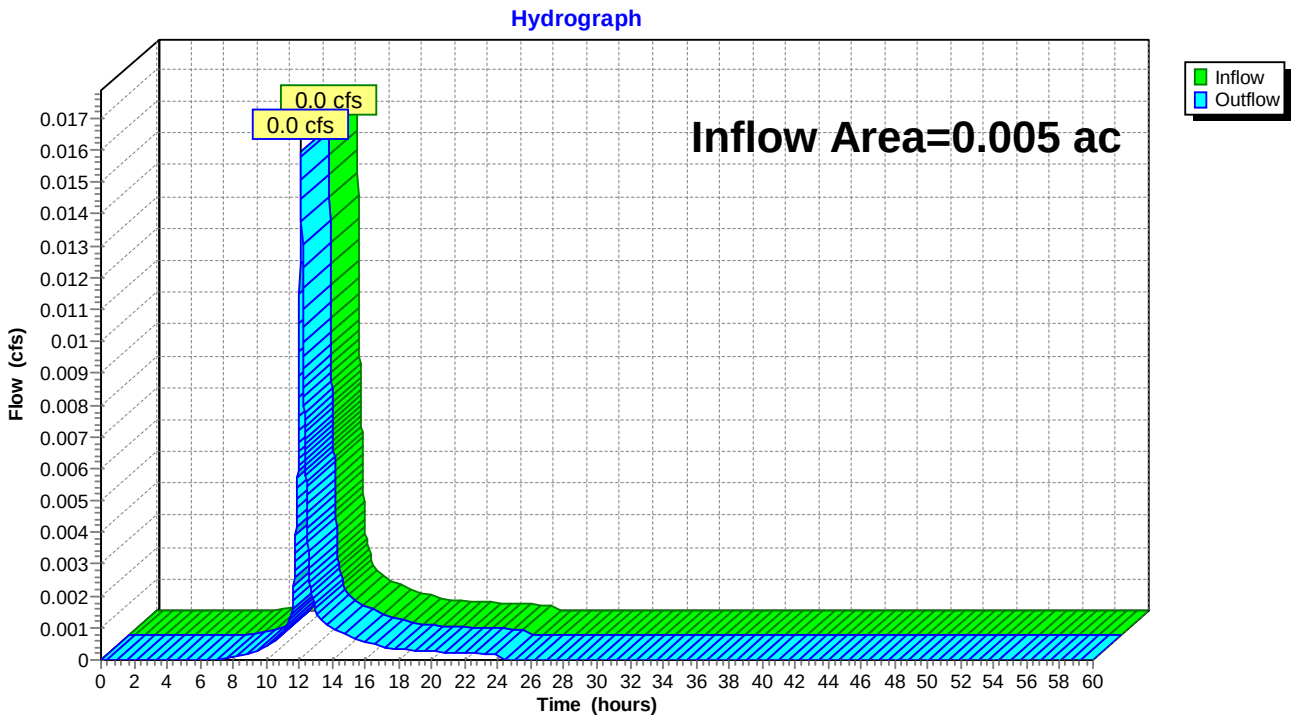
Summary for Reach SP2: SP2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.005 ac, 44.17% Impervious, Inflow Depth = 3.00" for 2 ANDRO 10YR event
Inflow = 0.0 cfs @ 12.10 hrs, Volume= 0.001 af
Outflow = 0.0 cfs @ 12.10 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2

Reach SP2: SP2



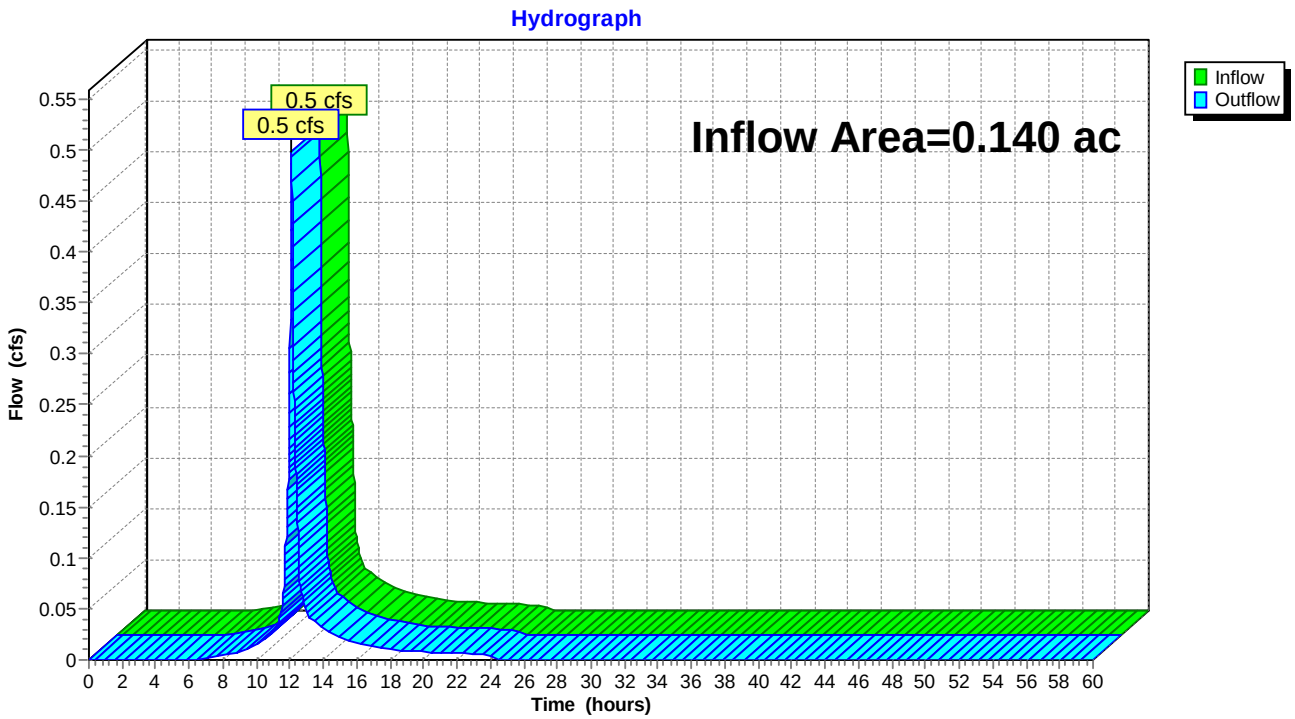
Summary for Reach SP3: SP3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.140 ac, 52.40% Impervious, Inflow Depth = 3.19" for 2 ANDRO 10YR event
Inflow = 0.5 cfs @ 12.10 hrs, Volume= 0.037 af
Outflow = 0.5 cfs @ 12.10 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2

Reach SP3: SP3



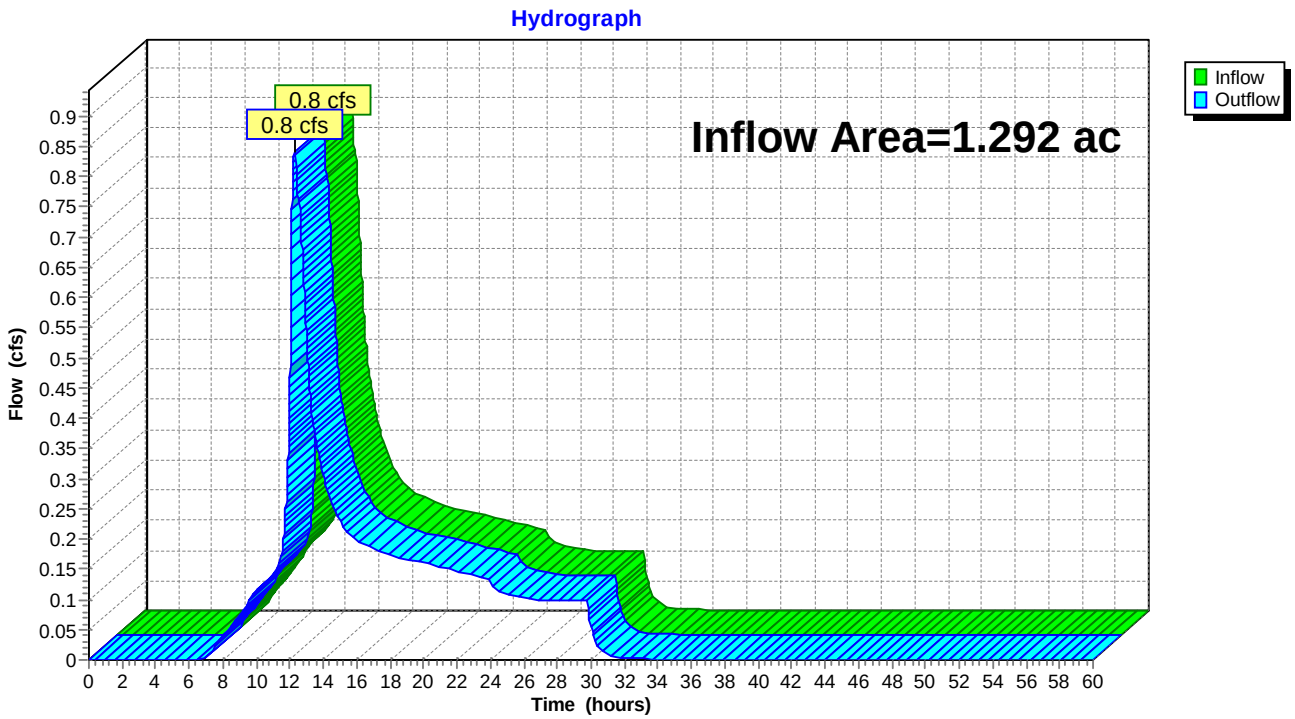
Summary for Reach SP4: SP4

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.292 ac, 45.94% Impervious, Inflow Depth = 3.08" for 2 ANDRO 10YR event
Inflow = 0.8 cfs @ 12.27 hrs, Volume= 0.332 af
Outflow = 0.8 cfs @ 12.27 hrs, Volume= 0.332 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2

Reach SP4: SP4



Summary for Pond 1P: Grassed Underdrain Filter 1 - OCS_1

Inflow Area = 0.790 ac, 75.09% Impervious, Inflow Depth = 3.72" for 2 ANDRO 10YR event
Inflow = 3.0 cfs @ 12.10 hrs, Volume= 0.245 af
Outflow = 0.3 cfs @ 12.93 hrs, Volume= 0.236 af, Atten= 90%, Lag= 50.0 min
Primary = 0.3 cfs @ 12.93 hrs, Volume= 0.236 af
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 230.60' @ 12.93 hrs Surf.Area= 2,664 sf Storage= 5,443 cf

Plug-Flow detention time= 367.6 min calculated for 0.236 af (97% of inflow)
Center-of-Mass det. time= 346.7 min (1,118.4 - 771.6)

Volume	Invert	Avail.Storage	Storage Description
#1	226.49'	8,045 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

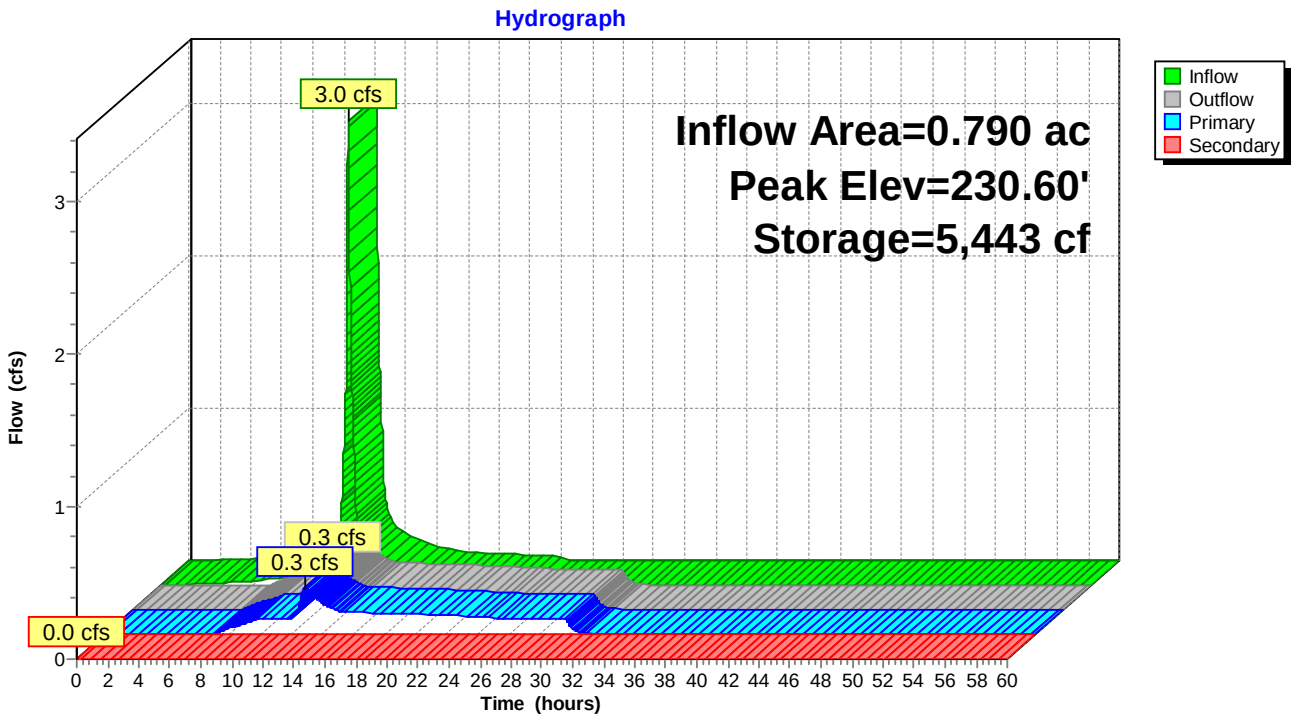
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
226.49	1,790	0.0	0	0
226.50	1,790	40.0	7	7
228.99	1,790	40.0	1,783	1,790
229.00	1,790	100.0	18	1,808
230.00	2,425	100.0	2,108	3,915
231.00	2,823	100.0	2,624	6,539
231.50	3,200	100.0	1,506	8,045

Device	Routing	Invert	Outlet Devices
#1	Secondary	231.00'	**15.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Primary	226.13'	**12.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 226.13' / 225.13' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 2	227.00'	**4.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 227.00' / 226.80' S= 0.0080 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf
#4	Device 3	226.49'	**2.410 in/hr Exfiltration over Horizontal area**
#5	Device 2	230.50'	**18.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.3 cfs @ 12.93 hrs HW=230.60' TW=224.49' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.3 cfs of 5.9 cfs potential flow)
  ├─**3=Culvert** (Passes 0.1 cfs of 0.6 cfs potential flow)
  │ └─**4=Exfiltration** (Exfiltration Controls 0.1 cfs)
  └─**5=Orifice/Grate** (Orifice Controls 0.2 cfs @ 1.02 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=226.49' TW=224.10' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 1P: Grassed Underdrain Filter 1 - OCS_1



Summary for Pond 5P: DMH-4

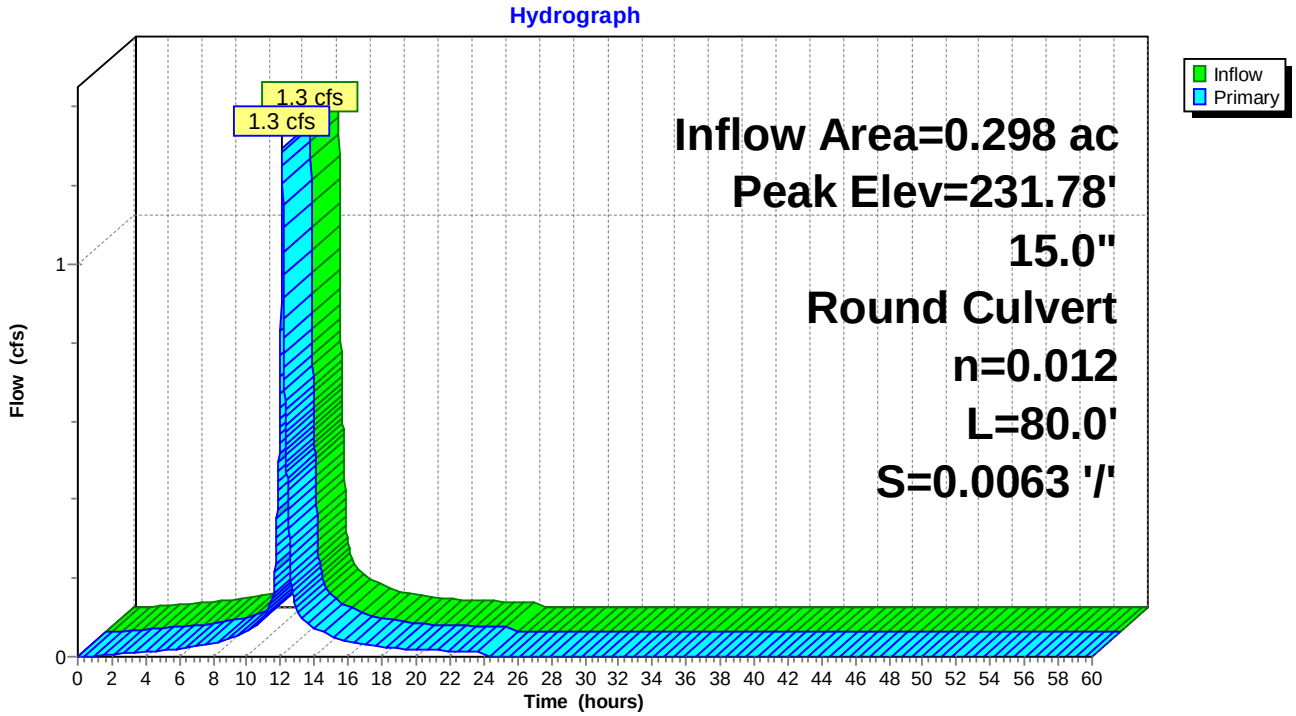
Inflow Area = 0.298 ac,100.00% Impervious, Inflow Depth = 4.36" for 2 ANDRO 10YR event
Inflow = 1.3 cfs @ 12.10 hrs, Volume= 0.108 af
Outflow = 1.3 cfs @ 12.10 hrs, Volume= 0.108 af, Atten= 0%, Lag= 0.0 min
Primary = 1.3 cfs @ 12.10 hrs, Volume= 0.108 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 231.78' @ 12.10 hrs
Flood Elev= 237.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	231.10'	**15.0" Round Culvert** L= 80.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 231.10' / 230.60' S= 0.0063 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.3 cfs @ 12.10 hrs HW=231.78' TW=231.34' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 1.3 cfs @ 2.73 fps)

Pond 5P: DMH-4



Summary for Pond 6P: CB-2

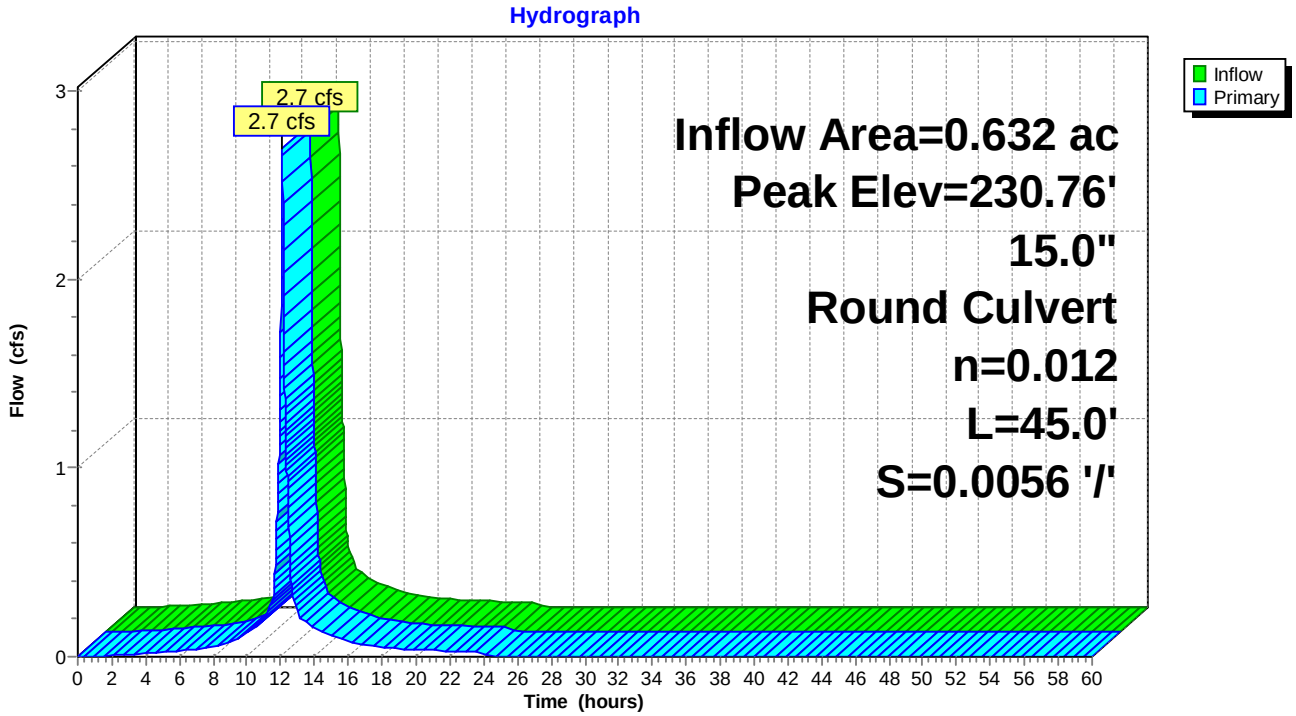
Inflow Area = 0.632 ac, 93.90% Impervious, Inflow Depth = 4.15" for 2 ANDRO 10YR event
Inflow = 2.7 cfs @ 12.10 hrs, Volume= 0.219 af
Outflow = 2.7 cfs @ 12.10 hrs, Volume= 0.219 af, Atten= 0%, Lag= 0.0 min
Primary = 2.7 cfs @ 12.10 hrs, Volume= 0.219 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 230.76' @ 12.10 hrs
Flood Elev= 234.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	229.75'	**15.0" Round Culvert** L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 229.75' / 229.50' S= 0.0056 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=2.7 cfs @ 12.10 hrs HW=230.76' TW=229.66' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 2.7 cfs @ 3.48 fps)

Pond 6P: CB-2



Summary for Pond 7P: CB-3

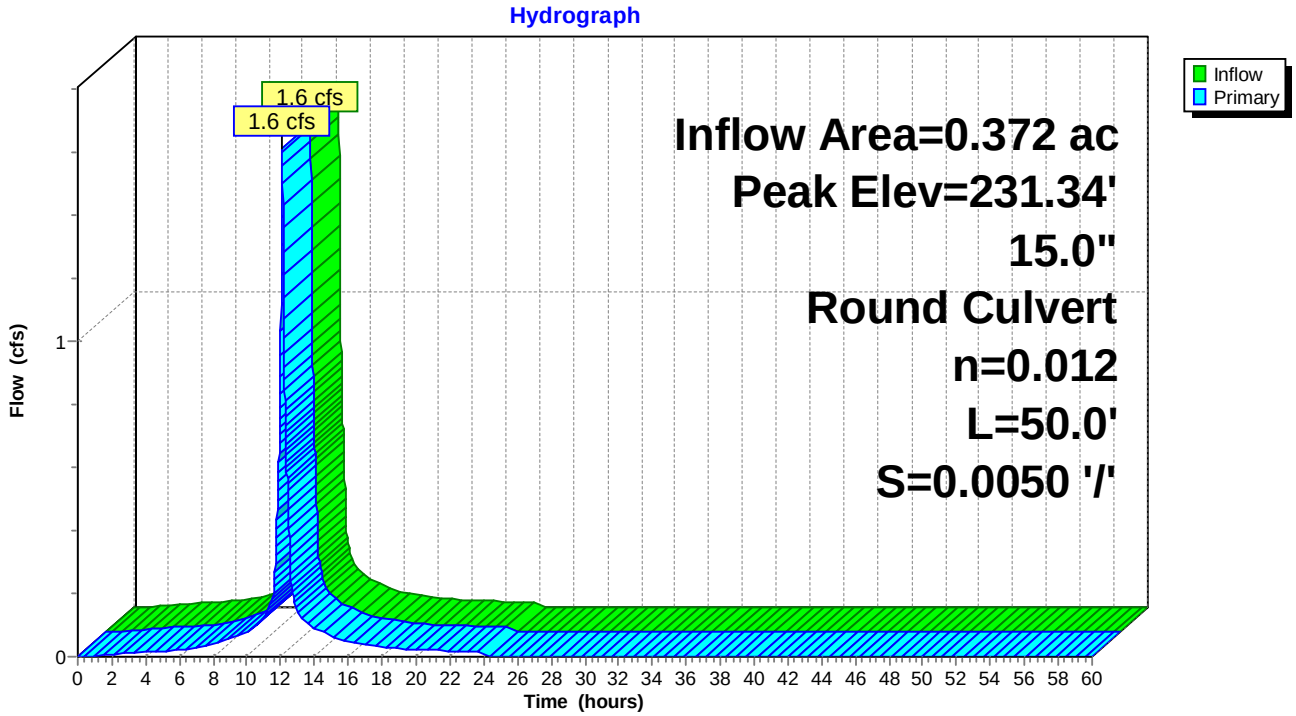
Inflow Area = 0.372 ac, 98.92% Impervious, Inflow Depth = 4.34" for 2 ANDRO 10YR event
Inflow = 1.6 cfs @ 12.10 hrs, Volume= 0.135 af
Outflow = 1.6 cfs @ 12.10 hrs, Volume= 0.135 af, Atten= 0%, Lag= 0.0 min
Primary = 1.6 cfs @ 12.10 hrs, Volume= 0.135 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 231.34' @ 12.10 hrs
Flood Elev= 234.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	230.60'	**15.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 230.60' / 230.35' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.6 cfs @ 12.10 hrs HW=231.34' TW=230.76' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 1.6 cfs @ 3.06 fps)

Pond 7P: CB-3



Summary for Pond 11P: CB-10

Inflow Area = 0.072 ac, 79.03% Impervious, Inflow Depth = 3.81" for 2 ANDRO 10YR event
Inflow = 0.3 cfs @ 12.10 hrs, Volume= 0.023 af
Outflow = 0.3 cfs @ 12.10 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.3 min
Secondary = 0.3 cfs @ 12.10 hrs, Volume= 0.021 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 238.03' @ 12.10 hrs Surf.Area= 0 sf Storage= 83 cf

Plug-Flow detention time= 65.1 min calculated for 0.021 af (92% of inflow)
Center-of-Mass det. time= 25.6 min (807.3 - 781.7)

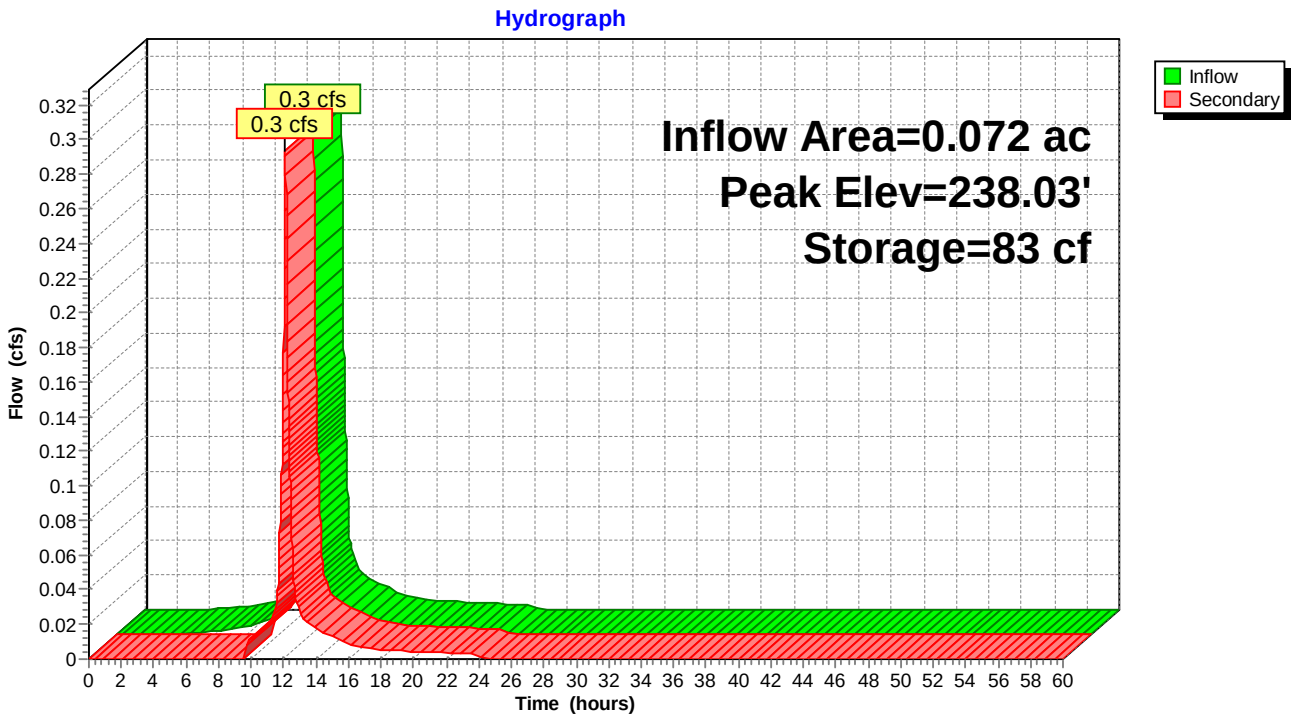
Volume	Invert	Avail.Storage	Storage Description
#1	235.00'	725 cf	**Custom Stage Data** Listed below

Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
235.00	0	0
238.00	75	75
238.50	150	225
240.00	500	725

Device	Routing	Invert	Outlet Devices
#1	Secondary	231.90'	**12.0" Round Culvert** L= 125.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 231.90' / 229.85' S= 0.0164 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	238.00'	**4.0" x 4.0" Horiz. Orifice/Grate X 16.00** C= 0.600 Limited to weir flow at low heads

Secondary OutFlow Max=0.3 cfs @ 12.10 hrs HW=238.03' TW=230.76' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.3 cfs of 7.1 cfs potential flow)
└─**2=Orifice/Grate** (Weir Controls 0.3 cfs @ 0.53 fps)

Pond 11P: CB-10



Summary for Pond PW: Wetlands

Inflow Area = 0.502 ac, 0.00% Impervious, Inflow Depth = 2.29" for 2 ANDRO 10YR event
Inflow = 1.3 cfs @ 12.10 hrs, Volume= 0.096 af
Outflow = 0.7 cfs @ 12.26 hrs, Volume= 0.096 af, Atten= 46%, Lag= 9.5 min
Primary = 0.7 cfs @ 12.26 hrs, Volume= 0.096 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 227.04' @ 12.26 hrs Surf.Area= 2,305 sf Storage= 616 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 7.9 min (842.4 - 834.5)

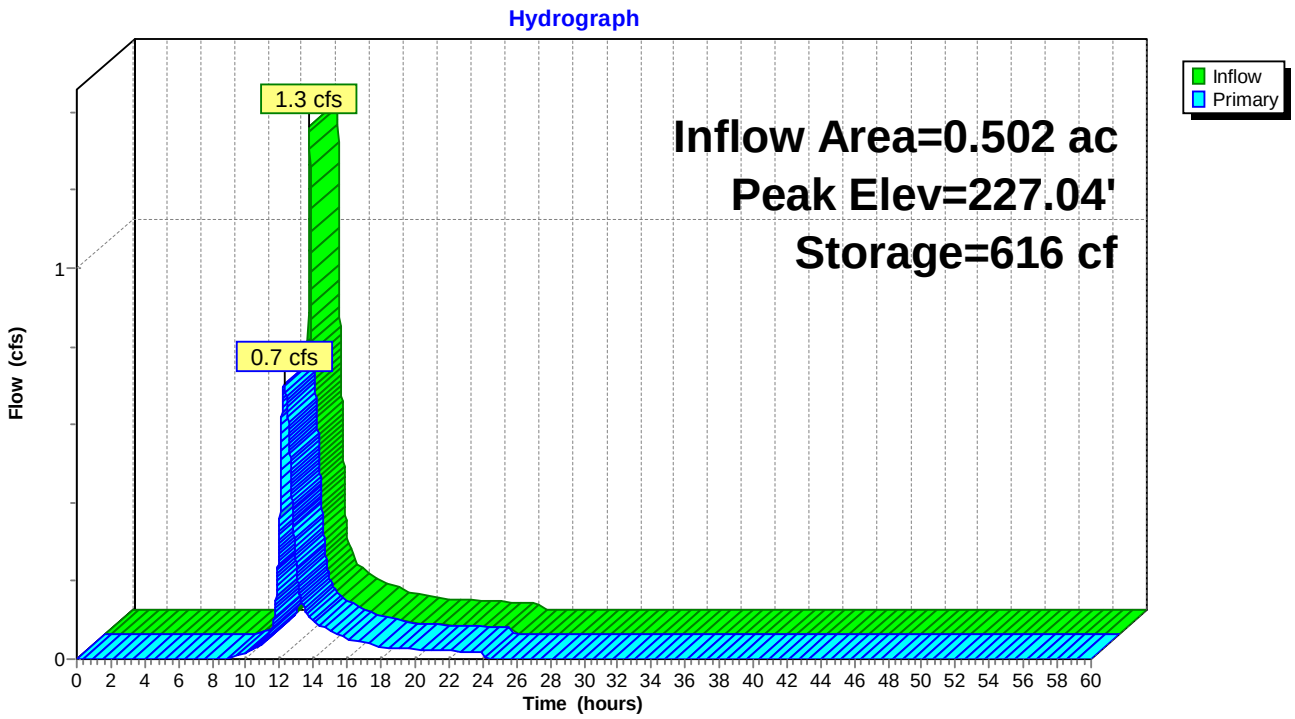
Volume	Invert	Avail.Storage	Storage Description
#1	226.50'	14,403 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
226.50	5	0	0
227.00	2,135	535	535
228.00	6,800	4,468	5,003
229.00	12,000	9,400	14,403

Device	Routing	Invert	Outlet Devices
#1	Primary	227.73'	**4.0" x 4.0" Horiz. Orifice/Grate X 16.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	226.43'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 226.43' / 225.73' S= 0.0280 '/' Cc= 0.900 n= 0.013, Flow Area= 0.35 sf
#3	Primary	227.00'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 227.00' / 225.73' S= 0.0508 '/' Cc= 0.900 n= 0.013, Flow Area= 0.35 sf

Primary OutFlow Max=0.7 cfs @ 12.26 hrs HW=227.04' TW=224.58' (Dynamic Tailwater)
- **1=Orifice/Grate** (Controls 0.0 cfs)
- **2=Culvert** (Inlet Controls 0.7 cfs @ 2.09 fps)
- **3=Culvert** (Inlet Controls 0.0 cfs @ 0.51 fps)

Pond PW: Wetlands



Summary for Pond PWC: Ex. CB (Wetlands)

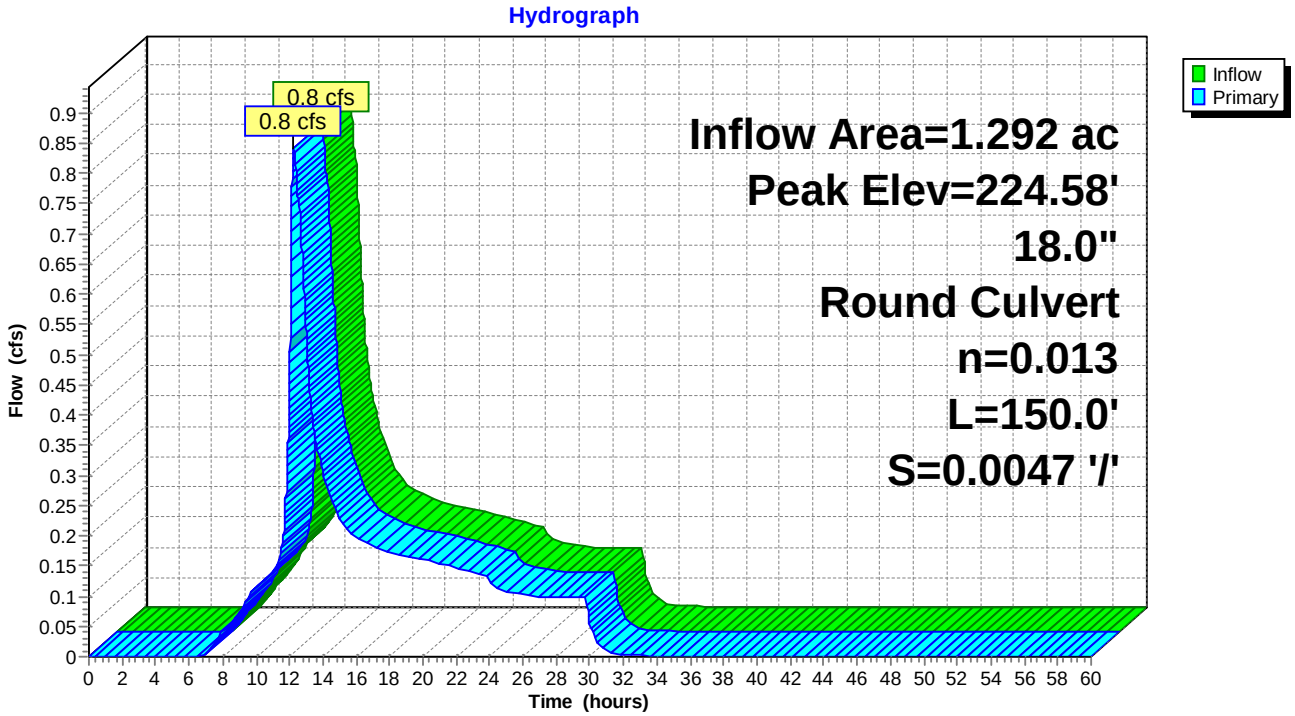
Inflow Area = 1.292 ac, 45.94% Impervious, Inflow Depth = 3.08" for 2 ANDRO 10YR event
Inflow = 0.8 cfs @ 12.27 hrs, Volume= 0.332 af
Outflow = 0.8 cfs @ 12.27 hrs, Volume= 0.332 af, Atten= 0%, Lag= 0.0 min
Primary = 0.8 cfs @ 12.27 hrs, Volume= 0.332 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 224.58' @ 12.27 hrs
Flood Elev= 228.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	224.10'	**18.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 224.10' / 223.40' S= 0.0047 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.8 cfs @ 12.27 hrs HW=224.58' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.8 cfs @ 2.60 fps)

Pond PWC: Ex. CB (Wetlands)



Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3S: Flat Roof Runoff Area=8,953 sf 100.00% Impervious Runoff Depth=5.16"
Tc=7.0 min CN=98 Runoff=1.1 cfs 0.088 af

Subcatchment 12-R: 45 Campus to East Runoff Area=206 sf 44.17% Impervious Runoff Depth=3.74"
Tc=7.0 min CN=85 Runoff=0.0 cfs 0.001 af

Subcatchment 13-R: 45 Campus to wetland Runoff Area=21,850 sf 0.00% Impervious Runoff Depth=2.96"
Flow Length=300' Tc=7.0 min CN=77 Runoff=1.7 cfs 0.124 af

Subcatchment 14-R: 45 Campus to West Runoff Area=6,092 sf 52.40% Impervious Runoff Depth=3.95"
Tc=7.0 min CN=87 Runoff=0.6 cfs 0.046 af

Subcatchment 15S: SW Roof Runoff Area=4,014 sf 100.00% Impervious Runoff Depth=5.16"
Tc=7.0 min CN=98 Runoff=0.5 cfs 0.040 af

Subcatchment 17S: SE Roof Runoff Area=3,138 sf 79.03% Impervious Runoff Depth=4.59"
Tc=7.0 min CN=93 Runoff=0.4 cfs 0.028 af

Subcatchment 19S: Pavement to CB Runoff Area=3,256 sf 94.63% Impervious Runoff Depth=5.05"
Tc=7.0 min CN=97 Runoff=0.4 cfs 0.031 af

Subcatchment 20S: Pavement to CB Runoff Area=8,174 sf 89.65% Impervious Runoff Depth=4.82"
Tc=7.0 min CN=95 Runoff=0.9 cfs 0.075 af

Subcatchment 21S: Direct to Detention Runoff Area=6,898 sf 0.00% Impervious Runoff Depth=2.60"
Tc=7.0 min CN=73 Runoff=0.5 cfs 0.034 af

Subcatchment 103 E: NE Corner of Lot Runoff Area=2,826 sf 90.02% Impervious Runoff Depth=4.93"
Flow Length=172' Tc=7.0 min CN=96 Runoff=0.3 cfs 0.027 af

Subcatchment 103 E-2: NW College Ave Runoff Area=1,815 sf 33.55% Impervious Runoff Depth=3.34"
Tc=7.0 min CN=81 Runoff=0.2 cfs 0.012 af

Reach SP1: SP1 Inflow=0.5 cfs 0.038 af
Outflow=0.5 cfs 0.038 af

Reach SP2: SP2 Inflow=0.0 cfs 0.001 af
Outflow=0.0 cfs 0.001 af

Reach SP3: SP3 Inflow=0.6 cfs 0.046 af
Outflow=0.6 cfs 0.046 af

Reach SP4: SP4 Inflow=1.7 cfs 0.410 af
Outflow=1.7 cfs 0.410 af

Pond 1P: Grassed Underdrain Filter 1 - OCS_1 Peak Elev=230.78' Storage=5,938 cf Inflow=3.6 cfs 0.295 af
Primary=0.9 cfs 0.286 af Secondary=0.0 cfs 0.000 af Outflow=0.9 cfs 0.286 af

Pond 5P: DMH-4 Peak Elev=231.86' Inflow=1.5 cfs 0.128 af
15.0" Round Culvert n=0.012 L=80.0' S=0.0063 '/' Outflow=1.5 cfs 0.128 af

Pond 6P: CB-2 Peak Elev=230.88' Inflow=3.2 cfs 0.261 af
15.0" Round Culvert n=0.012 L=45.0' S=0.0056 '/' Outflow=3.2 cfs 0.261 af

Pond 7P: CB-3 Peak Elev=231.42' Inflow=1.9 cfs 0.159 af
15.0" Round Culvert n=0.012 L=50.0' S=0.0050 '/' Outflow=1.9 cfs 0.159 af

Pond 11P: CB-10 Peak Elev=238.03' Storage=84 cf Inflow=0.4 cfs 0.028 af
Outflow=0.3 cfs 0.026 af

Pond PW: Wetlands Peak Elev=227.13' Storage=863 cf Inflow=1.7 cfs 0.124 af
Outflow=0.9 cfs 0.124 af

Pond PWC: Ex. CB (Wetlands) Peak Elev=224.79' Inflow=1.7 cfs 0.410 af
18.0" Round Culvert n=0.013 L=150.0' S=0.0047 '/' Outflow=1.7 cfs 0.410 af

Total Runoff Area = 1.543 ac Runoff Volume = 0.506 af Average Runoff Depth = 3.94"
51.96% Pervious = 0.802 ac 48.04% Impervious = 0.741 ac

Summary for Subcatchment 3S: Flat Roof

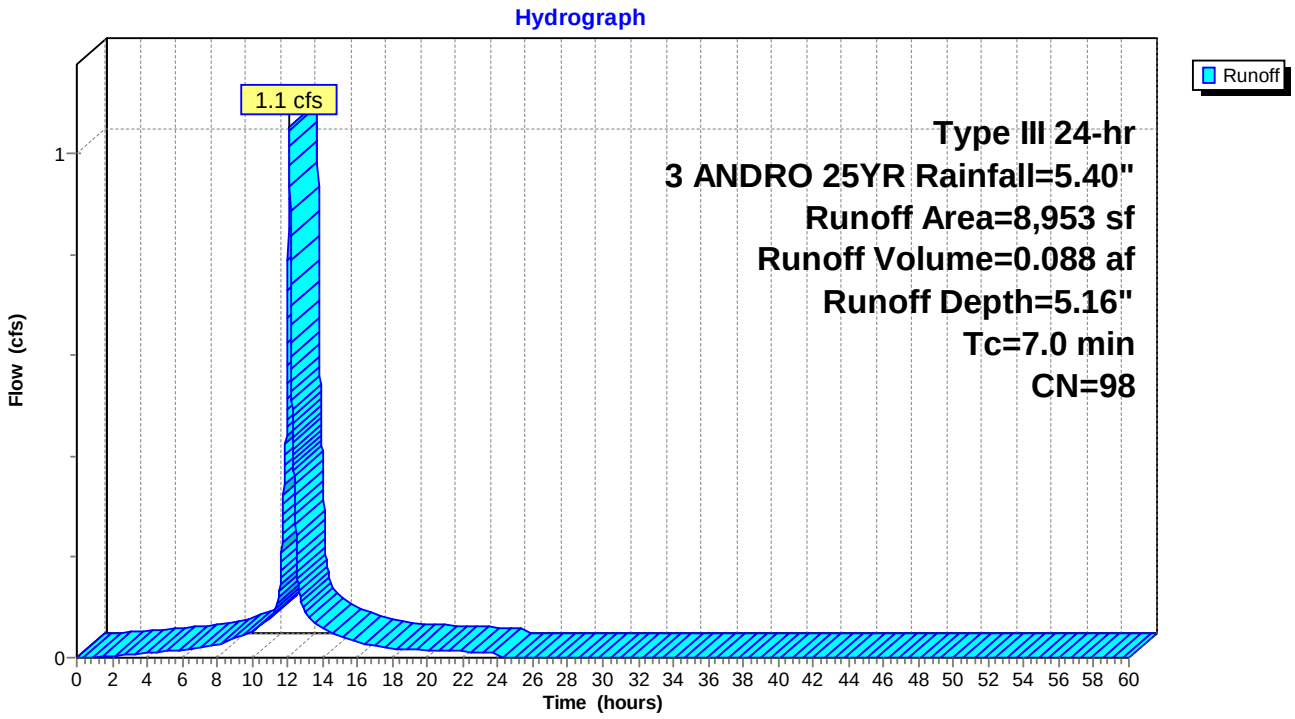
Runoff = 1.1 cfs @ 12.10 hrs, Volume= 0.088 af, Depth= 5.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 3 ANDRO 25YR Rainfall=5.40"

	Area (sf)	CN	Description
*	8,953	98	Roof
	8,953		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, Min 7**

Subcatchment 3S: Flat Roof



Summary for Subcatchment 12-R: 45 Campus to East

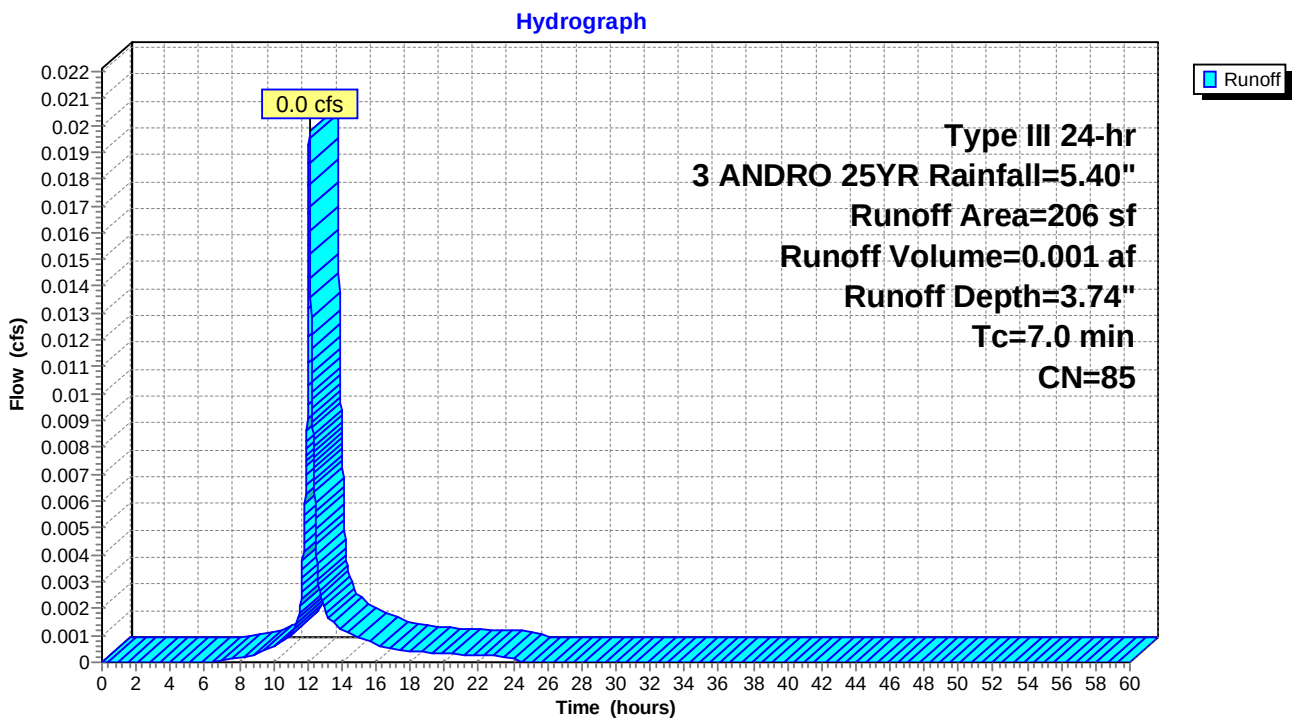
Runoff = 0.0 cfs @ 12.10 hrs, Volume= 0.001 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 3 ANDRO 25YR Rainfall=5.40"

	Area (sf)	CN	Description
*	91	98	Pavement
*	0	98	Roofs
	115	74	>75% Grass cover, Good, HSG C
	0	65	Brush, Good, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	72	Woods/grass comb., Good, HSG C
	206	85	Weighted Average
	115		55.83% Pervious Area
	91		44.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, DIRECT <7**

Subcatchment 12-R: 45 Campus to East



Summary for Subcatchment 13-R: 45 Campus to wetland

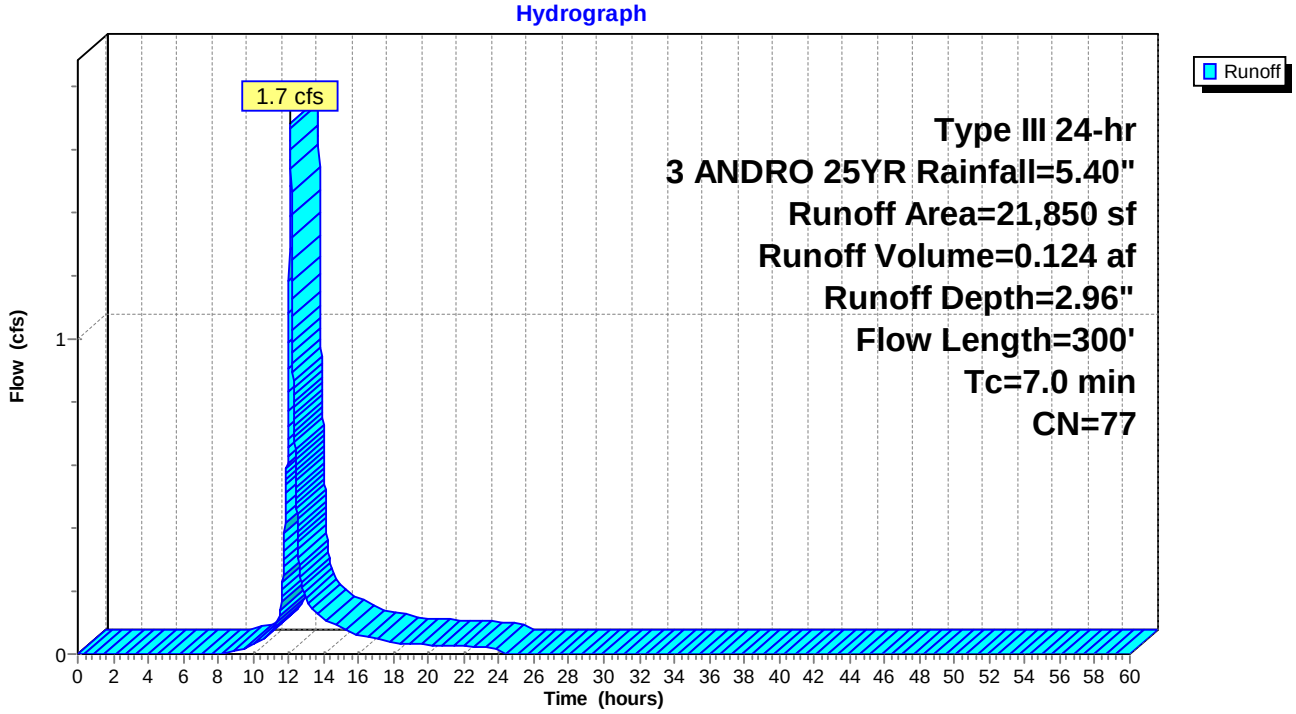
Runoff = 1.7 cfs @ 12.10 hrs, Volume= 0.124 af, Depth= 2.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 3 ANDRO 25YR Rainfall=5.40"

	Area (sf)	CN	Description
*	0	98	Roofs, pavment, ramps
	1,678	74	>75% Grass cover, Good, HSG C
	18,776	78	Meadow, non-grazed, HSG D
	1,396	72	Woods/grass comb., Good, HSG C
	21,850	77	Weighted Average
	21,850		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	30	0.0330	0.11		**Sheet Flow, SF 1**
					Grass: Dense n= 0.240 P2= 3.00"
1.3	270	0.0460	3.45		**Shallow Concentrated Flow, SCF 1**
					Unpaved Kv= 16.1 fps
1.1					**Direct Entry, DIRECT TO 7**
7.0	300	Total			

Subcatchment 13-R: 45 Campus to wetland



Summary for Subcatchment 14-R: 45 Campus to West

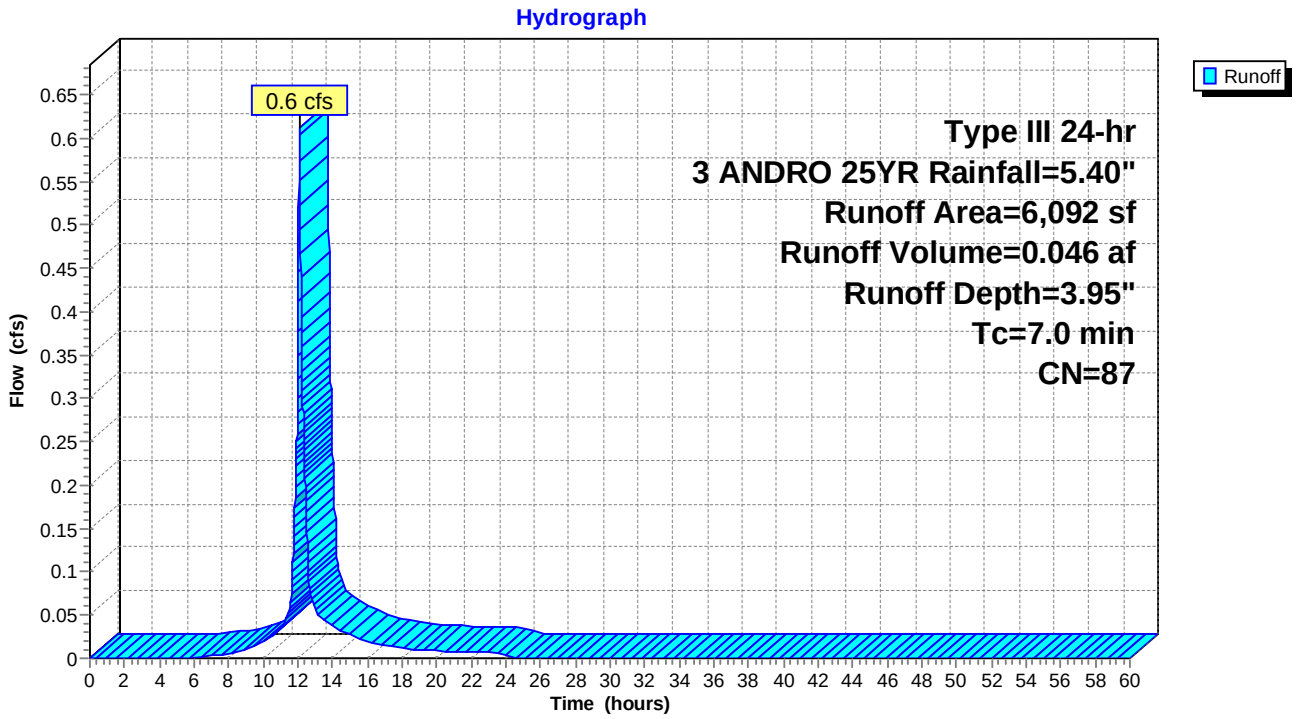
Runoff = 0.6 cfs @ 12.10 hrs, Volume= 0.046 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 3 ANDRO 25YR Rainfall=5.40"

	Area (sf)	CN	Description
*	3,192	98	Pavement
	2,900	74	>75% Grass cover, Good, HSG C
	0	65	Brush, Good, HSG C
	0	78	Meadow, non-grazed, HSG D
	0	72	Woods/grass comb., Good, HSG C
	6,092	87	Weighted Average
	2,900		47.60% Pervious Area
	3,192		52.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, DIRECT <7**

Subcatchment 14-R: 45 Campus to West



Summary for Subcatchment 15S: SW Roof

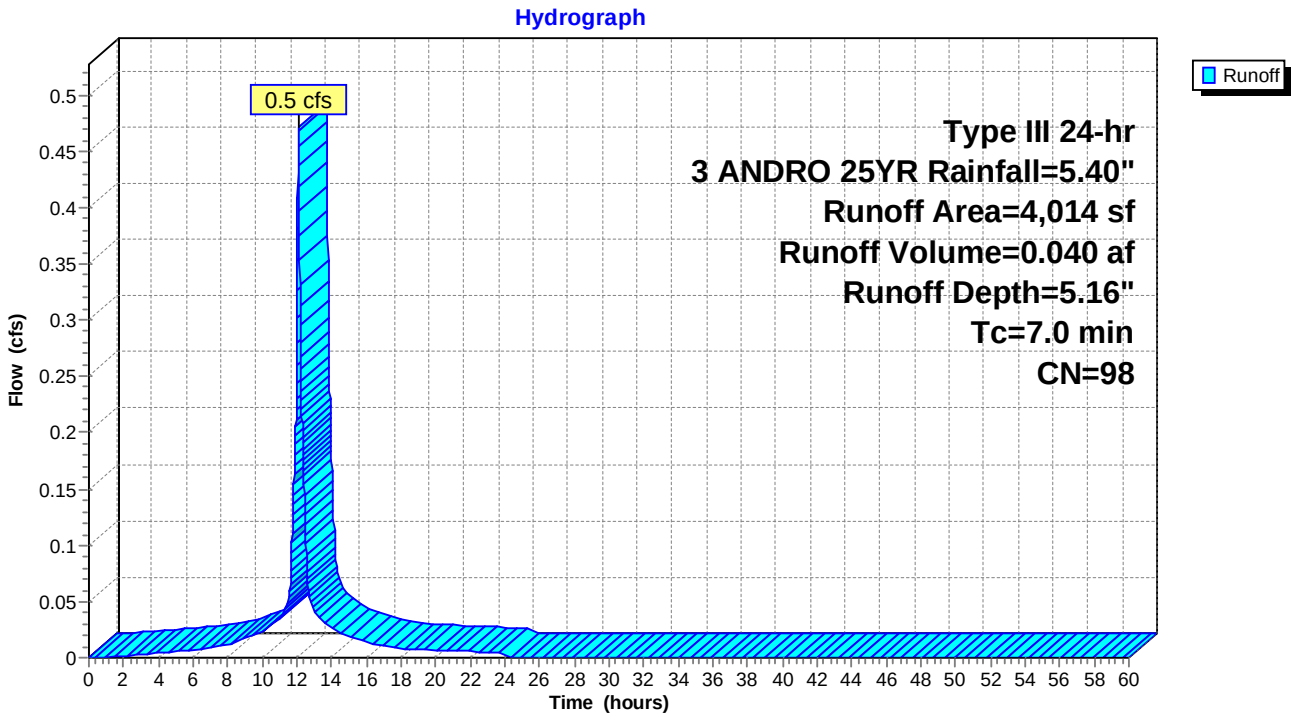
Runoff = 0.5 cfs @ 12.10 hrs, Volume= 0.040 af, Depth= 5.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 3 ANDRO 25YR Rainfall=5.40"

	Area (sf)	CN	Description
*	4,014	98	Roof
	4,014		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, Direct <7**

Subcatchment 15S: SW Roof



Summary for Subcatchment 17S: SE Roof

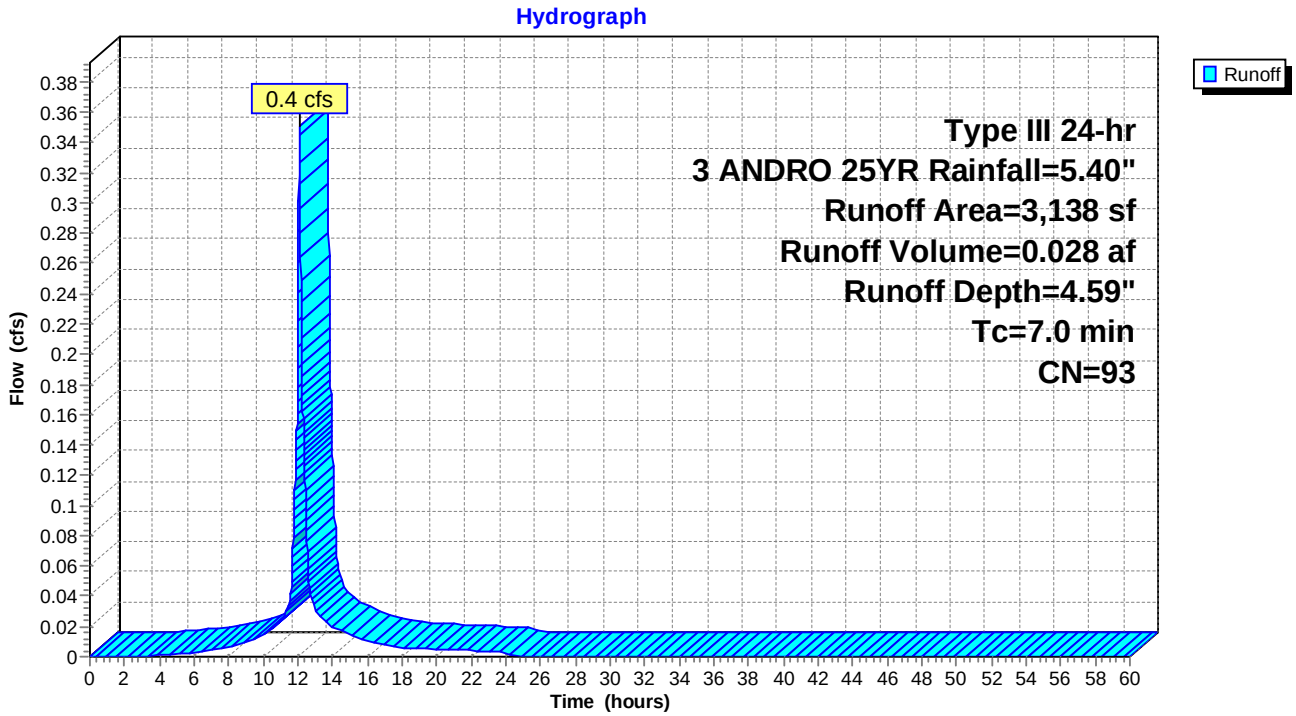
Runoff = 0.4 cfs @ 12.10 hrs, Volume= 0.028 af, Depth= 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 3 ANDRO 25YR Rainfall=5.40"

	Area (sf)	CN	Description
*	2,033	98	Roof
*	658	73	Grass - C
*	447	98	Other Impervious
	3,138	93	Weighted Average
	658		20.97% Pervious Area
	2,480		79.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, DIRECT <7**

Subcatchment 17S: SE Roof



Summary for Subcatchment 19S: Pavement to CB

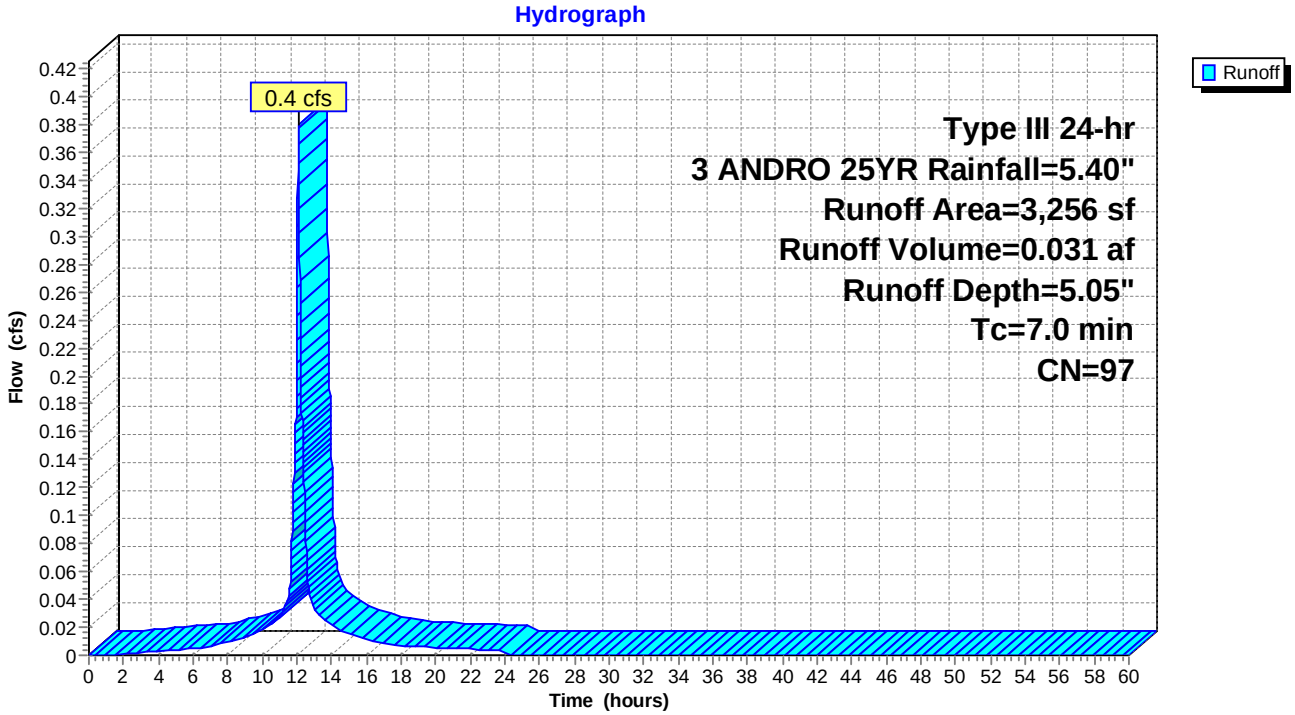
Runoff = 0.4 cfs @ 12.10 hrs, Volume= 0.031 af, Depth= 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 3 ANDRO 25YR Rainfall=5.40"

	Area (sf)	CN	Description
*	3,081	98	Pavement
	175	74	>75% Grass cover, Good, HSG C
	3,256	97	Weighted Average
	175		5.37% Pervious Area
	3,081		94.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, Direct to 7**

Subcatchment 19S: Pavement to CB



Summary for Subcatchment 20S: Pavement to CB

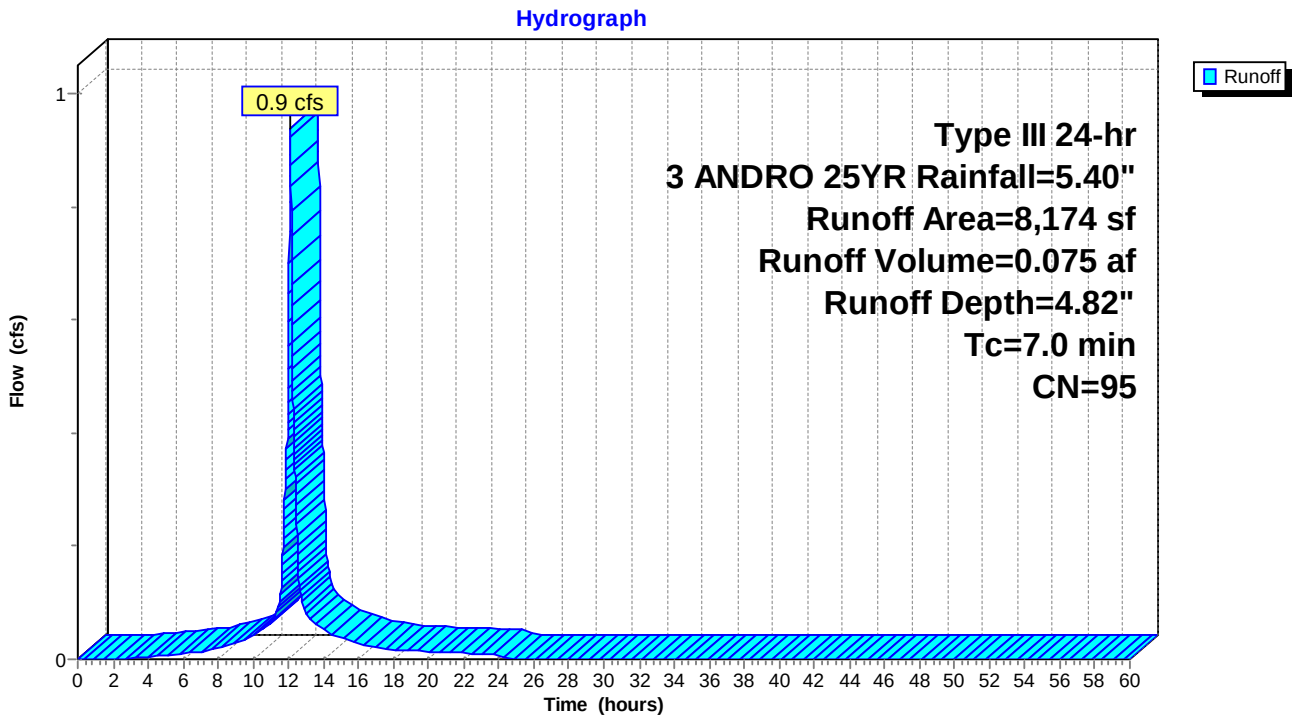
Runoff = 0.9 cfs @ 12.10 hrs, Volume= 0.075 af, Depth= 4.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 3 ANDRO 25YR Rainfall=5.40"

	Area (sf)	CN	Description
*	7,328	98	Pavement
*	846	73	Grass - C
	8,174	95	Weighted Average
	846		10.35% Pervious Area
	7,328		89.65% Impervious Area

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

Subcatchment 20S: Pavement to CB



Summary for Subcatchment 21S: Direct to Detention

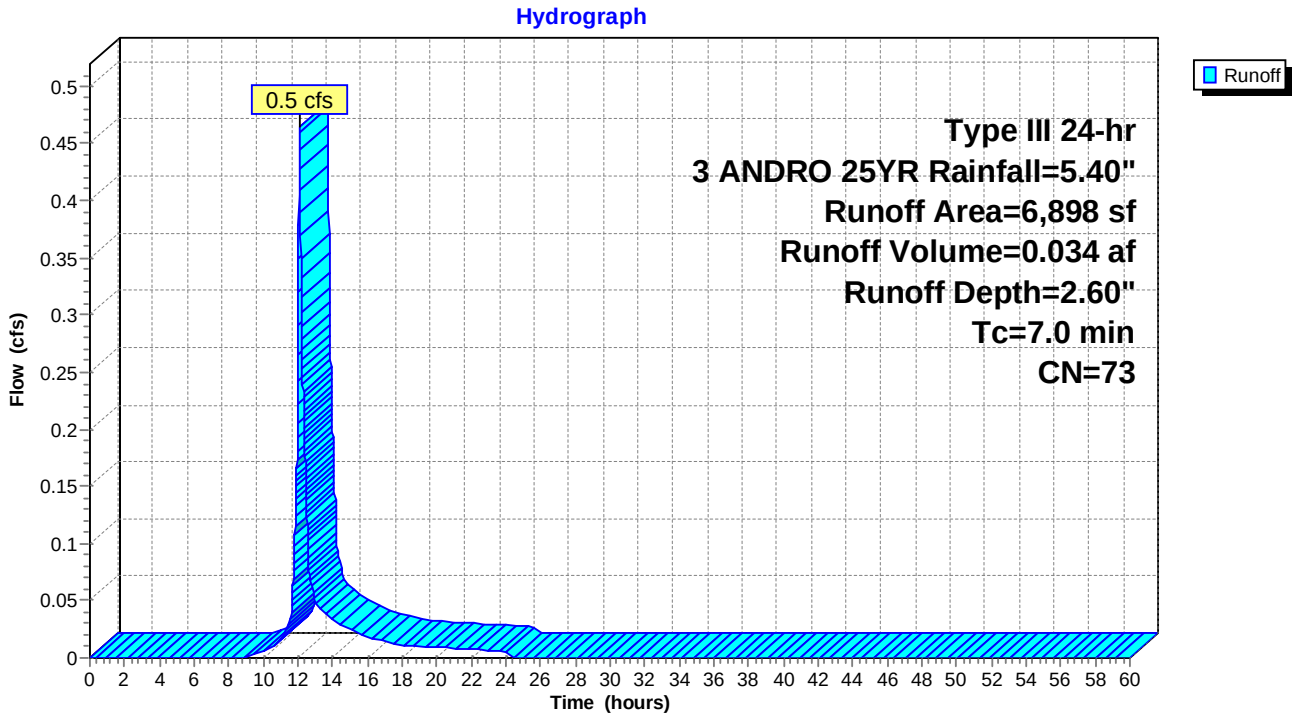
Runoff = 0.5 cfs @ 12.10 hrs, Volume= 0.034 af, Depth= 2.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 3 ANDRO 25YR Rainfall=5.40"

	Area (sf)	CN	Description
*	6,898	73	Type C Grassed
*	0	98	Generator Housing/Pad
	6,898	73	Weighted Average
	6,898		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, Direct - 7**

Subcatchment 21S: Direct to Detention



Summary for Subcatchment 103 E: NE Corner of Lot

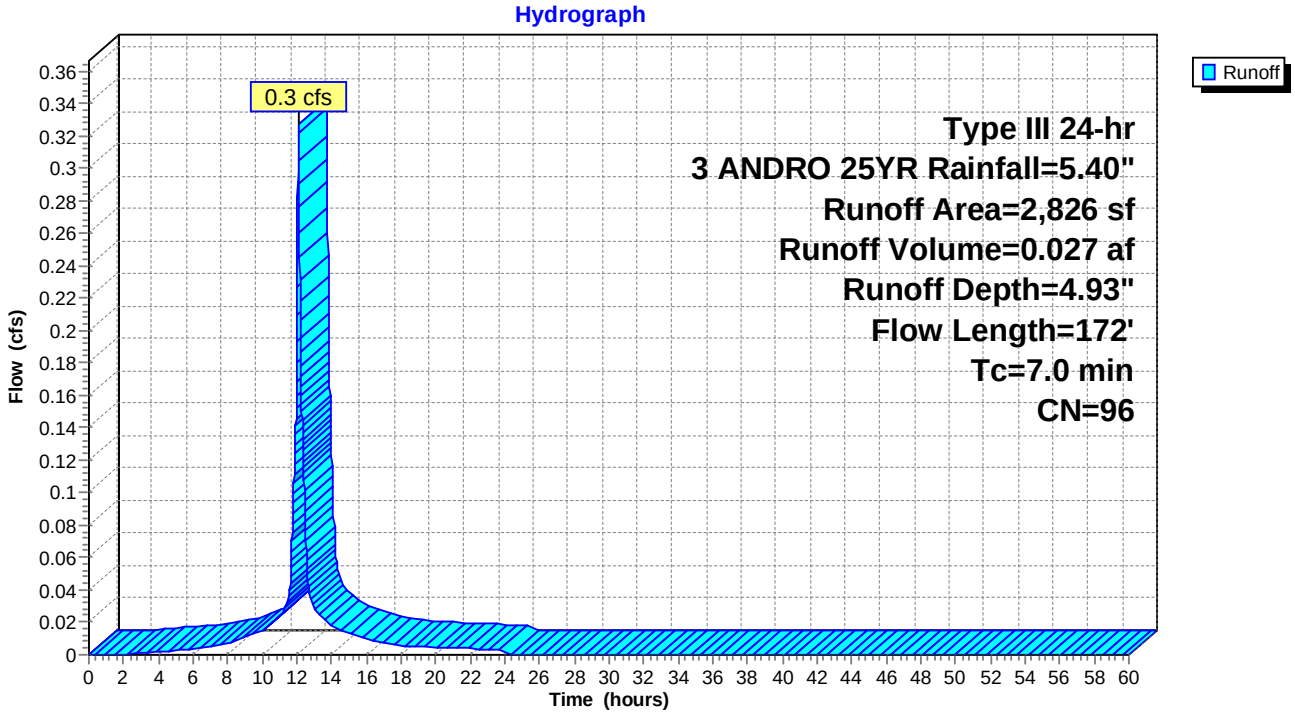
Runoff = 0.3 cfs @ 12.10 hrs, Volume= 0.027 af, Depth= 4.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 3 ANDRO 25YR Rainfall=5.40"

	Area (sf)	CN	Description
*	2,544	98	Other Impervious
	282	74	>75% Grass cover, Good, HSG C
	2,826	96	Weighted Average
	282		9.98% Pervious Area
	2,544		90.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	58	0.0050	0.69		**Sheet Flow, SF 1**
					Smooth surfaces n= 0.011 P2= 3.00"
1.0	114	0.0090	1.93		**Shallow Concentrated Flow, SCF 1**
					Paved Kv= 20.3 fps
4.6					**Direct Entry, DIRECT <7**
7.0	172	Total			

Subcatchment 103 E: NE Corner of Lot



Summary for Subcatchment 103 E-2: NW College Ave

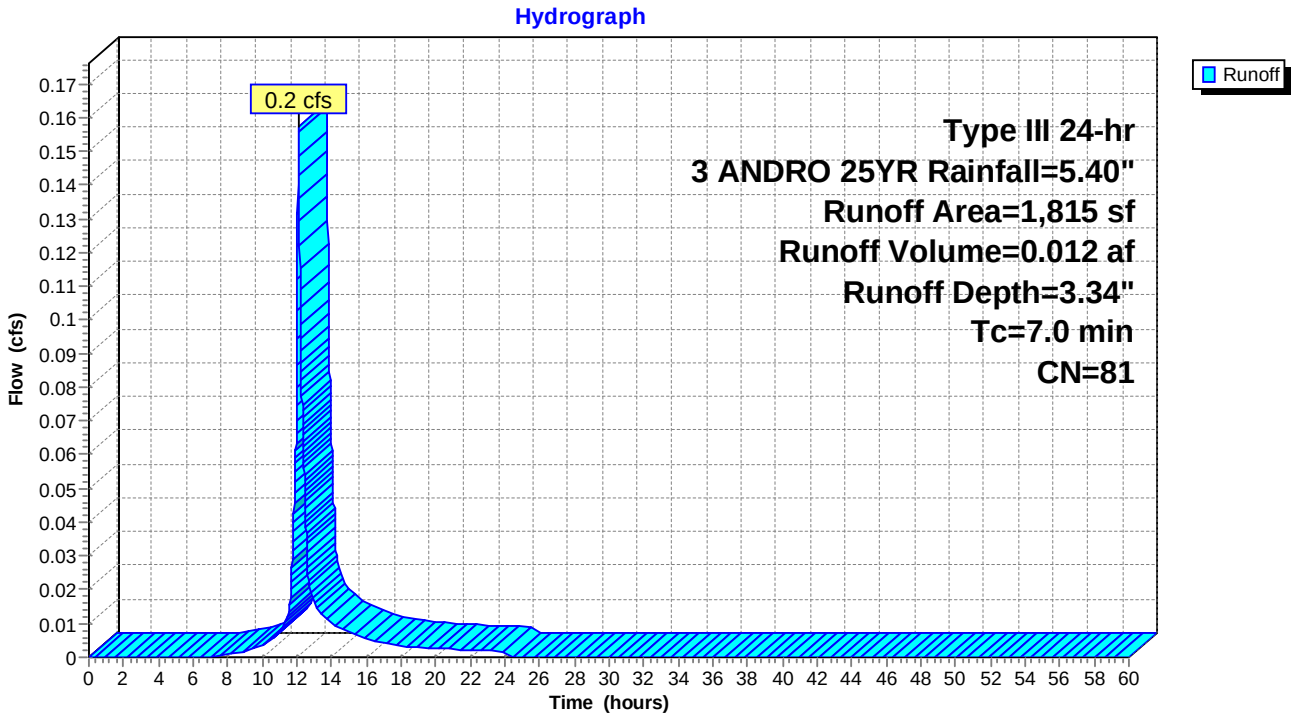
Runoff = 0.2 cfs @ 12.10 hrs, Volume= 0.012 af, Depth= 3.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 3 ANDRO 25YR Rainfall=5.40"

	Area (sf)	CN	Description
*	609	98	Other Impervious
*	1,206	73	Landscape
	1,815	81	Weighted Average
	1,206		66.45% Pervious Area
	609		33.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry, DIRECT <7**

Subcatchment 103 E-2: NW College Ave



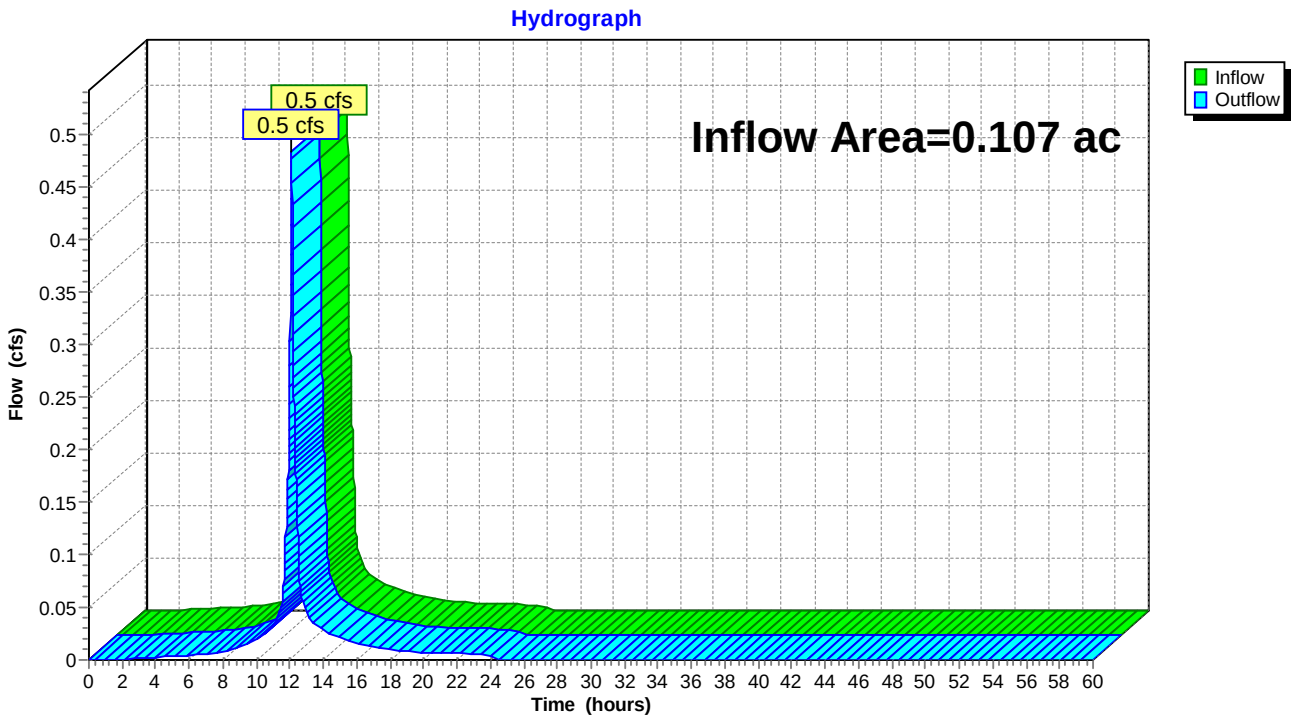
Summary for Reach SP1: SP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.107 ac, 67.94% Impervious, Inflow Depth = 4.31" for 3 ANDRO 25YR event
Inflow = 0.5 cfs @ 12.10 hrs, Volume= 0.038 af
Outflow = 0.5 cfs @ 12.10 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2

Reach SP1: SP1



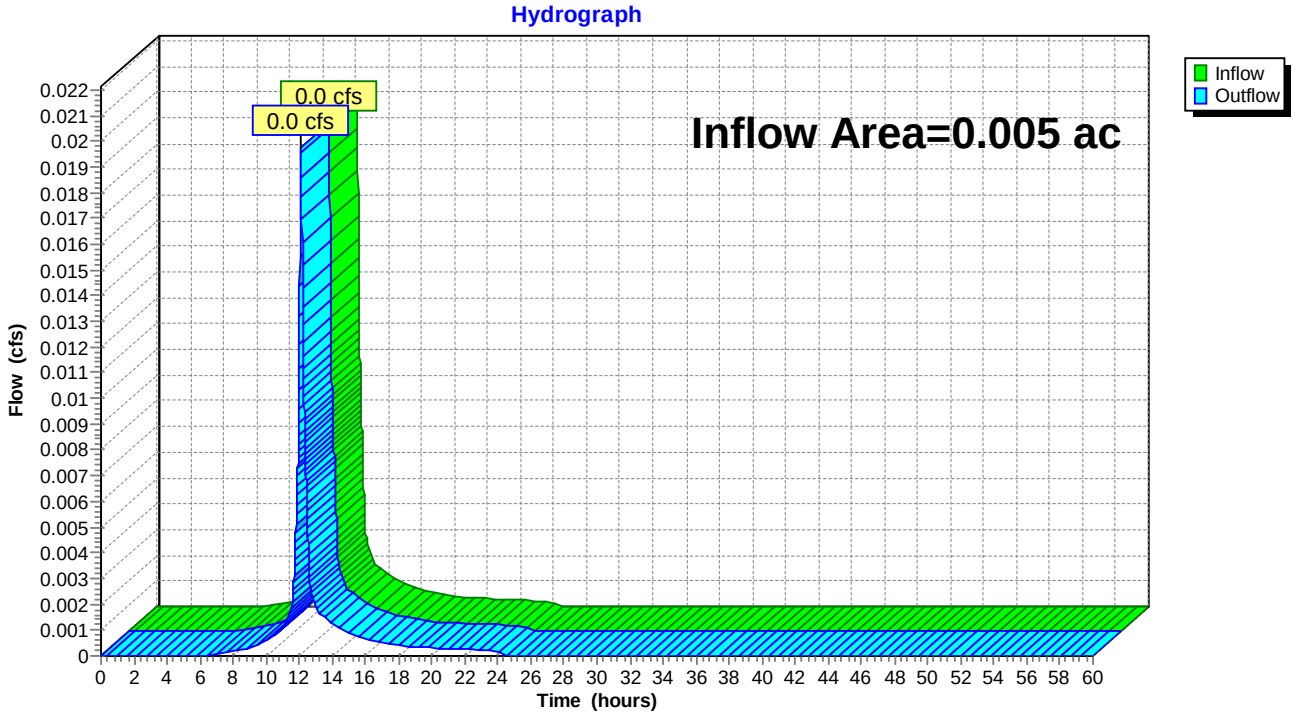
Summary for Reach SP2: SP2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.005 ac, 44.17% Impervious, Inflow Depth = 3.74" for 3 ANDRO 25YR event
Inflow = 0.0 cfs @ 12.10 hrs, Volume= 0.001 af
Outflow = 0.0 cfs @ 12.10 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2

Reach SP2: SP2



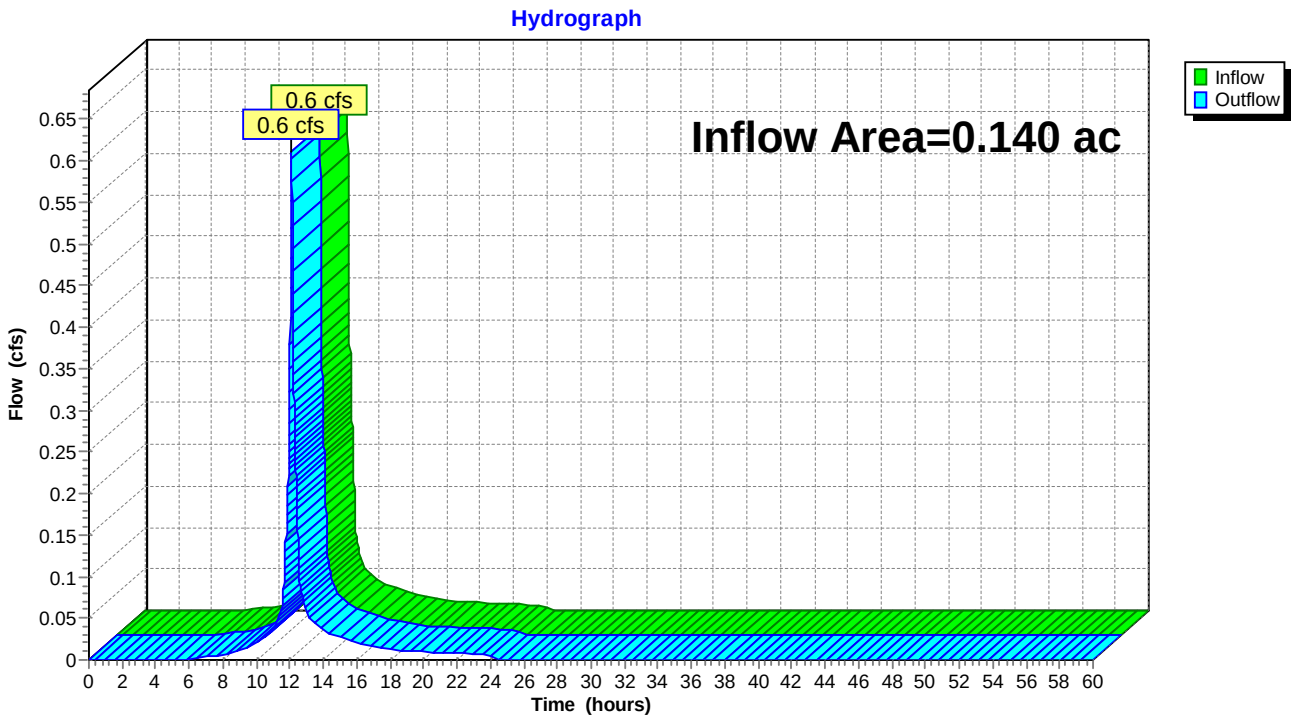
Summary for Reach SP3: SP3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.140 ac, 52.40% Impervious, Inflow Depth = 3.95" for 3 ANDRO 25YR event
Inflow = 0.6 cfs @ 12.10 hrs, Volume= 0.046 af
Outflow = 0.6 cfs @ 12.10 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2

Reach SP3: SP3



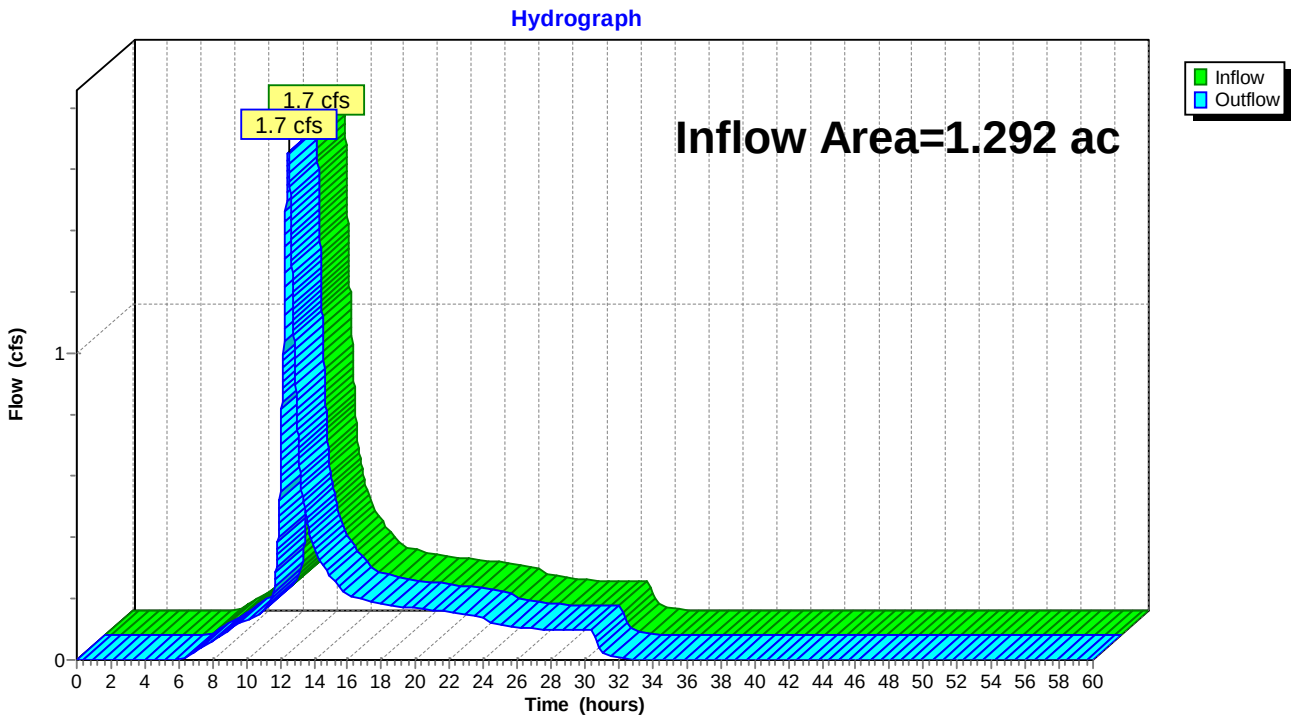
Summary for Reach SP4: SP4

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.292 ac, 45.94% Impervious, Inflow Depth = 3.81" for 3 ANDRO 25YR event
Inflow = 1.7 cfs @ 12.47 hrs, Volume= 0.410 af
Outflow = 1.7 cfs @ 12.47 hrs, Volume= 0.410 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2

Reach SP4: SP4



Summary for Pond 1P: Grassed Underdrain Filter 1 - OCS_1

Inflow Area = 0.790 ac, 75.09% Impervious, Inflow Depth = 4.48" for 3 ANDRO 25YR event
Inflow = 3.6 cfs @ 12.10 hrs, Volume= 0.295 af
Outflow = 0.9 cfs @ 12.49 hrs, Volume= 0.286 af, Atten= 76%, Lag= 23.8 min
Primary = 0.9 cfs @ 12.49 hrs, Volume= 0.286 af
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 230.78' @ 12.49 hrs Surf.Area= 2,737 sf Storage= 5,938 cf

Plug-Flow detention time= 327.5 min calculated for 0.286 af (97% of inflow)
Center-of-Mass det. time= 309.8 min (1,078.3 - 768.5)

Volume	Invert	Avail.Storage	Storage Description
#1	226.49'	8,045 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

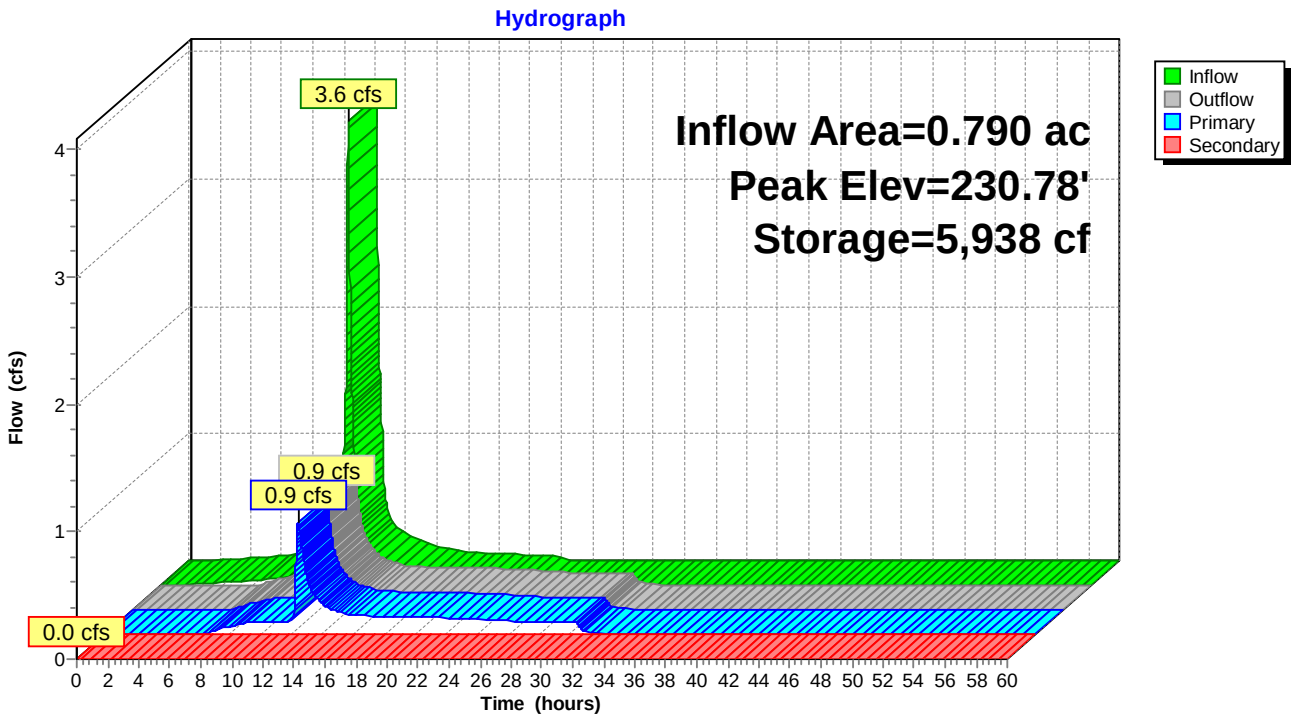
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
226.49	1,790	0.0	0	0
226.50	1,790	40.0	7	7
228.99	1,790	40.0	1,783	1,790
229.00	1,790	100.0	18	1,808
230.00	2,425	100.0	2,108	3,915
231.00	2,823	100.0	2,624	6,539
231.50	3,200	100.0	1,506	8,045

Device	Routing	Invert	Outlet Devices
#1	Secondary	231.00'	**15.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Primary	226.13'	**12.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 226.13' / 225.13' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 2	227.00'	**4.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 227.00' / 226.80' S= 0.0080 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf
#4	Device 3	226.49'	**2.410 in/hr Exfiltration over Horizontal area**
#5	Device 2	230.50'	**18.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.9 cfs @ 12.49 hrs HW=230.78' TW=224.78' (Dynamic Tailwater)
- **2=Culvert** (Passes 0.9 cfs of 6.1 cfs potential flow)
  - **3=Culvert** (Passes 0.2 cfs of 0.6 cfs potential flow)
    - **4=Exfiltration** (Exfiltration Controls 0.2 cfs)
  - **5=Orifice/Grate** (Orifice Controls 0.7 cfs @ 1.71 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=226.49' TW=224.10' (Dynamic Tailwater)
- **1=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 1P: Grassed Underdrain Filter 1 - OCS_1



Summary for Pond 5P: DMH-4

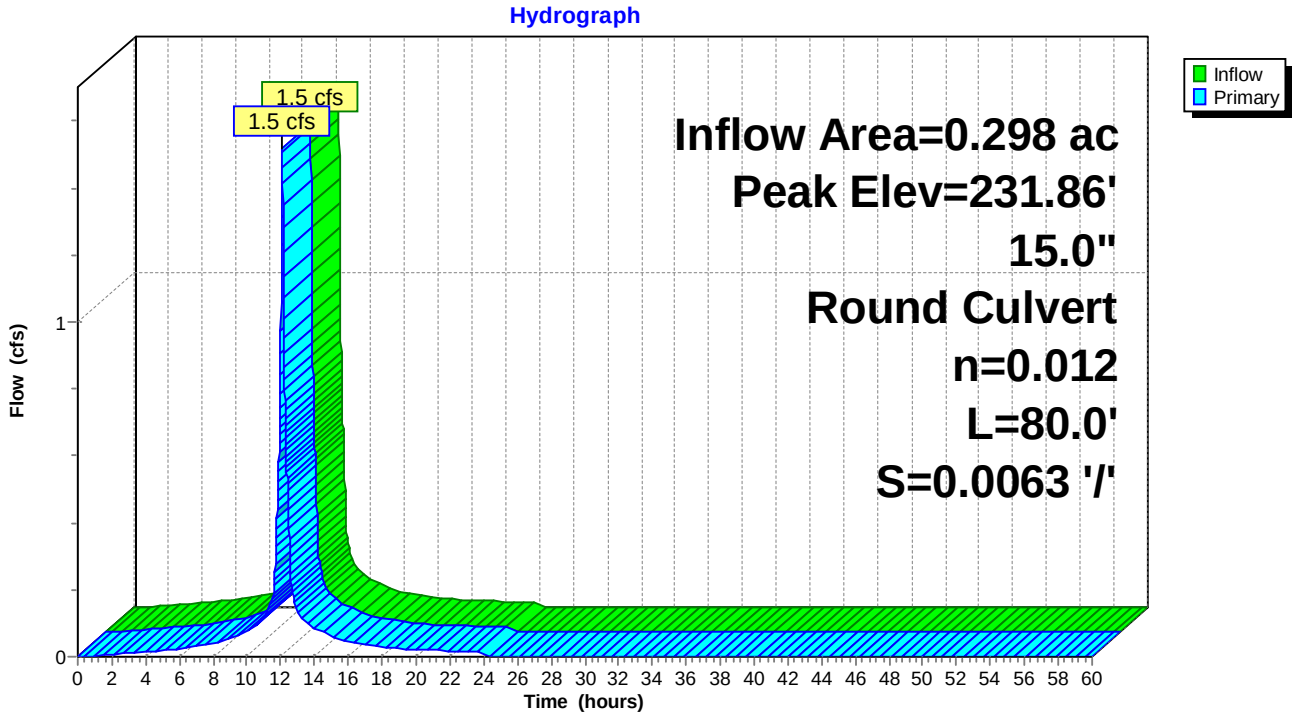
Inflow Area = 0.298 ac,100.00% Impervious, Inflow Depth = 5.16" for 3 ANDRO 25YR event
Inflow = 1.5 cfs @ 12.10 hrs, Volume= 0.128 af
Outflow = 1.5 cfs @ 12.10 hrs, Volume= 0.128 af, Atten= 0%, Lag= 0.0 min
Primary = 1.5 cfs @ 12.10 hrs, Volume= 0.128 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 231.86' @ 12.10 hrs
Flood Elev= 237.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	231.10'	**15.0" Round Culvert** L= 80.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 231.10' / 230.60' S= 0.0063 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.5 cfs @ 12.10 hrs HW=231.86' TW=231.42' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.5 cfs @ 2.80 fps)

Pond 5P: DMH-4



Summary for Pond 6P: CB-2

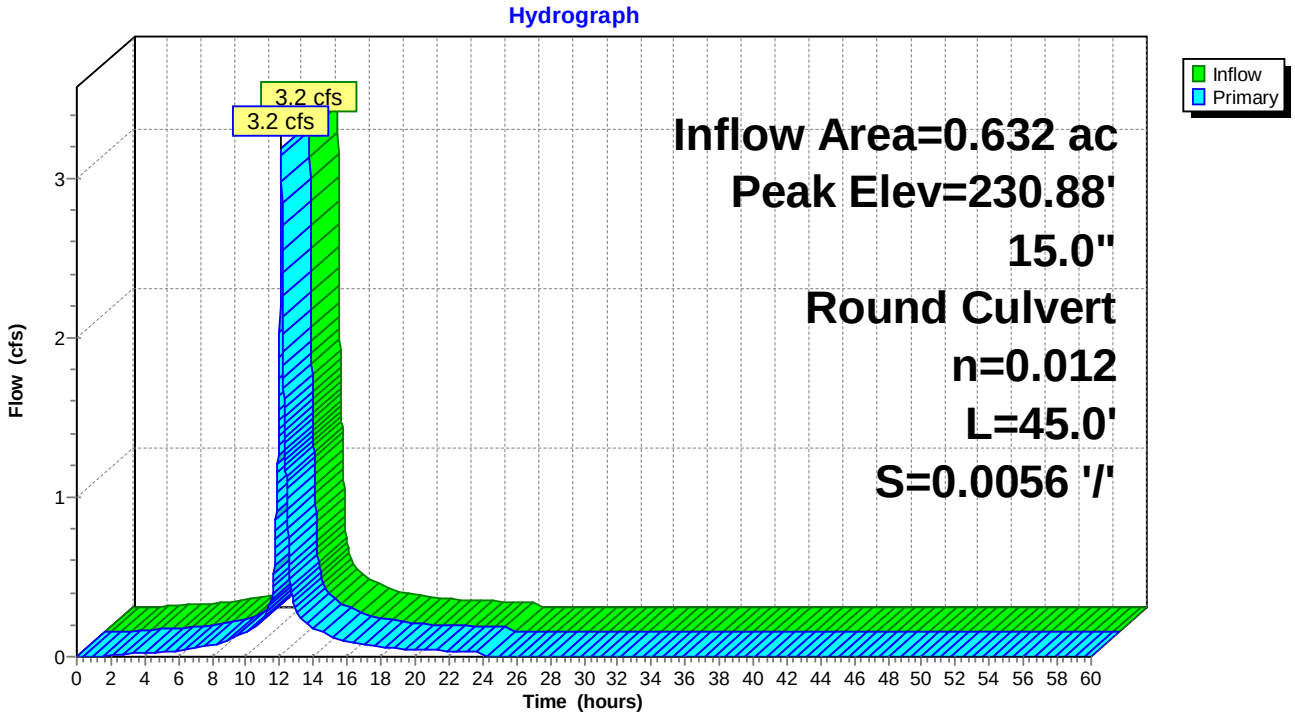
Inflow Area = 0.632 ac, 93.90% Impervious, Inflow Depth = 4.95" for 3 ANDRO 25YR event
Inflow = 3.2 cfs @ 12.10 hrs, Volume= 0.261 af
Outflow = 3.2 cfs @ 12.10 hrs, Volume= 0.261 af, Atten= 0%, Lag= 0.0 min
Primary = 3.2 cfs @ 12.10 hrs, Volume= 0.261 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 230.88' @ 12.10 hrs
Flood Elev= 234.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	229.75'	**15.0" Round Culvert** L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 229.75' / 229.50' S= 0.0056 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=3.2 cfs @ 12.10 hrs HW=230.87' TW=230.00' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 3.2 cfs @ 3.61 fps)

Pond 6P: CB-2



Summary for Pond 7P: CB-3

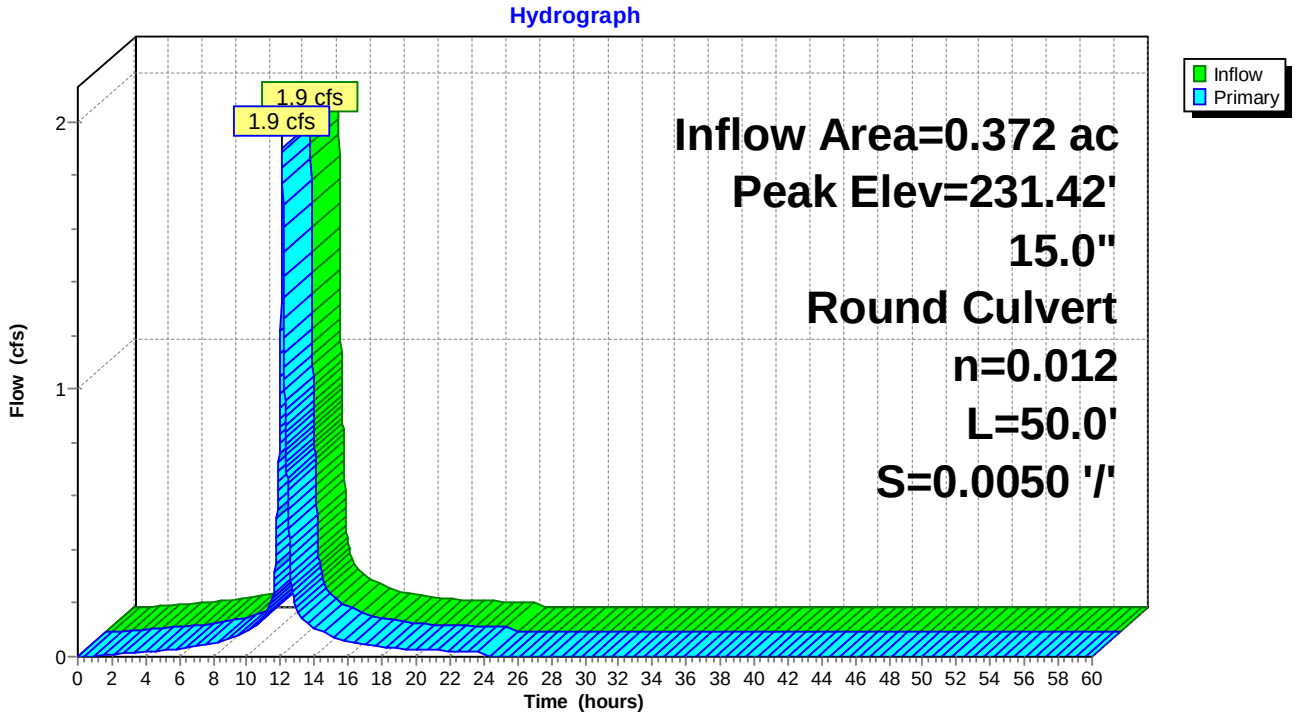
Inflow Area = 0.372 ac, 98.92% Impervious, Inflow Depth = 5.14" for 3 ANDRO 25YR event
Inflow = 1.9 cfs @ 12.10 hrs, Volume= 0.159 af
Outflow = 1.9 cfs @ 12.10 hrs, Volume= 0.159 af, Atten= 0%, Lag= 0.0 min
Primary = 1.9 cfs @ 12.10 hrs, Volume= 0.159 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 231.42' @ 12.10 hrs
Flood Elev= 234.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	230.60'	**15.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 230.60' / 230.35' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.9 cfs @ 12.10 hrs HW=231.42' TW=230.87' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 1.9 cfs @ 3.17 fps)

Pond 7P: CB-3



Summary for Pond 11P: CB-10

Inflow Area = 0.072 ac, 79.03% Impervious, Inflow Depth = 4.59" for 3 ANDRO 25YR event
Inflow = 0.4 cfs @ 12.10 hrs, Volume= 0.028 af
Outflow = 0.3 cfs @ 12.10 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.3 min
Secondary = 0.3 cfs @ 12.10 hrs, Volume= 0.026 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 238.03' @ 12.10 hrs Surf.Area= 0 sf Storage= 84 cf

Plug-Flow detention time= 57.5 min calculated for 0.026 af (94% of inflow)
Center-of-Mass det. time= 23.3 min (800.3 - 776.9)

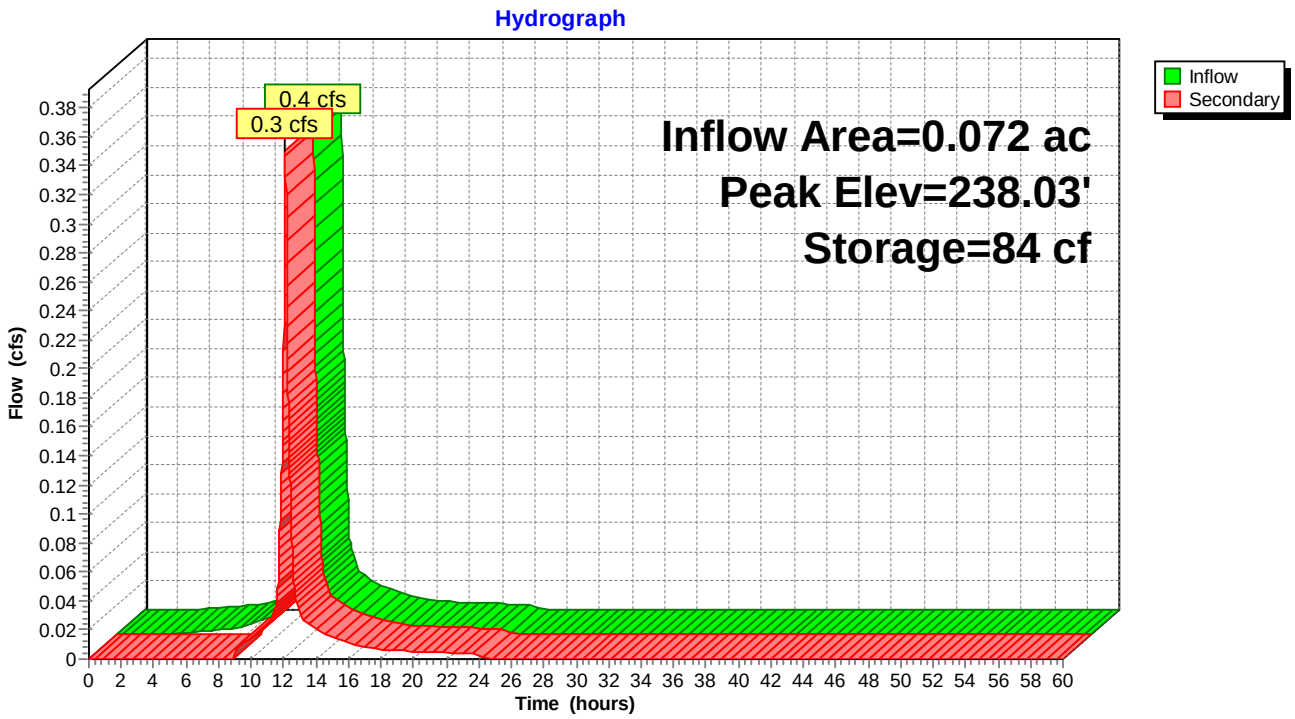
Volume	Invert	Avail.Storage	Storage Description
#1	235.00'	725 cf	**Custom Stage Data** Listed below

Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
235.00	0	0
238.00	75	75
238.50	150	225
240.00	500	725

Device	Routing	Invert	Outlet Devices
#1	Secondary	231.90'	**12.0" Round Culvert** L= 125.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 231.90' / 229.85' S= 0.0164 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	238.00'	**4.0" x 4.0" Horiz. Orifice/Grate X 16.00** C= 0.600 Limited to weir flow at low heads

Secondary OutFlow Max=0.3 cfs @ 12.10 hrs HW=238.03' TW=230.87' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.3 cfs of 7.1 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 0.3 cfs @ 0.56 fps)

Pond 11P: CB-10



Summary for Pond PW: Wetlands

Inflow Area = 0.502 ac, 0.00% Impervious, Inflow Depth = 2.96" for 3 ANDRO 25YR event
Inflow = 1.7 cfs @ 12.10 hrs, Volume= 0.124 af
Outflow = 0.9 cfs @ 12.28 hrs, Volume= 0.124 af, Atten= 49%, Lag= 10.4 min
Primary = 0.9 cfs @ 12.28 hrs, Volume= 0.124 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 227.13' @ 12.28 hrs Surf.Area= 2,760 sf Storage= 863 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 9.1 min (836.3 - 827.2)

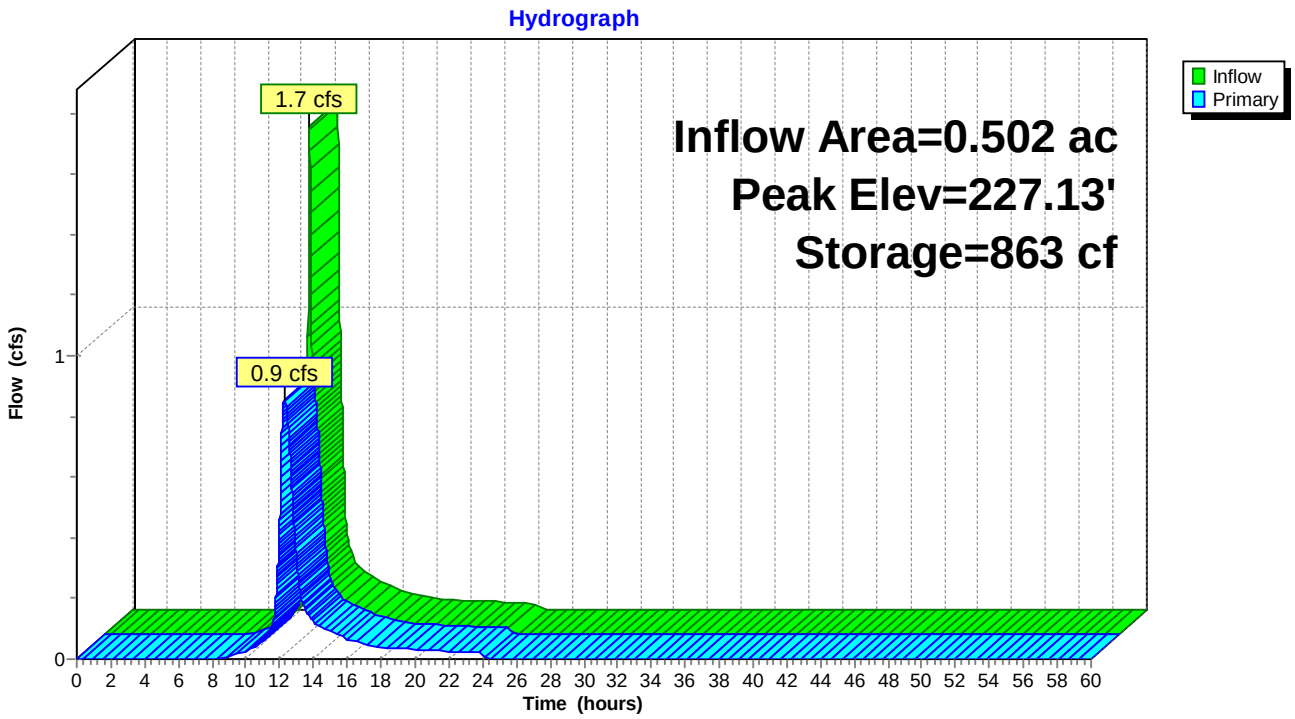
Volume	Invert	Avail.Storage	Storage Description
#1	226.50'	14,403 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
226.50	5	0	0
227.00	2,135	535	535
228.00	6,800	4,468	5,003
229.00	12,000	9,400	14,403

Device	Routing	Invert	Outlet Devices
#1	Primary	227.73'	**4.0" x 4.0" Horiz. Orifice/Grate X 16.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	226.43'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 226.43' / 225.73' S= 0.0280 '/' Cc= 0.900 n= 0.013, Flow Area= 0.35 sf
#3	Primary	227.00'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 227.00' / 225.73' S= 0.0508 '/' Cc= 0.900 n= 0.013, Flow Area= 0.35 sf

Primary OutFlow Max=0.9 cfs @ 12.28 hrs HW=227.13' TW=224.67' (Dynamic Tailwater)
- **1=Orifice/Grate** (Controls 0.0 cfs)
- **2=Culvert** (Inlet Controls 0.8 cfs @ 2.31 fps)
- **3=Culvert** (Inlet Controls 0.0 cfs @ 0.98 fps)

Pond PW: Wetlands



Summary for Pond PWC: Ex. CB (Wetlands)

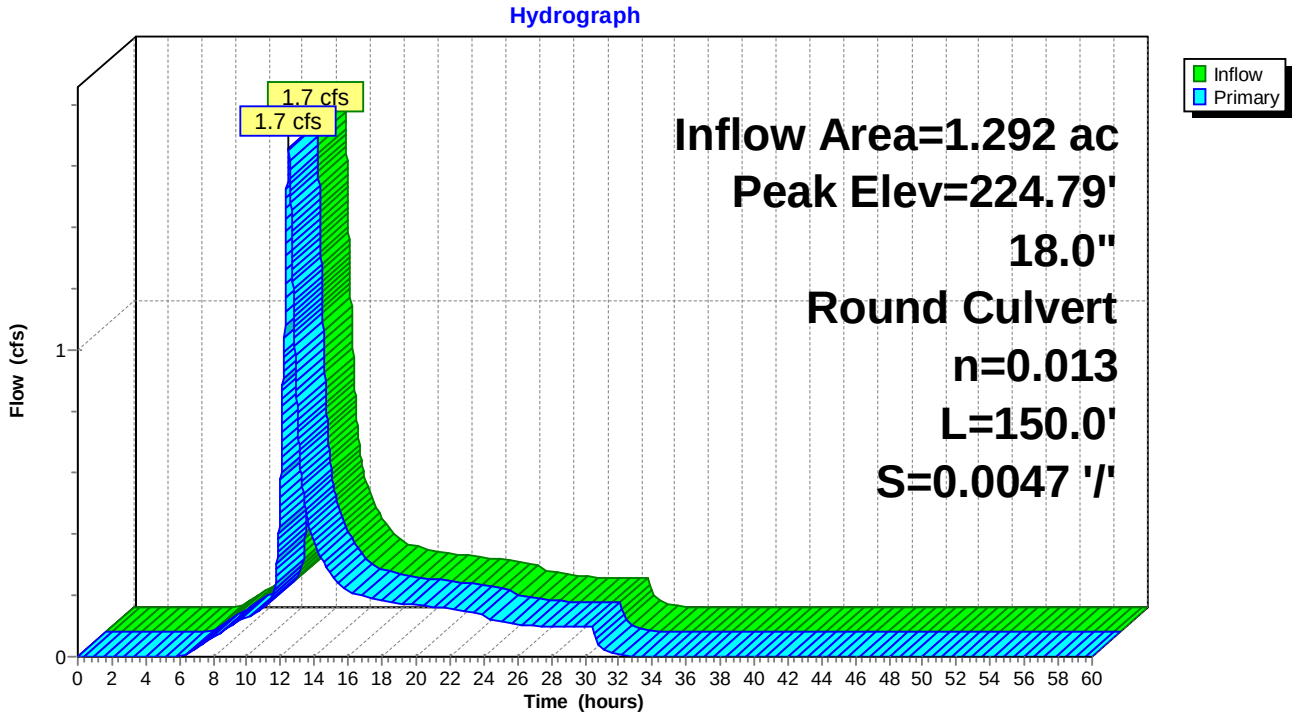
Inflow Area =	1.292 ac, 45.94% Impervious, Inflow Depth = 3.81" for 3 ANDRO 25YR event				
Inflow =	1.7 cfs @	12.47 hrs,	Volume=	0.410 af	
Outflow =	1.7 cfs @	12.47 hrs,	Volume=	0.410 af,	Atten= 0%, Lag= 0.0 min
Primary =	1.7 cfs @	12.47 hrs,	Volume=	0.410 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 224.79' @ 12.47 hrs
Flood Elev= 228.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	224.10'	**18.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 224.10' / 223.40' S= 0.0047 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.7 cfs @ 12.47 hrs HW=224.79' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 1.7 cfs @ 3.10 fps)

Pond PWC: Ex. CB (Wetlands)



EROSION AND SEDIMENTATION CONTROL PLAN

Bates College
STEM Building
Lewiston, Maine

INTRODUCTION

This Erosion and Sedimentation Control Plan (E&S Plan) has been developed to provide a strategy to prevent unreasonable erosion of soil and sediment transport beyond the project site or into a protected natural resource. These strategies apply to the proposed development immediately prior to soil disturbing activities on the site and shall remain in place until the site is permanently stabilized.

The information presented in this E&S Plan is provided as an overview of the anticipated measures to be used on this site. In some instances, additional measures may be required due to unexpected conditions that arise during construction. Also, specific detail on the application of a recommended practice for an unexpected instance may not be covered in this E&S Plan. For additional detail on any of the erosion and sedimentation control measures discussed in this E&S Plan or for further recommendations of applicable practices, refer to the "Maine Erosion and Sediment Control BMPs" manual published by the Maine Department of Environmental Protection (MDEP) dated March 2003, as revised.

1.0 PLAN IMPLEMENTATION PHASES

Generally, the implementation of this plan occurs in three distinct phases as described below.

1.1 Pre-construction Phase

Prior to the beginning of any construction, perimeter sediment barriers (i.e. silt fence, erosion control mix berm, etc…) shall be installed at, or just below, the limits of clearing or grubbing, and/or just above any adjacent property line or protected natural resource. Prior to any clearing or grubbing, a construction entrance shall be constructed at the intersection of the site access with the adjacent street to avoid tracking of mud, dust and debris from the site.

1.2 Construction Phase

Areas undergoing actual construction shall only expose that amount of mineral soil necessary for progressive and efficient site construction. Any area that has been disturbed and is not "permanently stabilized" (as described by this E&S Plan) shall be considered "open." Open areas shall be protected and stabilized with temporary erosion and sedimentation control measures as shown on the project plans and as described within this E&S Plan.

Preparation for winter stabilization applies to some disturbed areas that are open on or after September 15th of the construction season (refer to the Winter Construction Section of this E&S Plan, Paragraph B – Overwinter Stabilization Timeframe). Any areas that remain open after November 1 or new soil disturbance that occurs after November 1, but before April 15, must be protected by additional measures as described in the Winter Construction section of this E&S Plan. The recommendations outlined in the Winter Construction section of this E&S Plan shall supersede other conflicting recommendations.

1.3 Post-construction phase

Once the site has reached permanent stabilization, remove any temporary sediment control measures, such as silt fence, within 30 days. All accumulated sediment/debris in the permanent stormwater management system, ditches, swales, paved surfaces, and/or any other location that has accumulated sediment/debris during construction shall be removed and disposed of in an approved manner.

2.0 PERMANENT STABILIZATION

The strategies outlined in this E&S Plan shall be in effect until the site reaches permanent stabilization. Newly seeded or sodded areas must be protected from vehicle traffic, excessive pedestrian traffic, and concentrated runoff until the vegetation is well established. If necessary, areas must be seeded and mulched again if germination is sparse, plant coverage is spotty, or topsoil erosion is evident. The following list defines permanent stabilization for applicable situations.

2.1 **Seeded Areas:** For seeded areas, permanent stabilization means a 90% cover of vigorous perennial growth with no evidence of washing or rilling of the topsoil.

2.2 **Sodded Areas:** For sodded areas, permanent stabilization means the complete binding of the sod roots into the underlying soil with no slumping of the sod or die-off.

2.3 **Permanent Mulch:** For mulched areas, permanent mulching means total coverage of the exposed area with an approved mulch material. Erosion control mix may be used as mulch for permanent stabilization according to approved application rates and limitations.

2.4 **Riprap:** For areas stabilized with riprap, permanent stabilization means that slopes stabilized with riprap have an appropriate backing of well-graded gravel or approved geotextile to prevent soil movement from behind the riprap.

2.5 **Paved Areas:** For paved areas, permanent stabilization means the placement of compacted gravel subbase is completed.

2.6 **Ditches, channels, and swales**: For open channels, permanent stabilization means the channel is stabilized with a 90% cover of vigorous perennial growth, a well-graded riprap lining, or with another non-erosive lining such as specified. There must be no evidence of slumping of the channel lining, undercutting of the channel banks, or down-cutting of the channel.

3.0 TEMPORARY EROSION AND SEDIMENTATION CONTROL BMPS

The placement/use of the following erosion and sedimentation control measures shall be in accordance with the "Maine Erosion and Sediment Control BMPs" manual published by the Maine Department of Environmental Protection (MDEP) dated March 2003, as revised.

3.1 **Sediment Barriers:** Prior to the beginning of any construction, sediment barriers (i.e. silt fence, erosion control mix berms, etc…) shall be installed across the slope(s), on the contour, at or just below the limits of clearing or grubbing, and/or just above any adjacent property line or watercourse to protect against construction related erosion. Sediment barriers shall be maintained until all tributary open areas have been permanently stabilized. The following are recommended perimeter sediment barriers:

- **Silt fence**: Shall be installed per the detail on the plans. The effective height of the fence shall not exceed 36 inches. It is recommended that silt fence be removed by cutting the fence materials at ground level so as to avoid additional soil disturbance.
- **Staked hay bales**: Shall be installed per the detail on the plans. Bales shall be wire-bound or string-tied and these bindings must remain parallel with the ground surface during installation to prevent deterioration of the bindings. Bales shall be installed within a minimum four (4) inch deep trench line with ends of adjacent bales tightly abutting another.
- **Erosion control mix berm**: Shall be installed per the detail on the plans. The mix shall consist primarily of organic material and contain a well-graded mixture of particle sizes. The mix must meet the most recent composition specifications published by the MDEP. No trenching is required for installation of this barrier.

3.2 Surface Stabilization: All disturbed areas that will not be worked for more than 7 days shall be protected and stabilized with mulch or other non-erodable cover. Areas located within 75 feet of a wetland or waterbody must be protected and stabilized within 48 hours of the initial disturbance of the soil or prior to any storm event, whichever comes first. Areas that have been seeded (temporary or permanent) shall be stabilized immediately. The following are recommended practices for surface stabilization:

- **Hay or straw Mulch:** Organic mulches including hay and straw need to be air-dried, free of undesirable seeds and coarse materials. Application rate shall be 2 bales (70-90 lbs) per 1000 square feet or 1.5 to 2 tons (90-100 bales) per acre. This type of mulch must be anchored with a tackifier amendment and/or via physical means (i.e. vehicle tracking, jute netting, etc…) to avoid displacement by wind or water.
- **Erosion control mix**: Erosion Control Mix can be manufactured on or off the site. It is composed primarily of shredded bark, stump grindings, composted bark, or other acceptable products based on a similar raw source. The mix must meet the most recent composition specifications published by the MDEP. The mix shall be placed evenly and must provide 100% soil coverage. Erosion control mix shall be applied such that the thickness on slopes 3:1 or less is 2 inches plus ½ inch per 20 feet of slope up to 100 feet. The thickness on slopes between 3:1 and 2:1 is 4 inches plus ½ inch per 20 feet of slope up to 100 feet. This shall not be used on slopes greater that 2:1.
- **Erosion control blankets**: Erosion Control Blankets are used on steep slopes (greater than 3H:1V) and also areas that will receive concentrated stormwater flows. Blankets aid in controlling erosion on disturbed soils and critical areas during the establishment period of vegetation. Various forms of erosion control blankets are commercially available, each with different advantages for different applications. The type of blanket to be used for individual applications shall be as indicated on the development plan set or via the use of an approved equivalent blanket. In all applications, the blanket manufacturer's specifications and installation methods shall be referenced and adhered to.

3.3 Soil Stockpiles: All topsoil shall be stockpiled for future use on the project at a stable location on-site. Structural measures, such as sediment barriers, may be warranted for additional sediment control of the stockpile areas. Stockpiles of soil or subsoil shall be mulched with hay or straw or with erosion control mix. This must be done within 24 hours of stocking and re-established prior to any rainfall. Any soil stockpile will not be placed (even covered with hay or straw) within 75 feet from any protected natural resources.

3.4 Stabilized Construction Entrance/Exit: Prior to any clearing or grubbing, a stabilized construction entrance/exit shall be constructed wherever traffic will exit the construction site onto a paved roadway in order to minimize the tracking of sediment and debris from the construction site onto public roadways. The entrances and adjacent roadway areas shall be periodically swept or washed to further minimize the tracking of mud, dust or debris from the construction area.

When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment trapping device. Stabilized construction exits shall be constructed in areas as specified and detailed on the plans.

3.5 **Stone Check Dams:** Stone check dams are generally temporary devices, which are constructed across a swale or drainage ditch. Their purpose is to reduce the velocity of concentrated stormwater flows, thereby reducing erosion of the swale or ditch. These devices will also trap small amounts of sediment generated in the ditch itself, however, they are not an effective sediment trapping device and should not be used as such. Stone check dams are typically constructed of 2”-3” crushed stone and stand 24 inches in height.

3.6 **Storm Drain Inlet Protection:** Storm drains are typically operational prior to permanent stabilization of tributary areas. In these instances hay bales, crushed stone barriers, and/or silt sacks shall be used within a catch basin or prior to a pipe entrance. This temporary protection will assist in the removal of sediment prior to entrance into a storm drainage system and the prevention of clogging and/or loss of capacity. These devices alone will not prevent all sediment from entering the stormwater system and should be used in conjunction with other devices to achieve desired sediment removal levels.

3.7 **Dewatering:** Water from construction dewatering will pass first through a filter bag or secondary containment structure (e.g. hay bale lined pool) prior to discharge. The discharge site shall be selected to avoid flooding, icing and sediment discharges to a protected natural resource. Discharge is permitted within the filter basin locations prior to the installation of the filter media.

3.8 **Dust Control:** Dust control during construction shall be achieved by the use of a watering truck to periodically sprinkle the exposed roadway areas as necessary to reduce dust during the dry months. Applying other dust control products such as calcium chloride or other manufactured products are allowed if authorized by the proper local, state and/or federal regulating agencies. However, it is the contractor’s ultimate responsibility to mitigate dust and soil loss from the site.

4.0 VEGETATIVE MEASURES

4.1 **Temporary Vegetation:** If any disturbed area of soil will be left bare for more than 7 days, or if construction is to be completed in phases over an extended duration, temporary seeding and mulching shall commence immediately following initial fine grading of the site. In sensitive areas (within 75 feet of protected natural resources) temporary mulch must be applied within 48 hours or prior to any storm event on all disturbed surfaces. It shall be maintained and reseeded, as necessary, to ensure good vegetative cover for the entire duration of construction. Seed will be selected from the following table (Table 1 - Temporary Seed Mixture) according to the time of year or via an approved equivalent method.

TABLE 1
TEMPORARY SEED MIXTURE

Seed	Lbs./Acre	Lbs./1000s.f.	Recommended Seeding Date
Winter Rye	112	2.6	8/15 thru 10/1
Oats	80	1.8	4/1 thru 7/1 8/15 thru 9/15
Annual Ryegrass	40	0.9	4/1 thru 7/1
Sudangrass	40	0.9	5/15 thru 8/15
Perennial	40	0.9	8/15 thru 9/15

Note:
Some tree and shrub species may be desirable for sites primarily covered with sand and gravel. These methods shall be approved by the appropriate regulatory authority prior to use.

4.2 Permanent Vegetation: Revegetation measures shall commence immediately upon completion of final grading of areas to be loamed and seeded. Revegetation measures shall consist of the following:

4.2.1 Seedbed Preparation

- Four (4) inches of loam will be spread over disturbed areas and smoothed to a uniform surface. Loam shall be free of subsoil, clay lumps, stones and other objects over 2" in any dimension, and without weeds, roots or other objectionable material.

- Soil tests shall be taken at the time of soil stripping to determine fertilization requirements. Soil tests shall be taken promptly as to not interfere with the 7-day limit on soil exposure (48-hours adjacent to a protected natural resource). Based upon test results, soil amendments shall be incorporated into the soil prior to final seeding. In lieu of soil tests, soil amendments may be applied as shown below in Table 2:

TABLE 2
RECOMMENDED SOIL AMENDMENTS

Item	Application Rate
10-20-20 Fertilizer (N-P205-K20 or equal)	18.4lbs./1,000 s.f.
Ground Limestone (50% calcium and magnesium oxide)	138-lbs./1,000 s.f.

- Work lime and fertilizer into the soil as nearly as practical to a depth of four (4) inches with proper equipment. Roll the area to firm the seedbed except on clay, silty soils or coarse sand.

4.2.2 Application of Seed

- **Seeding**: The seed mixture shown below in Table 3 shall be utilized for permanent seeding applications. Alternate seed mixtures may be utilized as approved. Refer to Appendix A of the MDEP Erosion and Sedimentation Control BMP manual for additional seed mixture options.

TABLE 3
PERMANENT SEED MIXTURE

Seed Type	Application Rate
Creeping Red Fescue	0.46 lbs/1,000 s.f. (20 lbs/acre)
Red Top	0.05 lbs/1,000 s.f. (2 lbs/acre)
Tall Fescue	0.46 lbs/1,000 s.f. (20 lbs/acre)
Total:	0.97 lbs/1,000 s.f. (42 lbs/acre)

- **Hydroseeding:** Shall be conducted on prepared areas as described above. Hydroseeding shall not be done on slopes steeper than 2H:1V. Lime and fertilizer may be applied simultaneously with the seed. Recommended seeding rates must be increased by 10% when hydroseeding.

- **Surface Stabilization:** Mulching or other approved surface stabilization methods shall commence immediately after seed is applied. Refer to the surface stabilization section of this plan for more information.

4.2.3. Sodding

Following seedbed preparation, sod can be applied in lieu of seeding in areas where immediate vegetation is most beneficial such as ditches, around stormwater drop inlets and areas of aesthetic value. Sod should be laid at right angles to the direction of flow starting at the lowest elevation. Sod should be rolled or tamped down to even out the joints once laid down. Where flow is prevalent the sod must be properly anchored down. Irrigate the sod immediately after installation. In most cases, sod can be best established between April 1 and November 15 of the construction year.

5.0 WINTER CONSTRUCTION

The winter construction period is from November 1 through April 15. If the construction site is not permanently stabilized by November 15 then the site needs to be protected with over-winter stabilization.

Winter excavation and earthwork shall be completed such that no more than 1 acre of the site is without stabilization at any one time. Limit the exposed area to those areas in which work is expected to be under taken during the proceeding 15 days and that can be mulched in one day prior to any snow event. All areas shall be considered to be denuded until the subbase gravel is installed in roadway areas or the areas of future loam and seed have been loamed, seeded and mulched.

Any added measures, which may be necessary to control erosion/sedimentation from the site dependent upon the actual site and weather conditions, must be installed. Continuation of earthwork operations on additional areas shall not begin until the exposed soil surface on the area being worked has been stabilized, in order to minimize areas without erosion control protection.

5.1 Winter Construction BMP Adjustments

1) **Sediments Barriers:** During frozen conditions, sediment barriers shall consist of erosion control mix berms as frozen soil prevents the proper installation of hay bales and silt fences.

2) **Mulching:** Between the dates of November 1 and April 15, all mulch shall be anchored by either mulch netting, asphalt emulsion chemical, track or weed cellulose fiber. When the ground surface is not visible through the mulch then cover is sufficient. After November 1st, mulch and anchoring of all exposed soil shall occur at the end of each final grading workday.

   - **Open Surfaces (flatter than 8%)**: Hay and straw mulch shall be applied at a rate of 150 lb. per 1,000 square feet or 3 tons/acre (twice the normal accepted rate of 75-lbs./1,000 square feet or 1.5 tons/acre) and shall be properly anchored. Mulch shall not be spread on top of snow. The snow will be removed down to one-inch depth or less prior to application. After each day of final grading, the area will be properly stabilized with anchored hay or straw or erosion control matting. An area shall be considered to have been stabilized when exposed surfaces have been either mulched with straw or hay at a rate of 150 lb. per 1,000 square feet (3 tons/acre) and adequately anchored that ground surface is not visible through the mulch.

- **Open Slopes (8% or steeper) and Drainage Ways**: Slopes shall not be left exposed for any extended time of work suspension unless fully mulched and anchored with netting or erosion control blankets. Mulching shall be applied at a rate of 230-lbs/1,000 square feet on all slopes steeper than 8%. Mulch netting shall be used to anchor mulch in all drainage ways with a slope steeper than 3% for slopes exposed to direct winds and for all other slopes steeper than 8%. Erosion control blankets shall be used in lieu of mulch in all drainage ways. Erosion control mix can be used to substitute erosion control blankets on slopes that do not exceed 2H:1V. In this case, the erosion control mix shall be spread out, not placed in a berm as it is installed as a sedimentation barrier.

3) **Soil Stockpiles:** Stockpiles of soil or subsoil shall be mulched for over winter protection with hay or straw at twice the normal rate or at 150-lbs/1,000 square feet (3 tons per acre) or with a four-inch layer of wood waste erosion control mix. This will be done within 24 hours of stocking and re-established prior to any rainfall or snowfall. Any soil stockpile will not be placed (even covered with hay or straw) within 100 feet from any natural resources.

4) **Natural Resources Protection:** Any areas within 100 feet from any protected natural resources, if not stabilized with a minimum of 90% mature vegetation catch, shall be mulched by December 1 and anchored with plastic netting or protected with erosion control mats. During winter construction, a double line of sediment barriers (i.e. silt fence backed with hay bales or erosion control mix) will be placed between any natural resource and the disturbed area. Projects crossing the natural resource shall be protected a minimum distance of 100 feet on either side from the resource. Existing projects not stabilized by December 1 shall be protected with the second line of sediment barrier to ensure functionality during the spring thaw and rains.

5) **Seeding:** Between the dates of October 15 and April 1st, loam or seed will not be required. During periods of above freezing temperatures finished areas shall be fine graded and either protected with mulch or temporarily seeded and mulched until such time as the final treatment can be applied. If the date is after November 1st and if the exposed area has been loamed, final graded with a uniform surface, then the area may be dormant seeded at a rate of 3 times higher than specified for permanent seed and then mulched.

   Dormant seeding may be selected to be placed prior to the placement of mulch and fabric netting anchored with staples. If dormant seeding is used for the site, all disturbed areas shall receive 4” of loam and seed at an application rate of 5-lbs/1000 square feet. All areas seeded during the winter will be inspected in the spring for adequate catch. All areas insufficiently vegetated (less than 90% catch) shall be revegetated by replacing loam, seed and mulch. If dormant seeding is not used for the site, all disturbed areas shall be revegetated in the spring.

5.2 Overwinter Stabilization Timeframe

1) **Ditches and Channels:** All stone-lined ditches and channels must be constructed and stabilized on the site by November 15. All grass-lined ditches and channels must be constructed and stabilized by September 15. If a ditch or channel is not grass-lined by September 15, then one of the following actions must be taken to stabilize the ditch for late fall and winter.

- **Install a sod lining in the ditch**: A ditch must be lined with properly installed sod by October 1. Proper installation includes the contractor pinning the sod onto the soil with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, watering the sod to promote root growth into the disturbed soil, and anchoring the sod with jute or plastic mesh to prevent the sod strips from sloughing during flow conditions.

- **Install a stone lining in the ditch**: A ditch must be lined with stone riprap by November 15. A registered professional engineer must be hired to determine the stone size and lining thickness needed to withstand the anticipated flow velocities and flow depths within the ditch. If necessary, the ditch must be regraded prior to placing the stone lining to prevent the stone lining from reducing the ditch's cross-sectional area.

2) **Disturbed Slopes:** All stone-covered slopes must be constructed and stabilized by November 15. All slopes to be vegetated must be seeded by September 15. The MDEP will consider any area having a grade greater than 15% (10H:1V) to be a slope. If a slope to be vegetated is not stabilized by September 1, then one of the following actions must be taken to stabilize the slope for late fall and winter.

- **Stabilize the soil with temporary vegetation and erosion control blankets**: By October 1 the disturbed slope must be seeded with winter rye at a seeding rate of 3 pounds per 1,000 square feet and apply erosion control blankets over the mulched slope. If the rye fails to grow at least three inches or cover at least 90% of the disturbed slope by November 1, the slope will be covered with a layer of erosion control mix or stone riprap as described in the following standards.

- **Stabilize the slope with sod**: The disturbed slope must be stabilized with properly installed sod by October 1. Proper installation includes pinning the sod onto the slope with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, and watering the sod to promote root growth into the disturbed soil. Slopes steeper than 33% (3H:1V) or having groundwater seeps on the slope face, may not use late-season sod installation for stabilization.

- **Stabilize the slope with erosion control mix**: A six-inch layer of erosion control mix must be spread over the slope by November 15. Prior to placing the erosion control mix, any snow accumulation on the disturbed slope must be removed. Slopes steeper than 50% (2H:1V) or having groundwater seeps on the slope face can not use erosion control mix to stabilize slopes.

- **Stabilize the slope with stone riprap**: A layer of stone riprap can be placed on the slope by November 15. A registered professional engineer must be hired to determine the stone size needed for stability and to design a filter layer for underneath the riprap.

3) **Other Disturbed Soils:** By September 15, all disturbed soils on areas having a slope flatter than 15% (10H:1V) must receive seed and mulch. If disturbed areas are not stabilized by this date, then one of the following actions must be taken to stabilize the soil for late fall and winter.

- **Stabilize the soil with temporary vegetation**: By October 1, seed the disturbed soil with winter rye at a seeding rate of 3 pounds per 1,000 square feet, lightly mulch the seeded soil with hay or straw at 75 pounds per 1000 square feet, and

anchor the mulch with plastic netting. Monitor growth of the rye over the next 30 days. If the rye fails to grow at least three inches or cover at least 90% of the disturbed soil before November 1, then mulch the area for over-winter protection as described in the following "Stabilize the soil with mulch" standard.

- **Stabilize the soil with sod**: Stabilize the disturbed soil with properly installed sod by October 1. Proper installation includes pinning the sod onto the soil with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, and watering the sod to promote root growth into the disturbed soil.

- **Stabilize the soil with mulch**: By November 15, mulch the disturbed soil by spreading hay or straw at a rate of at least 150 pounds per 1000 square feet on the area so that no soil is visible through the mulch. Prior to applying the mulch, any snow accumulation on the disturbed area must be removed. Immediately after applying the mulch, anchor the mulch with plastic netting to prevent wind from moving the mulch off the disturbed soil.

6.0 INSPECTION AND MAINTENANCE

Inspection and maintenance are required of all erosion and sedimentation control measures outlined in this plan. Refer to the Inspection, Maintenance, and Housekeeping plan for this project (provided under separate cover) for an outline of the associated inspection and maintenance requirements.

INSPECTION, MAINTENANCE AND HOUSEKEEPING PLAN

Bates College
STEM Building
Lewiston, Maine

Introduction

The following plan outlines the anticipated inspection and maintenance procedures for the erosion and sedimentation controls as well as stormwater management devices for the project site. Also, this plan outlines several housekeeping requirements that shall be followed during and after construction. These procedures should be followed in order to ensure the intended function of the designed measures and to prevent unreasonable adverse impacts to the surrounding environment.

The procedures outlined in this inspection and maintenance plan are provided as an overview of the anticipated practices to be used on this site. In some instances, additional measures may be required due to unexpected conditions. For additional detail on any of the erosion and sedimentation control measures or stormwater management devices to be utilized on this project, refer to the most recently revised edition of the "Maine Erosion and Sediment Control BMPs" manual and/or the "Maine Stormwater Best Practices Manual (BMPs)" manual as published by the Maine Department of Environmental Protection (MDEP).

During Construction

1. **Inspection:** During the construction process, it is the Contractor's responsibility to comply with the inspection and maintenance procedures outlined in this section. These responsibilities include inspecting disturbed and impervious areas, erosion control measures, material storage areas that are exposed to precipitation, and locations where vehicles enter or exit the site. These areas shall be inspected at least once a week as well as before and after a storm event, and prior to completing permanent stabilization measures. A person with knowledge of erosion and stormwater control, including the standards and conditions in any applicable permits, shall conduct the inspections.

2. **Maintenance:** All measures shall be maintained in an effective operating condition until areas are permanently stabilized. If Best Management Practices (BMPs) need to be maintained or modified, additional BMPs are necessary, or other corrective action is needed, implementation must be completed within 7 calendar days and prior to any storm event (rainfall).

3. **Documentation:** A log summarizing the inspections and any corrective action taken must be maintained on-site. The log must include the name(s) and qualifications of the person making the inspections, the date(s) of the inspections, and major observations about the operation and maintenance of erosion and sedimentation controls, material storage areas, and vehicle access points to the site. Major observations must include BMPs that need maintenance, BMPs that failed to operate as designed or proved inadequate for a particular location, and locations where additional BMPs are needed. For each BMP requiring maintenance, BMP needing

replacement, and location needing additional BMPs, note in the log the corrective action taken and when it was taken. The log must be made accessible to the appropriate regulatory agency upon request.

4. **Specific Inspection and Maintenance Tasks:** The following is a list of erosion control and stormwater management measures and the specific inspection and maintenance tasks to be performed during construction.

- Sediment Barriers:

  - Hay bale barriers, silt fences, and filter berms shall be inspected immediately after each rainfall and at least daily during prolonged rainfall.
  - If the fabric on silt fence or filter barrier should decompose or become ineffective prior to the end of the expected usable life and the barrier is still necessary, it shall be replaced.
  - Sediment deposits should be removed after each storm event. They must be removed before deposits reach approximately one-half the height of the barrier.
  - Filter berms shall be reshaped as needed.
  - Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required should be dressed to conform to the existing grade, prepared, and seeded.

- Erosion Control Blankets:

  - Inspect these reinforced areas semi-annually and after significant rainfall events for slumping, sliding, seepage, and scour. Pay close attention to unreinforced areas adjacent to the erosion control blankets, which may experience accelerated erosion.
  - Review all applicable inspection and maintenance procedures recommended by the specific blanket manufacturer. These tasks shall be included in addition to the requirements of this plan.

- Temporary Storm Drain Inlet Protection:

  - The inlet protection structure shall be inspected before each rain event and repaired as necessary.
  - Sediment shall be removed and the storm drain sediment barrier restored to its original dimensions when the sediment has accumulated to half of the design depth of the trap.
  - Barriers shall be removed upon permanent stabilization of the tributary area.
  - Upon removal of the barrier, all accumulated sediments downstream of the structure shall be cleaned from the storm drain system.

- Stabilized Construction Entrances/Exits:

- The exit shall be maintained in a condition that will prevent tracking of sediment onto public rights-of-way.
- When the control pad becomes ineffective, the stone shall be removed along with the collected soil material. The entrance should then be reconstructed.
- Areas that have received mud-tracking or sediment deposits shall be swept or washed. Washing shall be done on an area stabilized with aggregate, which drains into an approved sediment-trapping device (not into storm drains, ditches, or waterways).

- Temporary Seed and Mulch:

  - Mulched areas should be inspected after rain events to check for rill erosion.
  - If less than 90% of the soil surface is covered by mulch, additional mulch shall be applied in bare areas.
  - In applications where seeding and mulch have been applied in conjunction with erosion control blankets, the blankets must be inspected after rain events for dislocation or undercutting.
  - Mulch shall continue to be reapplied until 95% of the soil surface has established temporary vegetative cover.

- Stabilized Temporary Drainage Swales:

  - Sediment accumulation in the swale shall be removed once the cross section of the swale is reduced by 25%.
  - The swales shall be inspected after rainfall events. Any evidence of sloughing of the side slopes or channel erosion shall be repaired and corrective action should be taken to prevent reoccurrence of the problem.
  - In addition to the stabilized lining of the channel (i.e. erosion control blankets), stone check dams may be needed to further reduce channel velocity.

After Construction

1. **Inspection:** After construction, it is the responsibility of the owner or assigned heirs to comply with the inspection and maintenance procedures outlined in this section. All measures must be maintained in effective operating condition. A person with knowledge of erosion and stormwater control, including the standards and conditions in all applicable permits, shall conduct the inspections.

2. **Specific Inspection and Maintenance Tasks:** The following is a list of permanent erosion control and stormwater management measures and the inspection and maintenance tasks to be performed after construction.

   A. Vegetated Areas:

   - Inspect vegetated areas, particularly slopes and embankments, early in the growing season or after heavy rains to identify active or potential erosion problems.

- Replant bare areas or areas with sparse growth. Where rill erosion is evident, armor the area with an appropriate lining or divert the erosive flows to on-site areas able to withstand the concentrated flows.

B. Catch Basins:

- Inspect and, if required, clean-out catch basins at least once a year, preferably in early spring.
- Clean out must include the removal and legal disposal of accumulated sediments and debris at the bottom of the basin, at any inlet grates, at any inflow channels to the basin, and at any pipes between basins.
- If the basin outlet is designed to trap floatable materials, then remove the floating debris and any floating oils (using oil-absorptive pads).

C. Winter Sanding:

- Clear accumulations of winter sand in parking lots and along roadways at least once a year, preferably in the spring.
- Accumulations on pavement may be removed by pavement sweeping.
- Accumulations of sand along road shoulders may be removed by grading excess sand to the pavement edge and removing it manually or by a front-end loader or other acceptable method.

D. Grassed Underdrained Soil Filters

- Check the impoundment embankments for sloughing or erosion. The vegetation should be well established and maintained. Remove any trees or shrubs growing in the impoundment or on the inside of the soil filter embankments.
- Check the outlet control structure for sediment accumulation or other blockages.
- Look for sediment deposits in the sediment forebays or along edges of the pond where stormwater may enter into the soil filter. If the sediments leave less than 1 foot to the top of the berm between the forebay and the impoundment, remove the sediments and reline the forebay with stones. If the sediments extend more than 1/8 of the width of the soil filter, remove the sediments and restore the vegetation.
- Monitor the time it takes for the stormwater takes to drain from the soil filter. For a 1inch or larger rainfall event, the pond should be drained in 24 to 48 hours. If the timeframe to drain the pond approaches 48 hours, the filter media should be reworked or replaced.

3. Duration of Maintenance: Perform maintenance as described and required for any associated

permits unless and until the system is formally accepted by a municipality or quasi-municipal district, or is placed under the jurisdiction of a legally created association that will be responsible for the maintenance of the system.

Housekeeping

The following general performance standards apply to the proposed project both during and after construction.

A. Spill prevention: Controls must be used to prevent pollutants from being discharged from materials and equipment on-site, including storage practices to minimize exposure of the materials to stormwater, and appropriate spill prevention, containment, and response planning and implementation.

B. Groundwater protection: During construction, liquid petroleum products and other hazardous materials with the potential to contaminate groundwater may not be stored or handled in areas of the site draining to an infiltration area. An "infiltration area" is any area of the site that by design or as a result of soils, topography and other relevant factors, accumulates runoff that infiltrates into the soil. Dikes, berms, sumps, and other forms of secondary containment that prevent discharge to groundwater may be used to isolate portions of the site for the purposes of storage and handling of these materials.

C. Fugitive sediment and dust: Actions must be taken to insure that activities do not result in noticeable erosion of soils or fugitive dust emissions during or after construction. Oil may not be used for dust control.

D. Debris and other materials: Litter, construction debris, and chemicals exposed to stormwater must be prevented from becoming a pollutant source.

E. Trench or foundation dewatering: Trench dewatering is the removal of water from trenches, foundations, cofferdams, ponds, and other areas within the construction area that retain water after excavation. In most cases, the collected water is heavily silted and hinders correct and safe construction practices. The collected water must be removed from the ponded area, either through gravity or pumping, and must be spread through natural wooded buffers or removed to areas that are specifically designed to collect the maximum amount of sediment possible, like a cofferdam sedimentation basin. Avoid allowing the water to flow over disturbed areas of the site. Equivalent measures may be taken if approved.

Stormwater Inspection and Maintenance Form

Bates College
Lewiston, Maine

Bates College STEM Building

Inspector: _____ Date: _____

Maintenance Personnel: _____

	Inspection		Maintenance	
SITE AREA	Date	Comments	Date	Corrective Action
Lawn Vegetation				
Slope Vegetation				
Parking Lot Sweeping				
Underdrain Soil Filter				
Catch Basins/Manholes				
Overflow Structures				
Vegetated areas adjacent to pavement runoff				

Sediment/Debris Disposal

Location of Sediment/Debris Accumulation	Location of Sediment/Debris Disposal	Date of Disposal

ATTACHMENT 4

Lighting Plan

SECTION 4

Lighting

A. Narrative

The project is part of the academic campus and the site lighting will be consistent with the lighting on the recent Chu and Kalperis resident hall sites which are directly adjacent to the science building site. The lighting fixtures for the residence hall sites include a pedestrian scale fixture for the walkways and a more commercial type fixture for lighting the parking lots and larger areas at the cross walks.

The pedestrian fixtures are a Hess Linea fixture mounted at 12' over the sidewalk along Campus Avenue and at the entrance plaza on Campus Ave. The remaining fixtures are Kim Archetype fixtures mounted at 20' for the parking lots and general site lighting at the pedestrian crosswalk locations along Campus Avenue. The two parking lot light fixtures closest to the remaining residential structure will have neighbor friendly optics to minimize lighting behind the fixture in the direction of the structure.

Included in this section are catalog sheets of the two types of fixtures, a site plan showing the fixture location and a photometric plan with the lighting levels.

ARX09/ARX16/ARX25

ArcheType® X Site/Area with Lens

SITE / AREA

FEATURES

- Independently aimable LEAR™ modules allow for 355° of horizontal rotation and 70° of vertical module tilt adjustment
- Wide range of drive currents available
- Design software interface for user-defined Type X distribution creation
- Traditional NEMA distributions available
- IP66 sealed optical chamber
- 11,900+, 19,700+ and 28,000+ lumen packages
- 3,000, 4,000 and 5,000K color temperatures

SiteSync LIGHTING CONTROL

c UL us LISTED

IK09

3000K and warmer CCTs only

ORDERING. INFORMATION (Example)

1SA | ARX16 | 2 | 5K60UV | BL | US | SF | A30 | FGL | NFO | WIR-RMI-IO | SQ

POLE MOUNTING

			ARX09 EPA	ARX16 EPA	ARX25 EPA
	1SA	1 Arm Side	0.6	0.8	1.0
	2SB	2 Arm Side	1.2	1.7	2.0
	2SL	2 Arm Side	1.2	1.6	1.9
	3ST	3 Arm Side	1.8	2.4	2.9
	3SY*	3 Arm Side	1.4	1.8	2.2
	4SC	4 Arm Side	1.8	2.4	2.9
	1W	Single Wall	0.6	0.8	1.0
	HSF	Horizontal Slipfitter	0.3	0.3	0.3

***NOTE:** Available round poles only. EPA is for Fixture only.

FIXTURE

ARX09 54 LEDs
ARX16 96 LEDs
ARX25 150 LEDs

ELECTRICAL MODULE

Color Temperature		Drive Current	Voltage
3K	3000K	**35** 350mA	**UV** 120-277V
4K	4000K	**40** 400mA	**347** 347V
5K	5000K	**45** 450mA	**480** 480V
		50 500mA	
		55 550mA	
		60 600mA	
		65 650mA[2]	
		70 700mA[2]	

DISTRIBUTION

1 Type I
2 Type II
3 Type III
4 Type IV
5 Type V
L Left
R Right
X Type X[1] — Type X IES File Name

FIXTURE FINISH

BL Black
DB Dark Bronze
LG Light Gray
PS Platinum Silver
TT Titanium
WH White
CC Custom Color[3]

ARM SUPPORT

US Upsweep
ST Straight

PHOTOCELL OPTIONS

A25-7 7-pin Photocell Receptacle
A30 120V Button Photocell
A31 208V Button Photocell
A32 240V Button Photocell
A33 277V Button Photocell
A34 480V Button Photocell
A35 347V Button Photocell

FUSE OPTIONS

SF 120, 277, 347 Line Volts
DF 208, 240, 480 Line Volts

LENS OPTION

FGL Flat Glass Lens

NFO OPTION

NFO Neighbor Friendly Optic

CONTROLS

Wireless

WIR-RMI-IO 120 - 347V 1000' range WiScape RF mesh control system with off/on/dim, motion, photo, GPS location, alert, monitoring and metering capabilities.

Motion/Occupancy Sensor

SCL-R Round Pole Mounted Occupancy Sensor up to 16'
SCL-S Square Pole Mounted Occupancy Sensor up to 16'
SCH-R Round Pole Mounted Occupancy Sensor 16' to 30'
SCH-S Square Pole Mounted Occupancy Sensor 16' to 30'
SCL Fixture Mounted Occupancy Sensor up to 16'
SCH Fixture Mounted Occupancy Sensor from 16' to 30'

Site Sync Lighting Control

SWP[4,5] SiteSync Wireless Pre-Commission
SWPM[4,5,6] SiteSync Wireless Pre-Commission w/ Occupancy Sensor

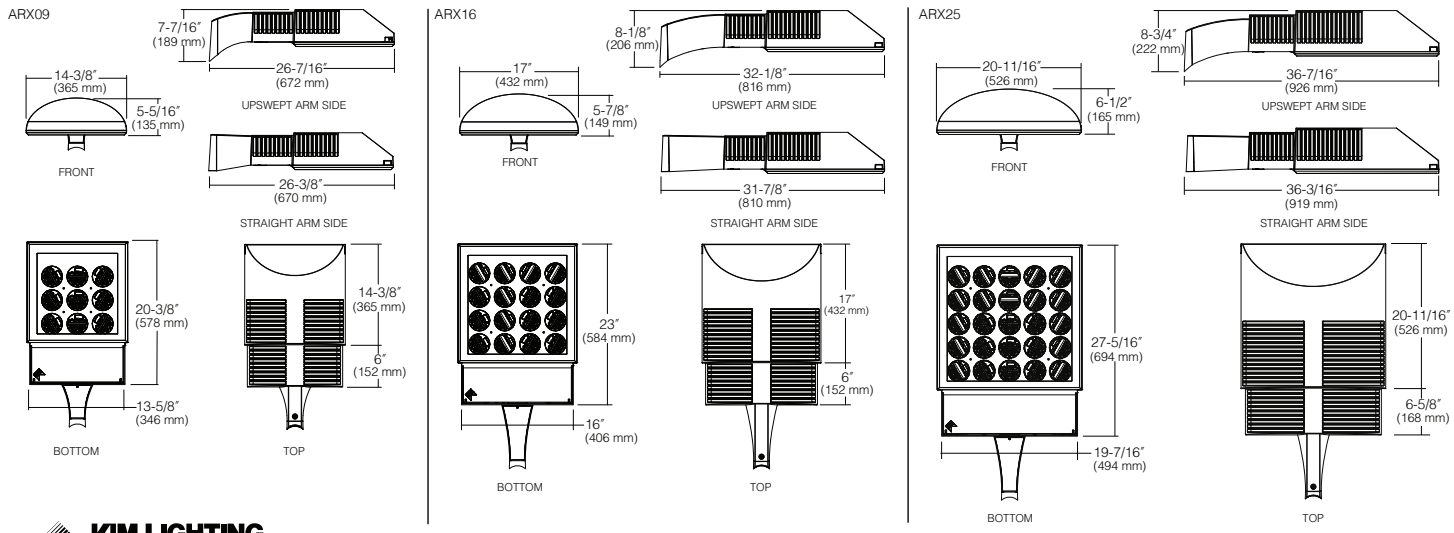
MOUNTING OPTIONS

VSF Vertical Slipfitter Mount
SVSF Square Vertical Slipfitter Mount

Side Arm Mount

3-4RD 3.3"- 4.2" O.D. round pole
4-6RD 4.5"- 6" O.D. round pole
SQ Square Pole

[1] User-defined distributions must include custom IES file name.
[2] ARX25 is only available up to 600mA. ARX16 and ARX09 available up to 700mA.
[3] Custom colors subject to additional charges, minimum quantities and extended lead times. Consult representative.
[4] Not available with other control or sensor options.
[5] Specify group and zone. See SiteSync product page www.hubbelllighting.com/controls/sitesync for more details.
[6] Specify time delay; dimming level and mounting height.



ARX09/ARX16/ARX25

ArcheType® X Site/Area without Lens

FEATURES

- Independently aimable LEAR™ modules allow for 355° of horizontal rotation and 70° of vertical module tilt adjustment
- Wide range of drive currents available
- Design software interface for user-defined Type X distribution creation
- Traditional NEMA distributions available
- IP66 rated LEAR module and driver
- 13,300+, 23,000+ and 31,200+ lumen packages
- 3,000, 4,000 and 5,000K color temperatures

SiteSync LIGHTING CONTROL

c UL us LISTED

IK09

3000K and warmer CCTs only

ARX16

ORDERING. INFORMATION (Example)

1SA | ARX16 | 2 | 5K60UV | BL | US | SF | A30 | NFO | WIR-RMI-IO | SQ

POLE MOUNTING

			ARX09 EPA	ARX16 EPA	ARX25 EPA
	1SA	1 Arm Side	0.6	0.8	1.0
	2SB	2 Arm Side	1.2	1.7	2.0
	2SL	2 Arm Side	1.2	1.6	1.9
	3ST	3 Arm Side	1.8	2.4	2.9
	3SY*	3 Arm Side	1.4	1.8	2.2
	4SC	4 Arm Side	1.8	2.4	2.9
	1W	Single Wall	0.6	0.8	1.0
	HSF	Horizontal Slipfitter	0.3	0.3	0.3

*NOTE: Available round poles only. EPA is for Fixture only.

FIXTURE

- **ARX09** 54 LEDs
- **ARX16** 96 LEDs
- **ARX25** 150 LEDs

DISTRIBUTION

- **1** Type I
- **2** Type II
- **3** Type III
- **4** Type IV
- **5** Type V
- **L** Left
- **R** Right
- **X** Type X[1] — Type X IES File Name

ELECTRICAL MODULE

Color Temperature		Drive Current		Voltage	
3K	3000K	35	350mA	UV	120-277V
4K	4000K	40	400mA	347	347V
5K	5000K	45	450mA	480	480V
		50	500mA		
		55	550mA		
		60	600mA		
		65	650mA		
		70	700mA		
		75	750mA		
		80	800mA[2]		
		85	850mA[2]		
		90	900mA[2]		
		95	950mA[2]		
		100	1000mA[2]		
		105	1050mA[2]		

FIXTURE FINISH

- **BL** Black
- **DB** Dark Bronze
- **LG** Light Gray
- **PS** Platinum Silver
- **TT** Titanium
- **WH** White
- **CC** Custom Color[3]

ARM SUPPORT

- **US** Upsweep
- **ST** Straight

PHOTOCELL OPTIONS

- **A25-7** 7-pin Photocell Receptacle
- **A30** 120V Button Photocell
- **A31** 208V Button Photocell
- **A32** 240V Button Photocell
- **A33** 277V Button Photocell
- **A34** 480V Button Photocell
- **A35** 347V Button Photocell

FUSE OPTIONS

- **SF** 120, 277, 347 Line Volts
- **DF** 208, 240, 480 Line Volts

NFO OPTION

- **NFO** Neighbor Friendly Optic

CONTROLS

Wireless

- **WIR-RMI-IO** 120 - 347V 1000' range WiScape RF mesh control system with off/on/dim, motion, photo, GPS location, alert, monitoring and metering capabilities.

Motion/Occupancy Sensor

- **SCL-R** Round Pole Mounted Occupancy Sensor up to 16'
- **SCL-S** Square Pole Mounted Occupancy Sensor up to 16'
- **SCH-R** Round Pole Mounted Occupancy Sensor 16' to 30'
- **SCH-S** Square Pole Mounted Occupancy Sensor 16' to 30'
- **SCL** Fixture Mounted Occupancy Sensor up to 16'
- **SCH** Fixture Mounted Occupancy Sensor from 16' to 30'

Site Sync Lighting Control

- **SWP[4,5]** SiteSync Wireless Pre-Commission
- **SWPM[4,5,6]** SiteSync Wireless Pre-Commission w/ Occupancy Sensor

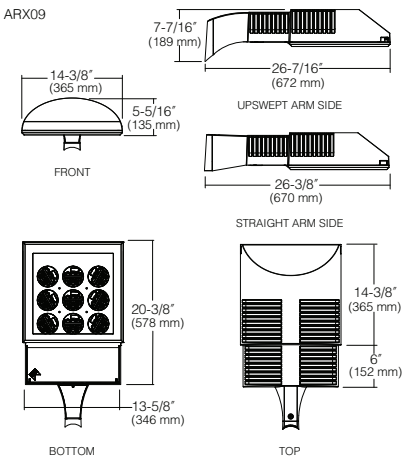
MOUNTING OPTIONS

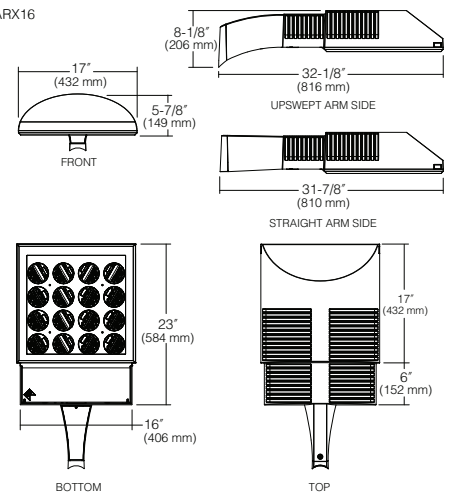
- **VSF** Vertical Slipfitter Mount
- **SVSF** Square Vertical Slipfitter Mount

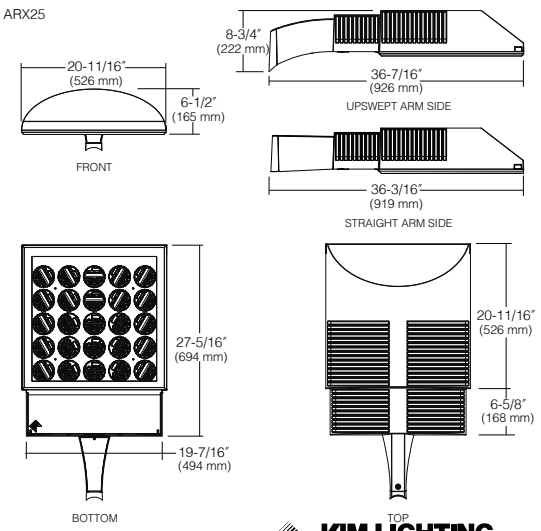
Side Arm Mount

- **3-4RD** 3.3"- 4.2" O.D. round pole
- **4-6RD** 4.5"- 6" O.D. round pole
- **SQ** Square Pole

[1] User-defined distributions must include custom IES file name.
[2] ARX25 is only available up to 800mA. ARX16 is only available up to 900mA. ARX09 is available up to 1050mA
[3] Custom colors subject to additional charges, minimum quantities and extended lead times. Consult representative.
[4] Not available with other control or sensor options.
[5] Specify group and zone. See SiteSync product page www.hubbelllighting.com/controls/sitesync for more details.
[6] Specify time delay; dimming level and mounting height.



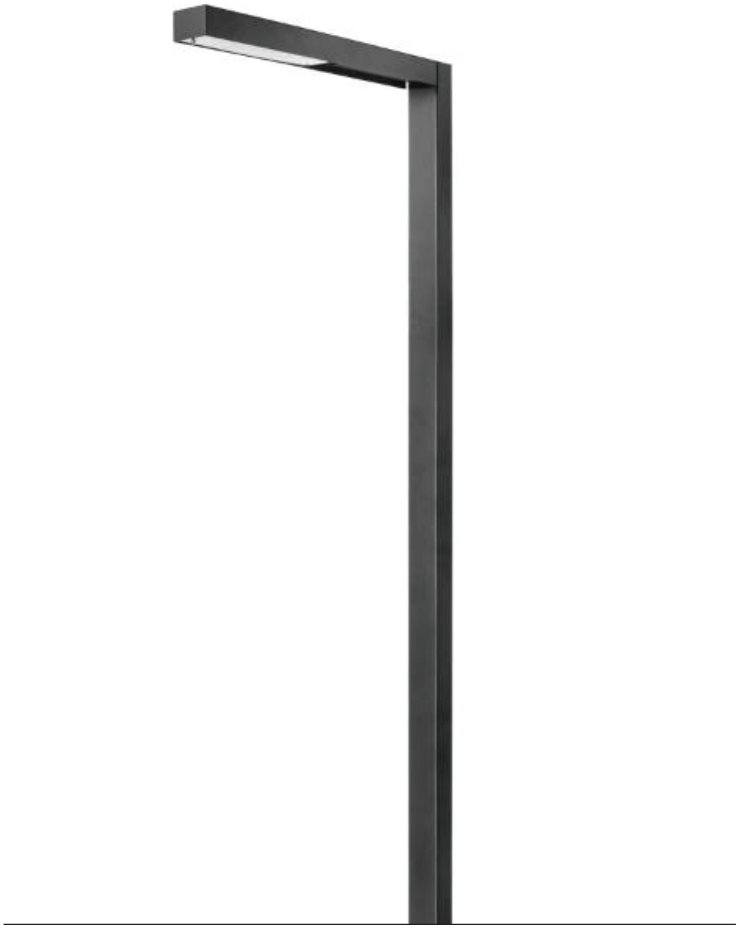




LINEA 450 LVC

Specification

The LINEA series features distinctly linear design qualities and exceptional versatility. Perceptively capturing today's minimal design philosophy, the reduced form is sure to retain its validity far into the future. It is available in three mounting heights in single or twin mounting configurations. The pedestrian-scale model is 15 feet, with intermediate and larger sizes at 20 and 26 feet, respectively, giving proper scale for a variety of applications. Units for bi-level mounting are available, where the street-side luminaire is mounted high and a second fixture is mounted on the sidewalk side at a lower height for pedestrian illumination. An LED illuminating bollard for low-level pathway illumination complements the family of products. CSA Listed for Wet Locations



Model	LED Module	Color Temperature	Distribution	Volt	Mounting	Pole	Pole Mat	Finish	Option
LN450	2LVC - 2 modules	WW -3000K	T2 - Type II	UNV - 120-277V	A - Single Mount	15SR - 15' Straight Rectangular	A - Aluminum	SG - Silver Grey	DIM - 0-10vDC Dimming
		NW - 4000K	T3 - Type III		B - Twin Mount	X - Other (specify)	S - Steel	GG - Graphite Grey	N - None
			T4 - Type IV					CC - Custom Color	

Ordering Information

Specifications are subject to change without notification

LINEA 450 LVC

Specification

HOUSING
Rectangular luminaire housing with integral fitter is extruded aluminum with no visible welds. Frameless tempered glass lens with decorative masking is hinged and secured in place with a single stainless steel quarter-turn fastener for tool-less access to the optical compartment. Lens seals to the housing with one-piece silicone gasketing when closed. Housing is fitted with stainless steel weather-tight strain relief bushing for the power cable exiting the rear of the housing. Luminaire mounts to tenon on pole and secured with four socket head cap screws on top of the housing. Luminaire is available in single or twin back-to-back mounting configurations. All hardware is stainless steel.

OPTICS
Optics include 2 individual LED modules. Each module consists of a field replaceable aluminum core PCB with four high-power LEDs and a single piece lens molded from optical quality acrylic. Light distributions include a choice of Type II, III, or IV optics. Luminaire emits zero uplight at 90 degrees horizontal and above and is suitable for use in all LEED lighting zones.

LED DELIVERED LUMEN OUTPUT / BUG RATING
2 Modules: 72 watts
Type II - 3000K: 5068 lumens / B1-U0-G1
Type III - 3000K: 5126 lumens / B1-U0-G1
Type IV - 3000K: 4639 lumens / B1-U0-G1

Type II - 4000K: 5398 lumens / B1-U0-G1
Type III - 4000K: 5459 lumens / B2-U0-G1
Type IV - 4000K: 4941 lumens / B1-U0-G1

NOTE : Due to rapid and continuous advances in LED technology, LED luminaire data is subject to change without notice and at the discretion of HessAmerica. Consult factory for current technical data.

ELECTRICAL
Electronic LED driver supplies 700mA drive current to LED modules with input voltage range from 120v through 277v at 50/60Hz. Power consumption is 72 watts. Optional 0-10v DC dimming is available on request.

LUMINAIRE WEIGHT: 22 lbs
LUMINAIRE EPA: 1.3 sq. ft

POLE

Aluminum:
Straight rectangular pole is 6.3" x 3.9" nominal and manufactured from seamless 6061 aluminum tubing and heat treated to produce a T6 temper. Nominal wall thickness is 0.236". Sides of the shaft are flat with 1/8" radiussed corners. Flush mounted hand hole cover is plasma cut with kerf not to exceed 1/8'' and includes triangular tamper-resistant locking device. Two piece base cover is fabricated aluminum. Nominal pole height is 15'.

Steel:
Straight rectangular pole is 6.3" x 3.5" nominal and manufactured from cold drawn over mandrel, electric weld, mechanical steel tubing with nominal wall thickness of 0.197". Sides of shaft are flat with 1/2" radiussed corners. Pole shall show no seam along the shaft. Flush mounted hand hole cover is plasma cut with kerf not to exceed 1/8" and includes triangular tamper-resistant locking device. Pole is hot-dip galvanized with coating inside and out, then lightly sanded prior to painting. Two piece base cover is fabricated aluminum. Nominal pole height is 15'.

FINISH
Standard finish is finely textured matte silver grey metallic or graphite grey. Special colors available on request.

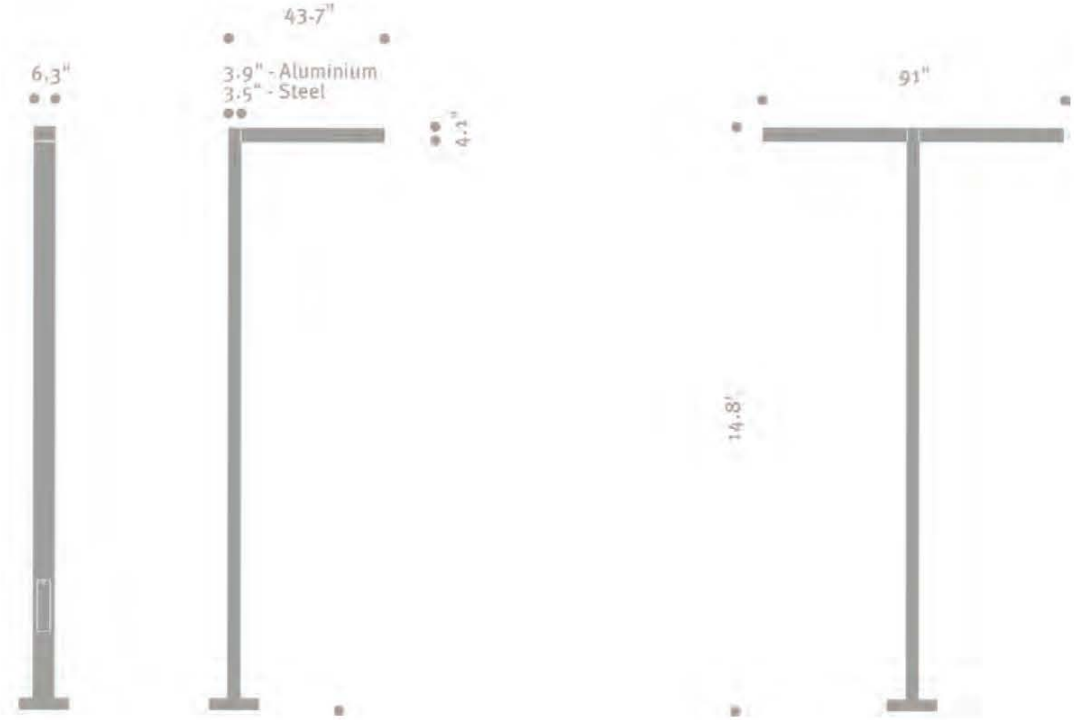
Specifications are subject to change without notification

CERTIFICATION: CSA Certified for Wet Locations
INGRESS PROTECTION: IP65

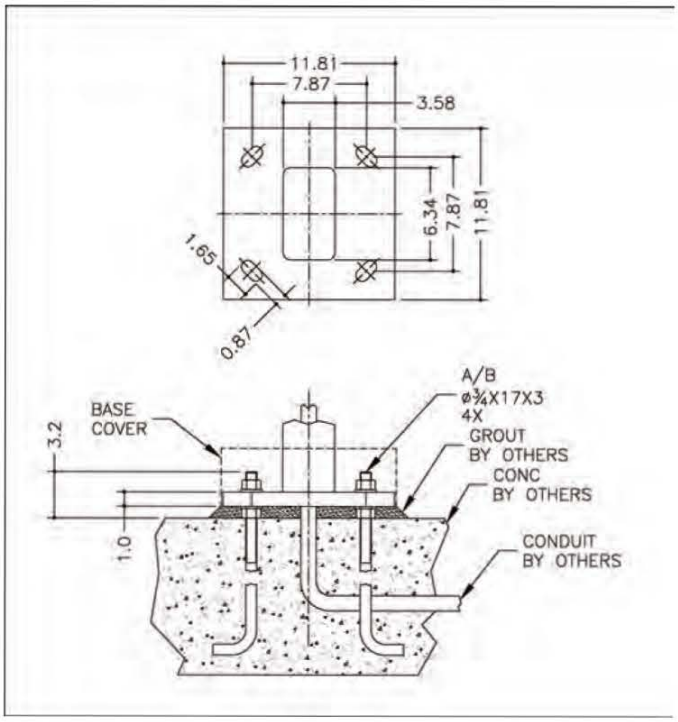
WARRANTY
Limited product warranty period including LEDs is five years. Driver shall carry the manufacturer's limited warranty.

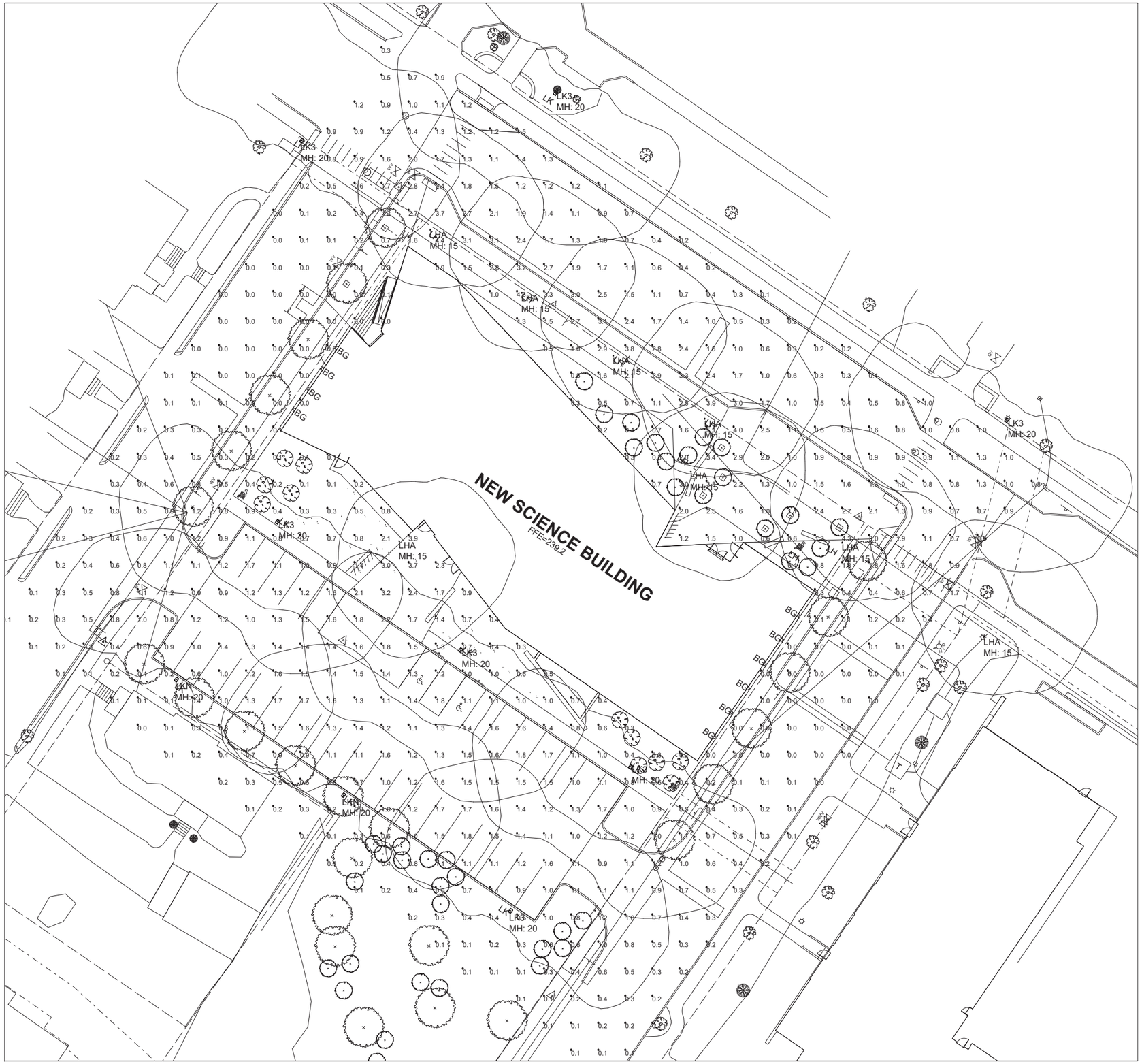
Additional information

Dimensions



Mounting detail





PLAN VIEW

NOTES:
1) EXACT MOUNTING DETAILS TO BE DETERMINED AT JOBSITE BY OTHERS.
2) CALCULATIONS MAY or MAY NOT SHOW THE EFFECT OF SHADOWING CAUSED BY BUILDINGS AND OBJECTS WITHIN THE CALCULATED SPACE OR IN THE SITE AREA.
3) READINGS SHOWN ARE INITIAL HORIZONTAL FOOTCANDLES ON A FLAT SITE WITHOUT REFLECTIONS OR OBSTRUCTIONS UNLESS OTHERWISE INDICATED.
4) THIS CALCULATION IS BASED ON LIMITED INFORMATION SUPPLIED BY OTHERS TO SWANEY LIGHTING ASSOCIATES AND STANDARD ASSUMPTIONS OF THE SPACE AND/OR SITE.
5) CONFORMANCE TO CODES AND OTHER LOCAL REQUIREMENTS AS DETERMINED BY THE AHJ ARE THE RESPONSIBILITY OF THE OWNER AND/OR THE OWNER'S REPRESENTATIVE.
6) THIS LAYOUT DRAWING MUST BE COORDINATED WITH THE SITE LOCATION FOR CORRECT FIXTURE ORIENTATION.
7) DOCUMENTS PRINTED OR PLOTTED FROM ELECTRONIC FILES MAY APPEAR AT OTHER THAN THE DESIRED OR ASSUMED GRAPHIC SCALES. IT IS THE RESPONSIBILITY OF THE RECIPIENT TO VERIFY THAT THE PRINTED OR PLOTTED-TO-SCALE DRAWING IS PRINTED TO SCALE.

Calculation Summary

Label	Avg	Max	Min	Avg/Min	Max/Min
SITE	0.92	5.1	0.0	N.A.	N.A.
parking	1.32	1.8	0.6	2.2	3.0

Luminaire Schedule (note fixture cataloge numbers are not complete)

Type	Qty	Lum. Lumens	LLF	Lum. Watts	Description
LHA	8	4639	0.900	72	LN450-2LVC-WW-T4
LK3	7	5070	0.900	44.5	SAR3P35-40L3K
LKN	2	4524	0.900	44.6	SAR3P35-40L3K-NFO

site 8-28-18.AGI

TITLE
BATES COLLEGE SCIENCE BUILDING
LEWISTON, ME
SITE LIGHTING LAYOUT

Date:8/28/2018

GENERATED BY SWANEY LIGHTING, SCARBOROUGH ME - 207-883-7100 - swaneylighting.com

GENERATED FOR:
WRIGHT-PIERCE

SCALE NOT TO SCALE

Page 1 of 1

SWANEY LIGHTING ASSOCIATES, INC.

NOTICE: THIS DRAWING IS THE EXCLUSIVE PROPERTY OF SWANEY LIGHTING ASSOCIATES. ITS ACCEPTANCE CONSTITUTES AN AGREEMENT THAT THE DRAWING WILL BE TREATED AS CONFIDENTIAL. THE DRAWING IS TO BE USED FOR NO PURPOSE OTHER THAN AS DETAILED IN WRITTEN AGREEMENT BETWEEN SWANEY LIGHTING ASSOCIATES AND THE RECIPIENT. IT IS TO BE RETURNED UPON REQUEST AND IS NOT TO BE COMMUNICATED, DISCLOSED OR COPIED; EXCEPT AS EXPRESSLY PERMITTED BY WRITTEN AGREEMENT.
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ATTACHMENT 5

Traffic Information

SECTION 5

Traffic

A. Narrative

The proposed new science building is being undertaken to modernize and enhance the existing science programs offered at the College. The new building will not add faculty or students to the campus. Because the project is a modernization and not intended to expand the faculty or student enrolment, the traffic impacts of the new building are nominal. The effect the new building will have on traffic is primarily related to pedestrian traffic. Students and faculty that were once served by buildings north of Campus Avenue will be crossing Campus Ave. to travel to the new science building from the main campus. Vehicular traffic to the building is limited to parking behind the building and deliveries. The site will also accommodate bicycle parking at the building.

Access to the building will be on three sides of the building. The main entrance facing Campus Avenue will be near the intersection of Bardwell Street with a clear visual connection to the campus. At the Nichols Street/Campus Ave intersection a side door near the corner of the building is clearly indicated with a widened sidewalk and a paver surface. The rear access is at the back of the building facing the parking lot and loading area.

Pedestrian crossing improvements are planned for Campus Ave and at both Bardwell and Nichols Street crossings. The crossings include painted crosswalks, enhanced lighting and raised sidewalks that extend into the street shoulders to shorten the roadway crossing distance and increase the pedestrian area of refuge when making the street crossing.

Parking in the vicinity of the project will be expanded by 9 spaces overall. The on-street parking will be reduced because current 2 hour parking along the west side of Bardwell street will be eliminated by the improvements that are planned for Bardwell Street, making the roadway too narrow to accommodate on street parking on both sides of the street. The loss of on street parking is more than offset by the increase in on-site parking which will expand to 33 spaces. A summary of the parking in the vicinity of the site is shown in Table 1 below.

Table 1: Parking Summary

	On-Street				Onsite	Overall
	Bardwell	Campus	Nichols	SubTotal		
Existing	10	3	7	20	18	38
Proposed	3	5	6	14	33	47
Net	(7)	2	(1)	(6)	14	9

ATTACHMENT 6

Utility Plan

SECTION 6

Utilities

A. Narrative

The proposed new science building is will be served by public water and sewer. The electrical will be fed from the internal campus electrical circuit. The building will also have a natural gas connection. Storm drainage from the site will be connected to the City's storm drain system.

B. Water and Sewer

The building's domestic water and sewer usage will be approximately 11,000 gal/day. A request has been made to Kevin Gagne Deputy Director of Public Works to confirm that the City's water and sewer systems have capacity to serve the project. A copy of this request is attached to this section of the application. The water for fire protection will also be served by the City. Bates is funding improvements to the water system in the vicinity of the project that will allow for adequate fire protection for the proposed building with a connection to the water line in Bardwell Street.

The water connection will be on Bardwell Street. Sewer will have two connections from the building, one on Campus Avenue to a Manhole and another on Nichols Street to a manhole. Both sewer service lines will be 6" diameter. The attached Utility plan shows the proposed utility connections.

C. Electrical

The building will be served by a new service from the internal campus electrical circuit. The improvements to extend the circuit to the south side of Campus Avenue have been made. Electricity will be supplied by CMP.

D. Natural Gas

The proposed building will utilize a natural gas fired boiler for heat and hot water and a natural gas generator. The anticipated peak load for the building will be 21,500 CFH. A service line to the building from a gas main in Nichols street is shown on the utility plan. A request has been made to Unitil regarding the ability to serve the project and a copy of the letter is attached to this section.

E. Stormwater

Stormwater from the proposed site will be treated on site for quality and quantity in conformance with Maine DEP Chapter 500 requirements. The stormwater will be discharged to a separated storm drain in the low area between Nichols and Bardwell Streets that is a City storm drain. A small portion of the site will discharge stormwater to the separated storm drain on Campus Avenue. The site's stormwater calculations and design will be reviewed as part of the City's Site Plan Review to confirm that the City's system has the ability to accommodate the project.

WRIGHT-PIERCE
Engineering a Better Environment

11 Bowdoin Mill Island, Suite 140
Topsham, ME 04086
Phone: 207.725.8721 | Fax: 207.729.8414
www.wright-pierce.com

July 10, 2018
W-P Project No. 14021A

Mr. Kevin Gagne
Deputy Director
Lewiston Public Works
103 Adams Avenue
Lewiston, ME 04240

Subject: Proposed STEM Building Bates Collage
Sewer and Water Ability to Serve

Dear Mr. Gagne:

As you may be aware from your colleagues, Bates College is proposing to construct a new Science Engineering, Mathematics, and Technology (STEM) building at 45 Campus Avenue in Lewiston. The building will be a three-story building with a total of approximately 45,000 square feet of class room, laboratory, offices and student space as well as a vivarium and other science related functions.

We are proposing to connect to the City's water and sewer system to serve the building. As you may know, we have had discussions with David Jones and Jeff Beaule regarding some water system changes in the vicinity of the project to allow for increase pressure in the existing water main in Bardwell Street to accommodate the building's fire system requirements.

We anticipate that the building will use approximately 11,000 gals/ day of water and generate up to 11,000 gal/day of sewage. zI have attached a copy of the utility plan for the site. Would you confirm that the City has the ability to serve the project's water and sewer needs?

If you have any questions, please let me know.

Sincerely,
WRIGHT-PIERCE

Jan Wiegman, PE
Project Manager
Jan.wiegman@wright-pierce.com

enclosure
cc: Chris Streifel (Bates)
Michael Hinchcliffe (Payette)

ATTACHMENT 7

Natural Resources

SECTION 7

Natural Resources

The proposed new science building is proposed as a redevelopment of an urban area that was originally developed as residential lots. The site has been previously developed and assessed for natural resources. Based on the information the site development will not impact existing natural resources.

A. Shoreland
The site is not located within the shoreland zone.

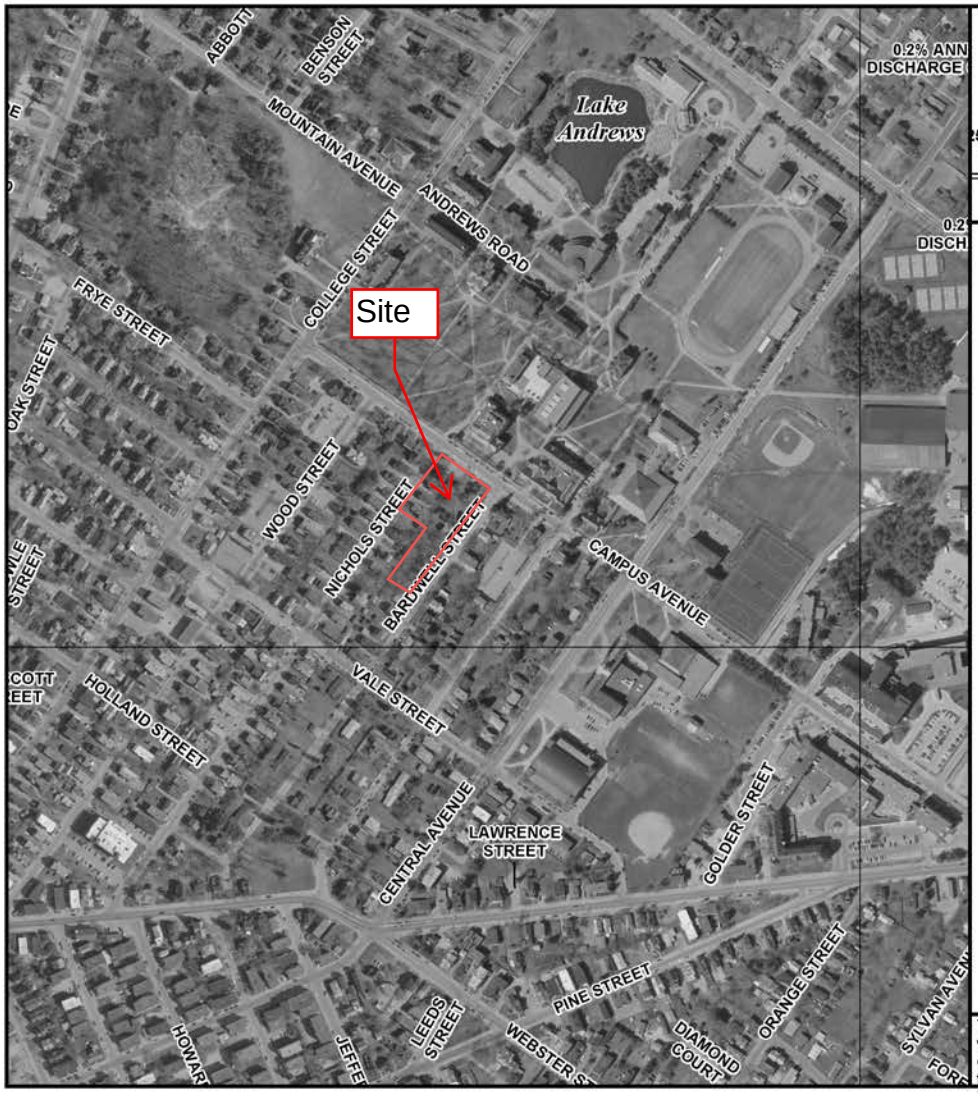
B. Flood Plain
The project is not located within a 100-year flood zone as defined by the Federal Emergency Management Agency (FEMA). See the attached FIRMette showing the Project Site on a portion of the FIRM, Flood Insurance Rate Map, Androscoggin County, Maine (All Jurisdictions), Panel 327 of 470, Map Number 23001C0327E, Effective Date: July 8, 2013.

C. Wetlands
Wetland on the site were mapped by Jones Associates in 2017 and there were two areas of wetland that were identified. The site improvements do not impact the existing wetlands. A copy of the wetland study is attached to this section.

D. Urban Impaired Stream Watershed
According to "Appendix B, Urban Impaired Streams", of Chapter 502, the project site is not located in an urban impaired stream watershed and is therefore not subject to subsection "D. Urban Impaired Stream Standard" of "Section 4. Stormwater Standards" in Chapter 500, Stormwater Management.

E. Phosphorous
The site is not with the watershed of a Lake Most At risk and phosphorous requirements do not apply.

F. Aquifer and Groundwater
The proposed project should not impact groundwater quantity or quality. The project boundaries have been delineated on the attached maps of: Significant Sand and Gravel Aquifers, the Bedrock Geology of the Lewiston Quadrangle, Maine and Surficial Geology. No groundwater will be used, discharged or otherwise extracted by this development.



MAP SCALE 1" = 500'

250 0 500 1000 FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0327E

FIRM

FLOOD INSURANCE RATE MAP

ANDROSCOGGIN COUNTY, MAINE (ALL JURISDICTIONS)

PANEL 327 OF 470

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
AUBURN, CITY OF	230001	0327	E
LEWISTON, CITY OF	230004	0327	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
23001C0327E

EFFECTIVE DATE
JULY 8, 2013

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

JONES ASSOCIATES

Foresters, Surveyors and Environmental Consultants

WETLAND REPORT

WRIGHT PIERCE - BATES COLLEGE

CAMPUS AVENUE HOUSING

LEWISTON, MAINE

Prepared for:	Prepared by:
Wright Pierce 99 Main Street Topsham, Maine	Jones Associates, Inc. 280 Poland Spring Road Auburn, Maine 04210

JA Job #17-049LE
January 2018

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- NRCS CUSTOM SOIL RESOURCE REPORT 16

INTRODUCTION

Jones Associates, Inc. was contracted to provide wetland delineation services for Wright Pierce. The wetland delineation was conducted over a +/- 3 acre property located along a portion of Nichols Street, Campus Avenue and Bardwell Street. The following report summarizes site conditions observed during site visit in June 2017.

Wetland/upland boundaries were identified and delineated according to *U.S. Army Corps of Engineers (ACOE) Wetlands Delineation Manual (Environmental Laboratory 1987)* and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, January 2012*. Wetlands were identified based on the presence of hydric soil (inundated or saturated soil conditions resulting from permanent or periodic inundation by ground water or surface water), hydrology (movement and distribution of water), and predominance of hydrophytic species (Hydrophytes: vegetation typically adapted for life in saturated soil conditions).

Wetland delineations consist of transecting the property, examining periodic soil samples, observing any evidence of hydrology and assessing each stratum of vegetation for its percentage of hydrophytic species. If all three factors were evident, the study plot was considered wetland habitat. Transitions between upland and wetland were clearly marked with blue sub-zero flagging every 30-40 feet, and labeled with alphanumeric codes to identify individual systems (A1, A2, A3….).

EXISTING CONDITIONS

The subject site is located in Lewiston, Maine. The lot is bound to the west by Bardwell St. and to the north, south and east by private property. There has been some previous disturbance in the area. There are drain pipes that discharge water into and drain water from the wetland. The area of investigation has steep slopes off of the edge of Bardwell Street which quickly tapers off into a concave wetland toward the northwest. The steep slopes near the road direct water to the wetland and the wetland hydrology is exacerbated by the addition of water from drainage pipes. A wetland delineation previously conducted on the property in November of 2013 identified a wetland area at the southern end of the lot. The current delineation results show a reduction in wetland size when compared to the previous delineation.

WETLAND CHARACTERISTICS

The term "wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

--Corps of Engineers Wetlands Delineation Manual (U.S. Army Corps of Engineers 1987)

Due to the slope of the parcel, surface water settles at the southern end of the property creating a palustrine forested wetland that consists of broad-leaved deciduous vegetation (PFO1). Wetland vegetation is abundant at the bottom of the concave portions but as the steepness of the slope becomes greater, soils become drier and vegetation changed to upland. This is where the wetland boundaries were placed. Vegetation found in the wetland included: red maple (*Acer rubrum),* jewelweed *(Impatiens capensis),* little green sedge *(Carex viridula),* old switch panic grass *(Panicum virgatum),* lesser poverty rush *(Juncus tenuis).* Jewelweed, a facultative wetland (FACW) plant was the most prevalent; it had an absolute percent cover of 70%.

The accumulation of water caused many primary indicators of a wetland to be present in this area. For example, water marks, sparsely vegetated concave surface, water-stained leaves, aquatic fauna, surface soil cracks, drainage patterns, and moss trim lines were all present. The soil texture was sandy and soil color was determined by using a Munsell soil color chart. From depths 0-20 inches 10YR 3/2 was the dominate color with clear redox concentrations. From this information I was able to determine the soils were classified as hydric by using the sandy redox (S5) indicator.

Above the concave wetland it was drier, leading to establishment of upland species. Species in the upland included; red maple (*Acer rubrum*), smooth sumac *(Rhus glabra),* redbud *(Cercis canadensis*), common dandelion (*Taraxacum officinale*), ox-eye daisy *(Leucanthemum vulgare)*, Canadian goldenrod (*Solidago canadensis*), sweet-scented bedstraw *(Galium odoratum)*, tall buttercup (*Ranunculus acris*), jewelweed *(Impatiens capensis*), sensitive fern *(Onoclea sensibilis)*, and greater burdock (*Arctium lappa*). The most abundant plant was an upland (UPL) species sweet-scented bedstraw with 83% absolute percent cover.

SOILS

According to U.S. Department of Agriculture, Natural Resources Conservation Service, the soil series typed within the property area are Brayton Fine Sandy Loam and Sheepscot Fine Sandy Loam. Characteristics of each series are described in the soil report according to: Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture, Official Soil Series Descriptions, https://soilseries.sc.egov.usda.gov/osdname.aspx.

MADE LAND

Area Composition: Made Land: 91%

Typical profile: H1-0 to 60 inches; Very gravely sandy loam

Properties and qualities: Slope: 0-35 percent, Natural drainage class: Moderately well drained, depth of water table: About 24 to 72 inches.

RARE OR UNUSUAL FEATURES AND VERNAL POOLS

It is recommended by JAI that a full vernal pool survey be conducted during the amphibian breeding season to determine the presence and significance of vernal pools within the area of investigation. This site was previously investigated for vernal pools in April/May of 2014, none were found. During our investigations Jones Associates, Inc. did not observe any vernal pools, nor did we find any rare or unusual plant or animal species within the mapped wetland area. The wetlands on this property were dominated by plant communities typical of this region of Maine.

NORTHERN LONG-EARED BAT

The United States Fish and Wildlife Service listed the Northern Long-Eared Bat (NLEB) (*Myotis septentrionalis*) as threatened with Interim 4(d) Rule. This listing affects development occurring within the range of the NLEB (www.fws.gov/midwest/endangered/mammals/nleb/nlebRangeMap.html) and within the White Nose Syndrome Buffer Zone (http://www.fws.gov/midwest/nleb/WNSBuffer.pdf) that could cause purposeful or incidental take (harm, kill or otherwise harass). This includes the clearing of trees where NLEB could be living. If the project requires such action a permit may be necessary.

US Fish and Wildlife Service, http://www.fws.gov/wetlands/Documents/Wetlands-and-Deepwater-Habitats-Classification-chart.pdf

WETLANDS AND DEEPWATER HABITATS CLASSIFICATION

System	M - Marine							
Subsystem	1 - Subtidal				2 - Intertidal			
Class	RB – Rock Bottom	UB – Unconsolidated Bottom	AB – Aquatic Bed	RF – Reef	AB – Aquatic Bed	RF – Reef	RS – Rocky Shore	US – Unconsolidated Shore
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud	1 Algal 3 Rooted Vascular	1 Coral 3 Worm	1 Algal 3 Rooted Vascular	1 Coral 3 Worm	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic

System	E - Estuarine												
Subsystem	1 - Subtidal				2 - Intertidal								
Class	RB – Rock Bottom	UB – Unconsolidated Bottom	AB – Aquatic Bed	RF – Reef	AB – Aquatic Bed	RF – Reef	SB – Streambed	RS – Rocky Shore	US – Unconsolidated Shore	EM – Emergent	SS – Scrub-Shrub	FO – Forested
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 3 Rooted Vascular 4 Floating Vascular	2 Mollusk 3 Worm	1 Algal 3 Rooted Vascular 4 Floating Vascular	2 Mollusk 3 Worm	1 Bedrock 2 Rubble 3 Cobble-Gravel 4 Sand 5 Mud 6 Organic	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Persistent 2 Non-persistent 5 *Phragmites australis*	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen

System	R - Riverine				
Subsystem	1 - Tidal	2 – Lower Perennial	3 – Upper Perennial	4* - Intermittent	5* – Unknown Perennial
Class	RB** – Rock Bottom UB – Unconsolidated Bottom	SB** – Streambed	AB – Aquatic Bed	RS – Rocky Shore	US – Unconsolidated Shore EM – Emergent
Subclass	1 Bedrock 2 Rubble 1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Bedrock 2 Rubble 3 Cobble-Gravel 4 Sand 5 Mud 6 Organic 7 Vegetated	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated 2 Nonpersistent

* **Intermittent** is limited to the **Streambed** Class;
Unknown Perennial is limited to **Unconsolidated Bottom** Class code **R5UB** only
** **Rock Bottom** is not permitted for the **Lower Perennial** Subsystem;
Streambed is limited to **Tidal** and **Intermittent** Subsystems

Page 1 of 2

Classification of Wetlands and Deepwater Habitats of the United States, Cowardin *et al.* 1979

February, 2011

WETLANDS AND DEEPWATER HABITATS CLASSIFICATION

System: L - Lacustrine

Subsystem: 1 - Limnetic

Class	Subclass
RB – Rock Bottom	1 Bedrock 2 Rubble
UB – Unconsolidated Bottom	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic
AB – Aquatic Bed	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular

Subsystem: 2 - Littoral

Class	Subclass
RB – Rock Bottom	1 Bedrock 2 Rubble
UB – Unconsolidated Bottom	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic
AB – Aquatic Bed	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular
RS – Rocky Shore	1 Bedrock 2 Rubble
US – Unconsolidated Shore	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated
EM – Emergent	2 Nonpersistent

System: P - Palustrine

Class	Subclass
RB – Rock Bottom	1 Bedrock 2 Rubble
UB – Unconsolidated Bottom	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic
AB – Aquatic Bed	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular
US – Unconsolidated Shore	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated
ML – Moss-Lichen	1 Moss 2 Lichen
EM – Emergent	1 Persistent 2 Nonpersistent 5 *Phragmites australis*
SS – Scrub-Shrub	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen
FO – Forested	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen

MODIFIERS

In order to more adequately describe the wetland and deepwater habitats, one or more of the water regime, water chemistry, soil, or special modifiers may be applied at the class or lower level in the hierarchy. The farmed modifier may also be applied to the ecological system.

Water Regime			Special Modifiers	Water Chemistry			Soil
Nontidal	**Saltwater Tidal**	**Freshwater Tidal**		**Coastal Halinity**	**Inland Salinity**	**pH Modifiers for all Fresh Water**	
A Temporarily Flooded	L Subtidal	S Temporarily Flooded-Tidal	b Beaver	1 Hyperhaline	7 Hypersaline	a Acid	g Organic
B Saturated	M Irregularly Exposed	R Seasonally Flooded-Tidal	d Partly Drained/Ditched	2 Euhaline	8 Eusaline	t Circumneutral	n Mineral
C Seasonally Flooded	N Regularly Flooded	T Semipermanently Flooded-Tidal	f Farmed	3 Mixohaline (Brackish)	9 Mixosaline	i Alkaline	
E Seasonally Flooded/ Saturated	P Irregularly Flooded	V Permanently Flooded-Tidal	h Diked/Impounded	4 Polyhaline	0 Fresh		
F Semipermanently Flooded			r Artificial	5 Mesohaline			
G Intermittently Exposed			s Spoil	6 Oligohaline			
H Permanently Flooded			x Excavated	0 Fresh			
J Intermittently Flooded							
K Artificially Flooded							

WETLAND RULES AND INFORMATION

WETLANDS OF SPECIAL SIGNIFICANCE

All coastal wetlands and great ponds are considered wetlands of special significance. In addition, certain freshwater wetlands are considered wetlands of special significance.

A. Freshwater Wetlands of Special Significance. A freshwater wetland of special significance has one or more of the following characteristics.

(1) Critically imperiled or imperiled community. The freshwater wetland contains a natural community that is critically imperiled (S1) or imperiled (S2) as defined by the Natural Areas Program.

(2) Significant wildlife habitat. The freshwater wetland contains significant wildlife habitat as defined by 38 M.R.S.A. § 480-B (10).

(3) Location near coastal wetland. The freshwater wetland area is located within 250 feet of a coastal wetland.

(4) Location near GPA great pond. The freshwater wetland area is located within 250 feet of the normal high water line, and within the same watershed, of any lake or pond classified as GPA under 38 M.R.S.A. § 465-A.

(5) Aquatic vegetation, emergent marsh vegetation or open water. The freshwater wetland contains, under normal circumstances, at least 20,000 square feet of aquatic vegetation, emergent marsh vegetation or open water, unless the 20,000 or more square foot area is the result of an artificial pond or impoundment.

(6) Wetlands subject to flooding. The freshwater wetland area is inundated with floodwater during a 100-year flood event based on flood insurance maps produced by the Federal Emergency Management Agency or other site-specific information.

(7) Peatlands. The freshwater wetland is or contains peatlands, except that the department may determine that a previously mined peatland, or portion thereof, is not a wetland of special significance.

(8) River, stream or brook. The freshwater wetland area is located within 25 feet of a river, stream or brook.

B. Permit Process. Alterations of wetlands of special significance usually require an individual permit. However, some alterations of freshwater wetlands of special significance may be eligible for Tier 1 or 2 review if the department determines, at the applicant's request, that the activity will not negatively affect the freshwater wetlands or other protected natural resources present. In making this determination, the department considers such factors as the size of the alteration, functions of the impacted area, existing development or character of the area in and around the alteration site, elevation differences and hydrological connection to surface water or other protected natural resources, among other things.

C. Seasonal Factors. When determining the significance of a resource or impact from an activity, seasonal factors and events that temporarily reduce the numbers or visibility of plants or animals, or obscure the topography and characteristics of a wetland such as a period of high water, snow and ice cover, erosion event, or drought, are taken into account. Determinations may be deferred for an amount of time necessary to allow an assessment of the resource without such seasonal factors.

STREAM CHANNELS

According to Maine's Natural Resource Protection Act, Title 38, Article 5-A, Protection of Natural Resources, §480-B Definitions:

"River, stream or brook" means a channel between defined banks. A channel is created by the action of surface water and has two or more of the following characteristics:

(1) It is depicted as a solid or broken blue line on the most recent edition of the U.S. Geological Survey 7.5-minute series topographic map or, if that is not available, a 15-minute series topographic map.

(2) It contains or is known to contain flowing water continuously for a period of at least 6 months of the year in most years.

(3) The channel bed is primarily composed of mineral material such as sand and gravel, parent material or bedrock that has been deposited or scoured by water.

(4) The channel contains aquatic animals such as fish, aquatic insects or mollusks in the water or, if no surface water is present, within the stream bed.

(5) The channel contains aquatic vegetation and is essentially devoid of upland vegetation.

"River, stream or brook" does not mean a ditch or other drainage way constructed, or constructed and maintained, solely for the purpose of draining storm water or a grassy swale.

VERNAL POOLS

As defined by Maine's Department of Environmental Protection (MDEP): A vernal pool, also referred to as a seasonal forest pool, is a natural, temporary to semi-permanent body of water occurring in a shallow depression that typically fills during the spring or fall and may dry during the summer. Vernal pools have no permanent inlet and no viable populations of predatory fish. A vernal pool may provide the primary breeding habitat for wood frogs (*Rana sylvatica*), spotted salamanders (*Ambystoma maculatum*), blue-spotted salamanders (*Ambystoma laterale*), and fairy shrimp (*Eubranchipus spp.*), as well as valuable habitat for other plants and wildlife, including several rare, threatened, and endangered species. A vernal pool intentionally created for the purposes of compensatory mitigation is included in this definition.

As of September 1, 2007, "Significant Vernal Pools" are defined by MDEP as "Significant Wildlife Habitat." As read in MDEP's Chapter 335 -- Significant Wildlife Habitat Rules, "Whether a vernal pool is a significant vernal pool is determined by the number and type of pool-breeding amphibian egg masses in a pool, or the presence of fairy shrimp, or use by threatened or endangered species as specified in Section 9(B). Significant vernal pool habitat consists of a vernal pool depression and a portion of the critical terrestrial habitat within a 250 foot radius of the spring or fall high water mark of the depression. An activity that takes place in, on, over, or adjacent to a significant vernal pool habitat must meet the standards of this chapter."

Species and abundance criteria required for Significant Vernal Pools.

Species	Abundance Criteria
Fairy shrimp	Presence in any life stage.
Blue spotted salamanders	Presence of 10 or more egg masses.
Spotted salamanders	Presence of 20 or more egg masses.
Wood frogs	Presence of 40 or more egg masses.

MDEP habitat management standards for significant vernal pools: To the greatest extent practicable, the following management practices must be followed within significant vernal pool habitat.

(1) No disturbance within the vernal pool depression;

(2) Maintain a minimum of 75% of the critical terrestrial habitat as unfragmented forest with at least a partly-closed canopy of overstory trees to provide shade, deep litter and woody debris.

(3) Maintain or restore forest corridors connecting wetlands and significant vernal pools;

(4) Minimize forest floor disturbance; and

(5) Maintain native understory vegetation and downed woody debris.

If more than 25% of the critical terrestrial habitat has been previously developed, restoring a portion of that area through supplemental planting or regrowth of native forest species may be considered toward meeting these standards, or towards standards for avoidance, minimization, or compensation. For purposes of Chapter 355, developed area includes

disturbed areas excluding areas that are returned to a condition with the same drainage patterns and the same or improved cover type that existed prior to the disturbance;

Currently, Army Corps of Engineers (ACOE) regulate vernal pools but do not have specific characteristics that define a vernal pool, or a definition of which vernal pools require protection or buffering. They review each site on a case by case basis. ACOE's jurisdiction does not begin until the waters of the United States are impacted.

NATURAL RESOURCES PROTECTION ACT

Jones Associates, Inc. has many years of experience working with and interpreting Maine's environmental laws; however MDEP has several unwritten policies that may change without public notice, therefore, certain project specific questions may need review by MDEP staff.

The Natural Resources Protection Act (NRPA) became effective on August 4, 1988. The law is focused on "protected natural resources". A permit is required when an "activity" will be:

(1) Located in, on or over any protected natural resource, or

(2) Located adjacent to (A) a coastal wetland, great pond, river, stream or brook or significant wildlife habitat contained within a freshwater wetland, or (B) certain freshwater wetlands.

An "activity" is (A) dredging, bulldozing, removing or displacing soil, sand, vegetation or other materials; (B) draining or otherwise dewatering; (C) filling, including adding sand or other material to a sand dune; or (D) any construction, repair or alteration of any permanent structure.

The Maine Department of Environmental Protection (MDEP) does not have to be contacted for projects involving minor wetland impacts. Single, complete activities that impact less than 4,300 square feet of freshwater wetland and <u>do NOT occur within</u>: another type of protected natural resource; 25 feet of another protected natural resource and erosion controls are used; a municipal shoreland zone; a wetland normally containing at least 20,000 sq. ft. of open water, aquatic or emergent marsh vegetation; or a peatland are exempt under the Natural Resources Protection Act, 38 M.R.S.A. Section 480-Q(17).

NRPA - PERMIT BY RULE

A "permit by rule" or "PBR", when approved by MDEP, is an approval for an activity that requires a permit under the Natural Resources Protection Act (NRPA). Only those activities described in Chapter 305 may proceed under the PBR process. A PBR activity will not significantly affect the environment if carried out in accordance with this chapter, and generally has less of an impact on the environment than an activity requiring an individual permit. A PBR satisfies the NRPA permit requirement and Water Quality Certification requirement. The following projects may be eligible as PBR activities:

Section (2) Activity Adjacent to Protected Natural Resource

> (An activity adjacent to (any land area within 75 feet, measured horizontally, of the normal high water line), but not in: a coastal wetland, great pond, river, stream or brook or significant wildlife habitat contained within a freshwater wetland; or freshwater wetlands consisting of or containing: under normal circumstances, at least 20,000 square feet of aquatic vegetation, emergent marsh vegetation or open water, except for artificial ponds or impoundments; or peatlands dominated by shrubs, sedges and sphagnum moss.

Section (3) Placement of permanent intake pipes and water monitoring devices (including drilled wells)

Section (4) Replacement of Structures

Section (6) Movement of Rocks or Vegetation

Section (7) Placement of outfall pipes (including ditches and drain tiles)

Section (8) Shoreline stabilization using vegetation or riprap

Section (9) Construction of crossings (utility lines, pipes and cables)

Section (10) Construction of stream crossings (bridges, culverts and fords)

Section (11) State Transportation Facilities

Section (12) Restoration of natural areas (i.e., "undoing" human alteration)

Section (13) Fisheries & wildlife habitat creation or enhancement and water quality improvement projects

Section (15) Public Boat Ramps

Section (16) Selected activities in coastal sand dunes

Section (17) Transfers and Permit Extensions

Section (18) One-time renewals of maintenance dredging permits

Section (19) Activities in/on/over significant vernal pool habitat

Section (20) Activities located in/on/over high or moderate value inland waterfowl & wading bird habitat or shorebird nesting, feeding & roosting areas

NRPA - TIER REVIEW PROCESS

NRPA's Tier Review process constitutes a joint application to both the Maine Department of Environmental Protection (MDEP) and the U.S. Army Corps of Engineers (USACOE) for a proposed alteration to a freshwater wetland that qualifies for Tier 1, 2 or 3 review. The square footage of impact is based on the alteration or impact of the whole activity in the wetland. If any part of the overall activity requires a higher tier review, then the whole activity will be reviewed under that higher tier.

The Tier Review process is required for impacts larger than 4,300 square feet, and for requesting a permit for activities in, on, or over a protected natural resource. It is also used for activities adjacent to certain protected natural resources (38 MRSA 480-C(1)). The Tier Review process is required when the activity is not eligible for a PBR.

According to 38 M.R.S.A. Section 480-X(2), an application for a permit to undertake activities altering freshwater wetlands must be reviewed in accordance with the following:

(1) A Tier 1 review process applies to any activity that involves a freshwater wetland alteration up to 15,000 square feet and does not involve the alteration of freshwater wetlands listed in 38 M.R.S.A. Section 480-X(4);

(2) A Tier 2 review process applies to any activity that involves a freshwater wetland alteration of 15,000 square feet up to one acre and does not involve the alteration of freshwater wetlands listed in 38 M.R.S.A. Section 480-X (4 or 5);

(3) A Tier 3 review process applies to any activity that does involve a freshwater wetland alteration greater than one acre, or an alteration of a freshwater wetland listed in 38 M.R.S.A. Section 480-X (4 or 5).

According to 38 M.R.S.A. Section 480-X(4), the following activities are not eligible for Tier 1 or Tier 2 review unless MDEP determines that the activity will not negatively affect the freshwater wetlands and other protected natural resources present.

(1) Activities located within 250 feet of a coastal wetland;

(2) Activities located within 250 feet of the normal high-water line, and within the same watershed, of any lake or pond classified as GPA under section 465-A;

(3) Activities occurring in freshwater wetlands, other than artificial ponds or impoundments, containing under normal circumstances at least 20,000 square feet of aquatic vegetation, emergent marsh vegetation or open water;

(4) Activities occurring in freshwater wetlands that are inundated with floodwater during a 100-year flood event based on flood insurance maps produced by the Federal Emergency Management Agency or other site-specific information;

(5) Activities occurring in freshwater wetlands containing significant wildlife habitat that has been mapped, identified or defined, as required pursuant to section 480-B(10), at the time of the filing by the applicant;

(6) Activities occurring in peatlands dominated by shrubs, sedges and sphagnum moss, except that applications proposing work in previously mined peatlands may be considered by the department for Tier 1 or Tier 2 review, as applicable;

(7) Activities occurring within 25 feet of a river, stream or brook.

According to 38 M.R.S.A. Section 480-X(5), an activity in freshwater wetlands containing a natural community that is imperiled (S2) or critically imperiled (S1), as defined by the Natural Areas Program pursuant to Title 12, Section 544 is not eligible for Tier 2 review unless the department determines that the activity will not negatively affect the freshwater wetlands and other protected natural resources present.

NRPA General Requirements for both the Tier 1 and Tier 2 review process require that the proposed freshwater wetland alteration must be avoided, if feasible, after considering cost, logistics, technology and the overall purpose of the project. However, if unavoidable, the alteration must be limited to the minimum amount necessary to complete the project. The project must utilize both temporary and permanent erosion control measures to prevent sedimentation of any protected natural resource. In addition, the alteration site must maintain an undisturbed 25 foot buffer strip between the activity and any river, stream or brook and must not violate any state water quality law, including those governing the classification of the State's waters.

WETLAND DELINEATION CHECKLIST

Job #:	17-049LE		
Client:	Wright Pierce		
Site Address:	Bates College - 55 & 65 Campus Ave		

Wetland Scientist:	Jason Tome
Date of Office Review:	06/2017
Date(s) of Field Delineation:	06/2017

Wetlands of Special Significance

Yes	No	
	X	Does the on-site or immediately adjacent wetland contain a mapped and numbered DWA?
	X	Does the on-site or immediately adjacent wetland contain an Inland Waterfowl Wading Bird Habitat?
	X	Does the on-site or immediately adjacent wetland contain a potential significant vernal pool?
	X	Does the recent aerial photos of the on-site or immediately adjacent wetland show or are there any open water or emergent wetlands with areas greater than 20,000 sq. ft.?
	X	Does the on-site or immediately adjacent wetland contain a 100 year flood plain?
	X	Does the on-site or immediately adjacent wetland contain a S1 or S2 community?
	X	Does the on-site or immediately adjacent wetland contain a significant wildlife habitat?
	X	Is the on-site wetland within 250’ of a coastal wetland?
	X	Is the on-site wetland within 250’ of a great pond?
	X	Does the site contain peatlands?

Stormwater Qualifications

	X	Is the site in the watershed of a Great Pond or Impaired stream?
X		Is the site in a lake watershed?
	X	Is the site in a watershed most at risk?

Additional Comments:

FEMA flood zone FIRM:

Lewiston 23001C0327E, Effective July 7, 2013

Watershed:

HUC_08: 01040002 Lower Androscoggin
HUC_10: 0104000208 Lake Auburn- Androscoggin River
HUC_12: 010400021005 Stetson Brook- Androscoggin River

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Websites:

Maine Department of Environmental Protection: www.maine.gov/dep/land/nrpa/index.html

United States Fish and Wildlife Service, National Wetlands inventory: www.fws.gov/wetlands/

United States Army Corps of Engineers, New England District: www.nae.usace.army.mil/Missions/Regulatory.aspx

United States Natural Resources Conservation Service, United States Department of Agriculture, Official Soil Series Descriptions: soils.usda.gov/technical/classification/osd/index.html.

APPENDICES:

- **WETLAND DETERMINATION DATA FORMS**
- **NRCS CUSTOM SOIL RESOURCE REPORT**

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Bates College City/County: Lewiston/Androscoggin Sampling Date: 6/27/17

Applicant/Owner: Wright Pierce State: ME Sampling Point: ____

Investigator(s): JMT Section, Township, Range: ____

Landform (hillside, terrace, etc.): Concave Depression Local relief (concave, convex, none): Concave Slope (%): 30

Subregion (LRR or MLRA): LRR R, MLRA 144B Lat: 44° 6'12.88"N Long: 70°12'19.39"W Datum: ____

Soil Map Unit Name: Androscoggin Country NWI classification: None

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

Are Vegetation NO , Soil NO , or Hydrology NO significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation NO , Soil NO , or Hydrology NO 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 ____	If yes, optional Wetland Site ID: ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks: (Explain alternative procedures here or in a separate report.)
Drain pipes found on property

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)
- ____ 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)
- X 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)

- X Surface Soil Cracks (B6)
- X Drainage Patterns (B10)
- X 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** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
Previously wetland deliniated, I'm filling out the deliniation forms for the site.

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: _____

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	5	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	5	=Total Cover	

Sapling/Shrub Stratum (Plot size: 15')			
1. *Acer rubrum*	25	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	25	=Total Cover	

Herb Stratum (Plot size: 5')			
1. *Impatiens capensis*	70	Yes	FACW
2. *Carex viridula*	5	No	OBL
3. *Panicum virgatum*	5	No	FAC
4. *Juncus tenuis*	5	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85	=Total Cover	

Woody Vine Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	70	x 2 =	140
FAC species	40	x 3 =	120
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	115 (A)		265 (B)

Prevalence Index = B/A = 2.30

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - 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 or equal to 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** X **No** ___

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

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 3/2						Mucky Sand	Redox Concentrations

[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)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ 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)
- ___ Marl (F10) (**LRR K, L**)

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**)
- ___ 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** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Bates College City/County: Lewiston/Androscoggin Sampling Date: 6/27/17

Applicant/Owner: Wright Pierce State: ME Sampling Point: ____

Investigator(s): JMT Section, Township, Range: ____

Landform (hillside, terrace, etc.): Hillside Local relief (concave, convex, none): Convex Slope (%): 15

Subregion (LRR or MLRA): LRR R, MLRA 144B Lat: 44° 6'12.88"N Long: 70°12'19.39"W Datum: ____

Soil Map Unit Name: Androscoggin Country NWI classification: None

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

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

Are Vegetation NO , Soil NO , or Hydrology NO 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	If yes, optional Wetland Site ID: ____
Wetland Hydrology Present?	Yes ____	No X	

Remarks: (Explain alternative procedures here or in a separate report.)

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:
Previously wetland deliniated, I'm filling out the deliniation forms for the site.

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: _____

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Sapling/Shrub Stratum (Plot size: 15')			
1. *Acer rubrum*	5	Yes	FAC
2. *Rhus glabra*	2	Yes	UPL
3. *Cercis canadensis*	2	Yes	FACU
4.			
5.			
6.			
7.			
	9	=Total Cover	

Herb Stratum (Plot size: 5')			
1. *Taraxacum officinale*	2	No	FACU
2. *Leucanthemum vulgare*	2	No	UPL
3. *Solidago canadensis*	5	No	FACU
4. *Galium odoratum*	83	Yes	UPL
5. *Ranunculus acris*	2	No	FAC
6. *Impatiens capensis*	3	No	FACW
7. *Onoclea sensibilis*	1	No	FACW
8. *Arctium lappa*	2	No	UPL
9.			
10.			
11.			
12.			
	100	=Total Cover	

Woody Vine Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	4	x 2 =	8
FAC species	7	x 3 =	21
FACU species	9	x 4 =	36
UPL species	89	x 5 =	445
Column Totals:	109 (A)		510 (B)

Prevalence Index = B/A = 4.68

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - 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 or equal to 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** X

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

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/3						Sandy	
10-20	10YR 4/4						Sandy	

[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)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ 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)
- ___ Marl (F10) (**LRR K, L**)

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**)
- ___ 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** X

Remarks:

United States Department of Agriculture

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Androscoggin and Sagadahoc Counties, Maine

Bates College

June 27, 2017

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

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 17, Sep 15, 2016

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

Date(s) aerial images were photographed: Jun 20, 2010—Aug 29, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Androscoggin and Sagadahoc Counties, Maine (ME606)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Md	Made land, loamy materials	1.5	100.0%
Totals for Area of Interest		**1.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Androscoggin and Sagadahoc Counties, Maine

Md—Made land, loamy materials

Map Unit Composition

Made land: 91 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Made Land

Typical profile

H1 - 0 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 35 percent

Natural drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 20.00 in/hr)

Depth to water table: About 24 to 72 inches

Available water storage in profile: Moderate (about 6.6 inches)

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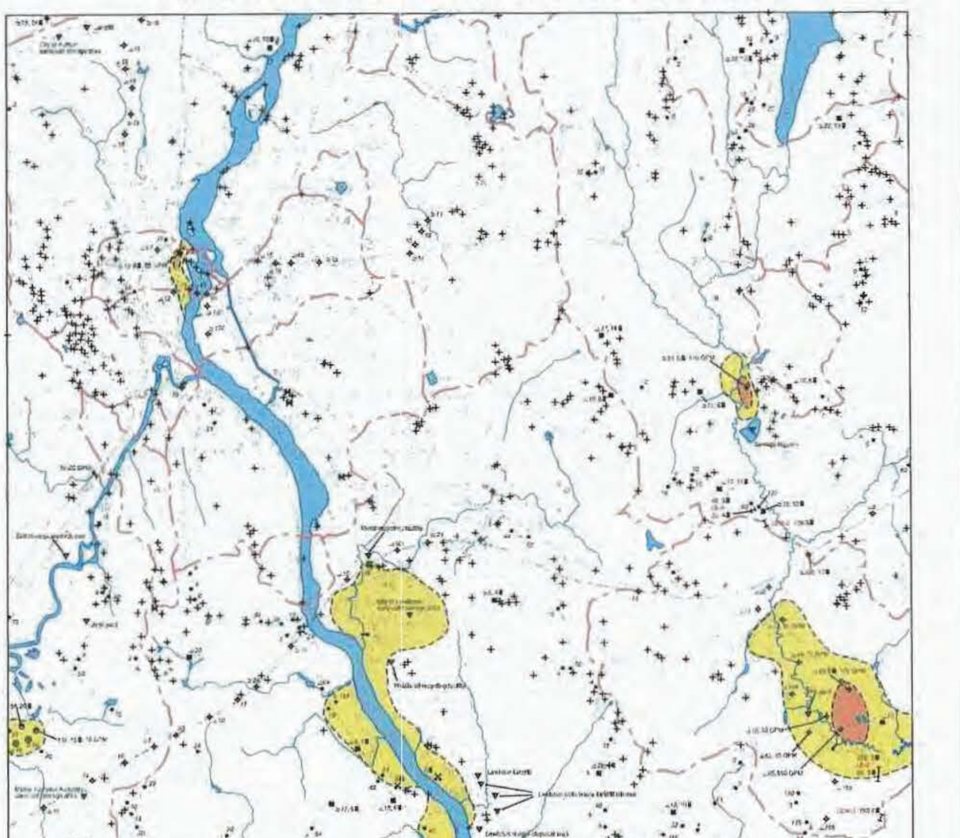
United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Significant Sand and Gravel Aquifers



Aquifer boundaries modified from: Williams, J. S., and Lanctot, E. M. (compilers), 1985, Hydrogeologic data for significant sand and gravel aquifers in parts of Androscoggin, Cumberland, and Sagadahoc Counties, Maine: Maine Geological Survey, Open-File Map 85-82c, scale 1:50,000.

Well inventory data from U.S. Geological Survey Data Reports and additional data collected by Maine Geological Survey field assistants during the 1982 field season.

Drainage basin boundaries compiled by U.S. Geological Survey, Water Resources Division, Augusta, Maine, with funding from the Maine Low-Level Radioactive Waste Authority.

SCALE 1:24,000

CONTOUR INTERVAL 10 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Lewiston quadrangle, scale 1:24,000, using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local government names on this map is for location purposes only and does not impute responsibility for any present or potential effects on the natural resources.

Lewiston Quadrangle, Maine

Compiled by
Craig D. Neil

Preliminary aquifer boundaries mapped by:
Daniel B. Locke

Digital cartography by:
Michael E. Foley

Robert G. Marvinney
State Geologist

Cartographic design and editing by:
Robert D. Tucker
Bennett J. Wilson, Jr.

Funding for the preparation of this map was provided in part by the Maine Department of Environmental Protection.

Maine Geological Survey
Address: 22 State House Station, Augusta, Maine 04333
Telephone: 207-287-2801 **E-mail:** mgs@maine.gov
Home page: http://www.state.me.us/doc/nrimc/nrimc.htm

Open-File No. 99-22
1999

WHAT IS AN AQUIFER?

Ground water, as the name implies, is water found below the land surface in the pore spaces between sand grains and in fractures in the bedrock (see diagram below). An *aquifer* is a water-bearing geologic formation capable of yielding a usable amount of ground water to a well. In Maine there are two types of aquifers: loose soil materials (such as sand, gravel, and other sediments) and fractured bedrock. A sand and gravel deposit is considered a *significant aquifer* when a well in that deposit is capable of being continuously pumped at a rate of 10 gallons per minute (gpm) or more. To sustain a yield of 10 gpm or more, a deposit must be permeable enough for water to flow readily into the well as it is pumped (see section on *porosity* and *permeability* below), and there must be a sufficient depth of water in the well so that it will not be pumped dry.

The diagram below shows a schematic cross section of a sand and gravel aquifer in Maine. The symbols above the diagram correspond to the well symbols shown on the map at left. Information typically shown for these wells includes type of well, depth to bedrock, depth to water, and well yield. The blue line in the diagram is the *water table*. The area below the water table is called the *saturated zone*, where all pore spaces between the sediment particles are filled with water. In order to yield water, a well must extend below the water table into the saturated zone. Notice that the water table corresponds to the water level in most wells and to the streams.

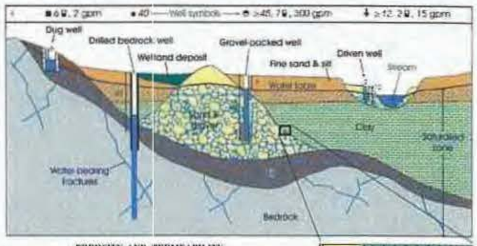
Several types of wells, common in Maine, are shown in the diagram. A *dug well* is a large diameter hole excavated by hand or backhoe. The hole is kept from caving in by installing a lining that may be stone, tile, or cement blocks. The hole must be deep enough to extend below the water table. The shallow dug well in the diagram has a yield of 2 gpm. Although the yield is often low, dug wells generally supply enough ground water for a household because of the large amount of water stored in the well.

A *gravel-packed well* is usually installed into coarse-grained sediment and is drilled with a much larger diameter than the final casing and screen diameter. To increase the yield and pumping efficiency of the well, the space around the well screen is filled with selected gravel that increases the permeability in the immediate vicinity of the well. The gravel-packed well in the diagram has a high yield of 300 gpm. Such high-yielding gravel-packed wells are commonly drilled for municipal or industrial water systems.

A *driven well* or *well point* can be installed into sand and gravel where the water table is within about 20 feet of the ground surface. A 2 to 3 inch diameter pipe, equipped with a well screen at its lower end, is driven into the deposit until the screen is below the water table. This pipe acts as a casing, and water is pumped directly from the aquifer. The driven well in the diagram has a significant yield of 15 gpm. Although the yield is relatively high, driven wells generally only supply a single household because very little water is stored in the well casing.

Wells of any type constructed in the other sediments shown in the diagram (clay or fine sand and silt) would yield some water, but yields would be lower than for wells in coarse-grained sand and gravel deposits.

Another type of well common in Maine is the *drilled bedrock well*. This well is drilled into the underlying rock with steel casing to isolate the well from potential surface-water contaminants. In this type of well, water is found when the well hole intersects water-bearing fractures in the bedrock. Notice how the water level in this well is not the same level as the water table. The well casing isolates the bedrock well from the overlying sediments. The water level is controlled by water pressure in the fractures in the bedrock and is not related to the water table in the overlying materials.

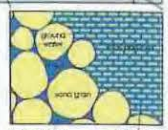


POROSITY AND PERMEABILITY

The diagram at right is an enlarged view of a section of the diagram above. Note that the section shown is below the water table and that ground water completely fills the pore spaces between the sediment grains. In an aquifer, the more pore space there is, the more water the aquifer can hold. This is called the *porosity* of a deposit. *Permeability* refers to the ability of a surficial deposit to transmit water. Permeability depends on the size of the spaces between the sediment grains.

Permeability is related to porosity, but is not the same. Porosity determines the capacity of the material to hold water. Permeability determines its ability to yield water. For example, clay is made of tiny particles with a large amount of pore space between them. However, the pore spaces are so small that they create a resistance to flow which reduces ground water permeability. Sand and gravel may not be as porous as clay, but the pore spaces are larger and better connected and the materials are much more permeable.

Permeability is an important characteristic since it determines whether ground water can actually be drawn into a pumping well.



moderate porosity high permeability   *high porosity low permeability*

HOW ARE AQUIFERS MAPPED?

Operating a twelve-channel seismograph, Piscataquis County, Maine.

When mapping sand and gravel aquifers, geologists visit gravel pits, stream banks, road cuts, and other surface exposures to describe materials and identify deposits. This surficial geology mapping is supplemented with seismic-refraction studies and the installation of observation wells and test borings. In addition, much information about an aquifer may already be available from water-company explorations, large construction projects, town well inventories, and other sources. This information, along with aerial photography and previously published maps, allows the geologist to define the boundaries of favorable surficial deposits and estimate how well the deposits will yield water to a well.

The boundaries of favorable surficial deposits do not necessarily coincide with the aquifer boundaries. In some areas, a thin cover of favorable coarse-grained material may overlie fine-grained sediments, till, or bedrock. A well in that material would not be able to sustain a yield of 10 gpm, so the area would not be mapped as an aquifer. In other areas, fine-grained sediments or till may overlie favorable coarse-grained sediments and the subsurface deposit may not be recognized as an aquifer.

Single- and 12-channel seismic-refraction studies are conducted to determine the saturated thickness of a deposit by establishing the depth to water table and bedrock surface. The 12-channel seismic survey has the additional advantage of providing the topography of the buried bedrock surface.

Installing monitoring wells and drilling test borings provide direct information about the aquifer characteristics of a deposit. This work provides information on the depth to water table and bedrock surface, water quality, and how easily the sediment transmits water.

GROUND-WATER FLOW AND CONTAMINATION

Ground water is replenished or *recharged* by rainwater and melting snow that soak into the soil. This water percolates downward and eventually reaches the water table. When recharge is high during spring snowmelt and fall rains, the amount of ground water increases and the water table rises. When recharge is low during the late summer or when the ground is frozen during the winter, the water table becomes lower.

Notice in the diagram below that ground water is not static; it flows. This concept is very important, especially when ground water becomes contaminated. Once in the ground-water system, contaminants usually travel along the paths followed by ground water and are sometimes able to migrate considerable distances over time.

In the diagram below, a plume of contamination originates at the source in the sand and gravel deposit. This source could be a landfill, a leaking fuel storage tank, or an accidental spill. As the contaminant seeps into the subsurface system and enters the aquifer, it flows with the ground water. In the diagram, the plume contaminated the gravel-packed well as it passed by. The driven well near the stream is not contaminated, but is at risk since the plume is flowing in that direction. The dug well on the hillside, however, is not affected because it is upgradient of the source; hence the contaminated ground water flows away from this well.

Once ground water is contaminated, it is very difficult and expensive to correct. To design a clean-up plan, monitoring wells are installed under the direction of a hydrogeologist or other specialist. These wells define the three-dimensional extent of the affected area. Sometimes it is possible to pump contaminants to the surface using remediation wells within the plume. Often the only solution for a homeowner is to install filtering devices or to abandon the well and find an alternative water supply.

Installing a monitoring well, Washington County, Maine.

SIGNIFICANT SAND AND GRAVEL AQUIFERS
(yields greater than 10 gallons per minute)

Approximate boundary of surficial deposits with significant saturated thickness where potential ground-water yield is moderate to excellent.

Surficial deposits with good to excellent potential ground-water yield; yields generally greater than 50 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yield zones are based on subsurface data where available, and may vary from mapped extent in areas where data are unavailable.

Surficial deposits with moderate to good potential ground-water yield; yields generally greater than 10 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yields may exceed 50 gallons per minute in deposits hydraulically connected with surface-water bodies, or in extensive deposits where subsurface data are available.

SURFICIAL DEPOSITS WITH LESS FAVORABLE AQUIFER CHARACTERISTICS
(yields less than 10 gallons per minute)

Areas with moderate to low or no potential ground-water yield (includes areas underlain by till, marine deposits, eolian deposits, alluvium, swamps, thin glacial sand and gravel deposits, or bedrock); yields to surficial deposits generally less than 10 gallons per minute to a properly constructed well.

SEISMIC-LINE INFORMATION

Profiles for 12-channel seismic lines are shown in Figure 8 of Open-File Report 85-82a (Tepper and others, 1985), or may be viewed at the Maine Geological Survey. Lengths of 12-channel seismic lines are shown on the map at true scale. All single-channel lines ranged from 80 to 300 feet long and are not shown to scale.

52 — Depth to bedrock, in feet below land surface

>83 — Depth to bedrock exceeds depth shown (based on calculations)

12 — Depth to water level, in feet below land surface

MAP-1 121, 23 — For 12-channel seismic line, with depth to bedrock and depth to water shown at the midpoint of the line, in feet below land surface.

52, 12 / MAP-5 / 72, 12 — Single-channel seismic line, with depth to bedrock and depth to water shown at each end of the line, in feet below land surface. Unless otherwise indicated, data shown above the line identifier refer to the northern end of the seismic line.

The 3-letter identifier for a line is an abbreviation for the topographic quadrangle. If the 3-letter identifier for the line is followed by a number (ex: MAP-7, MAP-8) the line is a 12-channel line. If the identifier is followed by a letter (ex: MAP-E, MAP-F), the line is a single-channel line. Single-channel seismic interpretations by D. H. Tepper. Twelve-channel seismic interpretations by D. H. Tepper and C. D. Neil.

GEOLOGIC AND WELL INFORMATION

80 — Depth to bedrock, in feet below land surface

≥72 — Penetration depth of boring; ≥ symbol refers to minimum depth to bedrock based on boring depth or refusal

5▼ — Depth to water level in feet below land surface (observed in well, spring, test boring, pit, or seismic line)

X — Gravel pit or exhausted thickness noted in feet, e.g. 5-12'

X — Quarry

4 GPM — Yield (flow) of well or spring in gallons per minute (GPM)

Spring, with general direction of flow

Drilled overburden well

Dug well

Observation well (project well if labeled; nonproject well if unlabeled)

Test boring (project boring if labeled; nonproject boring if unlabeled)

Driven point

Test pit

Drilled bedrock well

▽ — Potential point source of ground-water contamination

\+ — Bedrock outcrop

Surface-water drainage-basin boundary; surface-water divides generally correspond to ground-water divides. Horizontal direction of ground-water flow generally is away from divides and toward surface-water bodies.

HOW TO USE THIS MAP

Types of Information Shown on this Map: The yellow and red colored areas on the map indicate significant aquifers, areas where ground-water yield is estimated to be 10 gpm or greater. The boundaries of the aquifers are drawn by a geologist based, in part, on the well data shown on the map. Areas not mapped as aquifer may be thin or unsaturated sand and gravel deposits, surficial deposits other than sand and gravel, or bedrock.

The well data on the map provide information about the type of well, depth to water table, depth to bedrock, and yield of the wells in the area. This information is useful when making decisions about water supply, a drainage plan, or the need for blasting.

Information from seismic refraction studies also is shown on the map. Seismic studies give detailed information about depth to water table and depth to and shape of the bedrock surface. Geologic cross sections generated from seismic information are shown in associated reports listed in the references below the map at left.

Surface-water drainage-basin boundaries are also shown on the map. Horizontal direction of ground-water flow generally is away from drainage divides and toward surface-water bodies.

Uses of this Map: Sand and gravel aquifer maps are useful in two major categories of decision-making: ground-water supply and ground-water protection. For ground-water supply, these maps are useful in locating areas favorable for developing water supplies for municipal, industrial, or residential use. Information on the map, such as depth to bedrock and well yield, indicate the potential for ground-water production.

Ground-water protection is another important function of these maps. Knowledge of the location and extent of sand and gravel aquifers is critical when siting potential contamination sites such as landfills and salt storage facilities. When used in conjunction with other geologic information, this map can help planners and municipal officials make much more informed decisions to guide industrial growth or residential development.

If ground-water contamination occurs, the general trend of the plume migration can be deduced from these maps by analyzing the drainage basin boundaries and the local surface water bodies.

For further assistance in interpreting this map, contact a geologist at the Maine Geological Survey.

OTHER SOURCES OF INFORMATION

1. Tepper, D. H., Williams, J. S., Tolman, A. L., and Prescott, G. C., Jr., 1985, Hydrogeology and water quality of significant sand and gravel aquifers in parts of Androscoggin, Cumberland, Franklin, Kennebec, Lincoln, Oxford, Sagadahoc, and Somerset Counties, Maine: Maine Geological Survey, Open-File Report 85-82a, 104 p.

2. Locke, D. B., 1999, Surficial materials of the Lewiston quadrangle, Maine: Maine Geological Survey, Open-File Map 99-60.

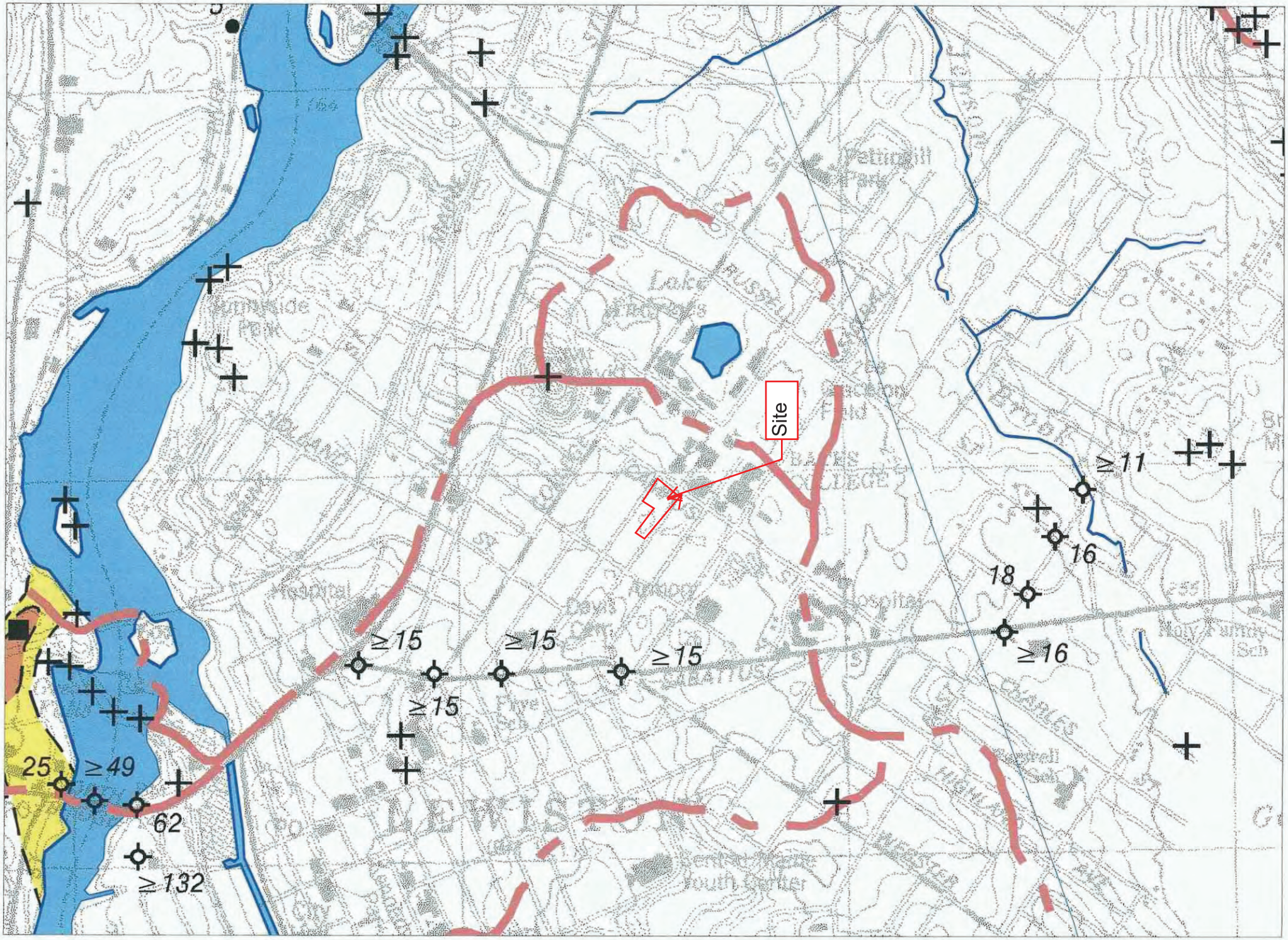
3. Smith, G. W., and Thompson, W. B., 1980, Reconnaissance surficial geology of the Lewiston 15' quadrangle, Maine: Maine Geological Survey, Open-File Map 80-21.

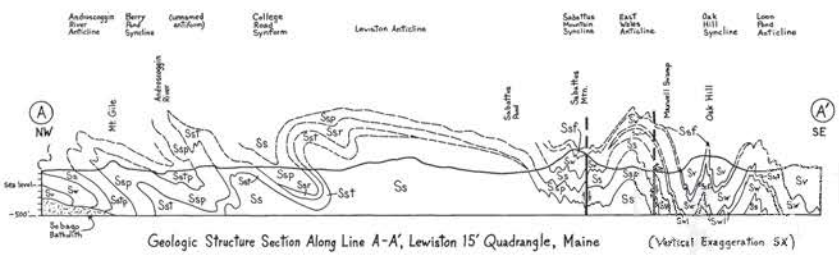
4. Caswell, W. B., 1987, Ground water handbook for the state of Maine, Second Edition: Maine Geological Survey, Bulletin 39, 135 p.

5. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print).

6. Kendall, D. L., 1987, Glaciers and granite: A guide to Maine's landscape and geology: Down East Books, Camden, Maine, 240 p.

7. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.


Site
≥11
16
18
≥16
≥15
≥15
≥15
≥15
25
≥49
62
≥132



Geologic Structure Section Along Line A-A', Lewiston 15' Quadrangle, Maine (Vertical Exaggeration 5X)

EXPLANATION

INTRUSIVE ROCKS

Td

Basalt and diabase dikes.

Dg

Fine to medium-grained light gray two-mica granite, locally weakly foliated; pegmatite stringers common.

Dgd

Fine-grained strongly foliated medium gray granodiorite.

STRATIFIED ROCKS

Sv

VASSALBORO FORMATION

Thin to medium-bedded, occasionally massive, medium gray quartz-plagioclase-biotite(-hornblende) granofels and medium gray calc-silicate granofels.

Ssf

SMALLS FALLS(?) FORMATION

Rusty-weathering sillimanite schist and quartz-plagioclase-biotite granofels.

Sw
Swl

WATERVILLE FORMATION

Sw: Thin-bedded quartz-biotite-muscovite-sillimanite schist, quartz-plagioclase-biotite granofels, and sporadically, calc-silicate granofels.
Swl: Thin ribbony-bedded metalimestone and purplish brown quartz-biotite-calcite granofels.

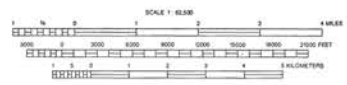
Ss Ssl
Sstp Ssr
Ssp
Sst Ssf Ssl
Ss

SANGERVILLE FORMATION

Ss: Migmatized thin to medium-interbedded biotite-muscovite sillimanite-garnet schist and quartz-plagioclase-biotite granofels.
Sstp: Taylor Pond Member: Dark gray quartz-plagioclase-biotite-hornblende granofels, quartz-plagioclase-biotite granofels, salt and pepper-textured amphibolite, and thinly-bedded calc-silicate granofels.
Ssr: Rusty-weathering sulfidic muscovite-biotite-sillimanite schist and very garnet-rich biotite schist.
Ssp: Patch Mountain Member: Thin-bedded calc-silicate granofels, quartz-plagioclase-biotite granofels, and marble.
Ssl: Thin metalimestone and calc-silicate lenses; lithically like Ssp.
Sst: Migmatized medium to dark gray biotite(-sillimanite)-garnet gneiss, in places with thin interbeds of calc-silicate gneiss.

SYMBOLS

- Dip and strike of bedding
- Strike of vertical bedding
- Dip and strike of bedding; tops known; tops in direction of ball
- Strike of vertical beds; tops in direction of ball
- Strike and dip of overturned bedding
- Strike and dip of schistosity and gneissic foliation in metasediments
- Strike of vertical schistosity and gneissic foliation in metasediments
- Strike and dip of foliation in granitic rocks
- Strike of vertical foliation in granitic rocks
- Plunge of mineral lineation (combined with a bedding or foliation symbol)
- Contact: accurately located
- Contact: approximate or inferred
- Inferred high-angle fault
- Diabase dike (dots parallel to strike)
- Quarry
  - peg: pegmatite
  - r: rock
  - gr: granite



Preparation of this map was supported by funds furnished by the Nuclear Regulatory Commission Grant No. NRC-04-76-291 and the Maine Geological Survey.

Quadrangle Location

BEDROCK GEOLOGY OF THE LEWISTON QUADRANGLE, MAINE

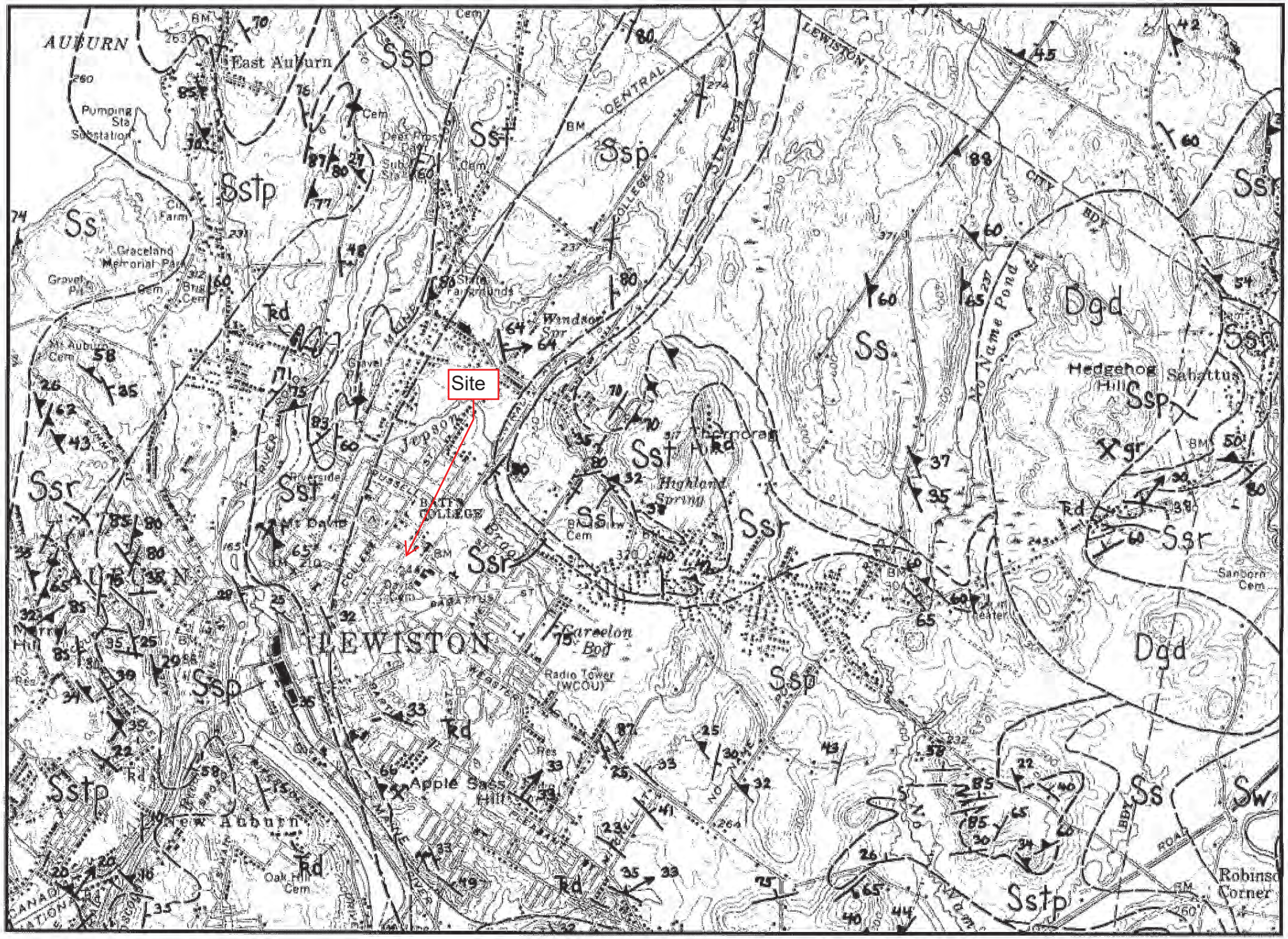
BY
ARTHUR M. HUSSEY II

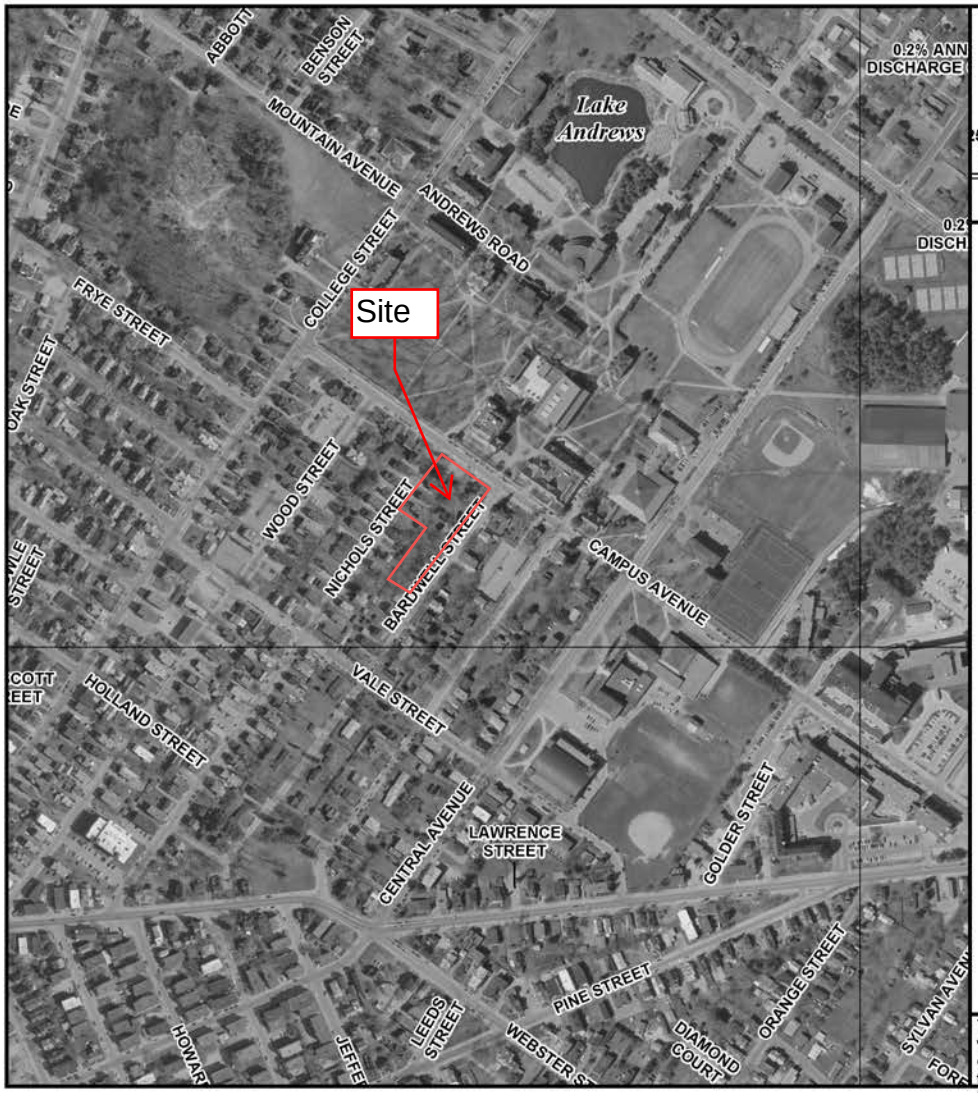
1983

Maine Geological Survey
DEPARTMENT OF CONSERVATION
Augusta, Maine 04333

Walter A. Anderson, State Geologist

OPEN FILE NO. 83-4


Site
AUBURN
East Auburn
LEWISTON
New Auburn
Graceland Memorial Park
Hedgehog Hill
Highland Spring
Apple Sass Hill
Radio Tower (WCOU)
Robinson Corner
Ssp
Sst
Ss
Sstp
Ssr
Dgd
Rd
Sw



MAP SCALE 1" = 500'

250 0 500 1000 FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0327E

FIRM

FLOOD INSURANCE RATE MAP

ANDROSCOGGIN COUNTY, MAINE (ALL JURISDICTIONS)

PANEL 327 OF 470

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
AUBURN, CITY OF	230001	0327	E
LEWISTON, CITY OF	230004	0327	E

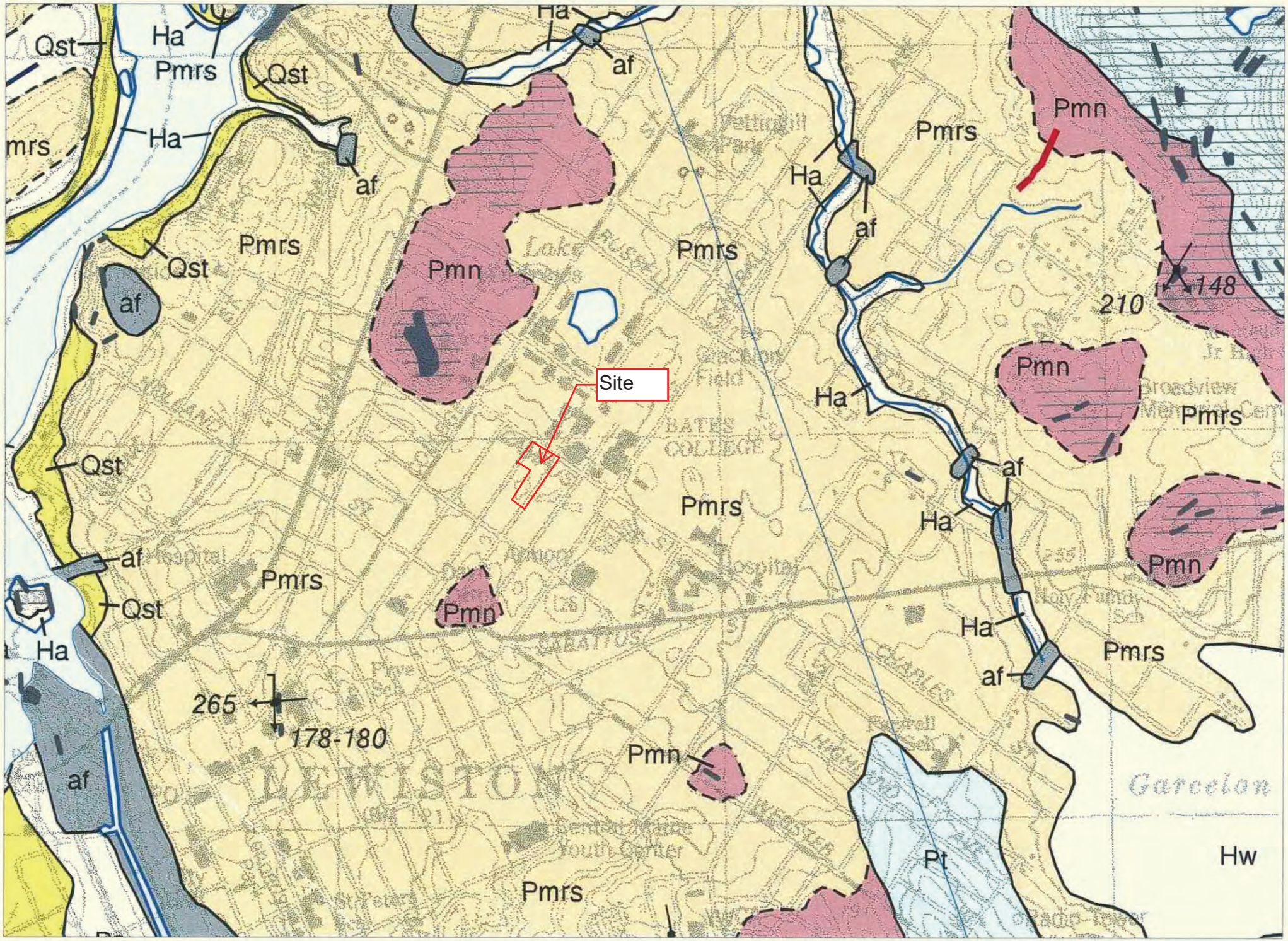
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
23001C0327E

EFFECTIVE DATE
JULY 8, 2013

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov


Qst
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af
148
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Pmn
Site
Ha
Pmrs
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Pmrs
Ha
Pmn
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Qst
Pmrs
Pmn
Ha
Pmrs
af
265
178-180
Pmn
af
Pmrs
Pt
Hw

ATTACHMENT 8

Right, Title or Interest

SECTION 8

Right Title or Interest

8.0 Title, Right or Interest

The project site is generally bounded by Campus Avenue on the north, Bardwell Street on the east and Nichols Street on the west and is comprised of property conveyed to The President and Trustees of Bates College (Bates College) by several deeds. The following Table 2.1 lists the parcels comprising the project site arranged by City of Lewiston tax map and lot number with the corresponding street addresses and book and page references to the deeds recorded at the Androscoggin County Registry of Deeds:

TABLE 8.1

Grantee: THE PRESIDENT AND TRUSTEES OF BATES COLLEGE

Tax Map/Lot Number	Address	Deed References - Book/Page
194/169	145 Nichols Street	4040/282
194/170	141 Nichols Street	2141/233
194/167	45 Campus Avenue	1681/202
194/168	151 Nichols Street	903/58
194/166	104 Bardwell Street	3497/29
195/165	96 Bardwell Street	2859/238

(Tax Map/Lot Numbers are City of Lewiston Tax Maps/Lot Numbers)
(Deed References are Book and Page, Androscoggin County Registry of Deeds)

Attached hereto are copies of the deeds referenced above.

145 Nichols

WARRANTY DEED

ROBERT J. THOMAS and **CAROL F. THOMAS**, husband and wife, both of Lewiston, County of Androscoggin, and State of Maine, for consideration paid, grant to **THE PRESIDENT AND TRUSTEES OF BATES COLLEGE**, a nonprofit corporation, with a place of business in Lewiston, County of Androscoggin, State of Maine with **WARRANTY COVENANTS**, a certain lot or parcel of land, with any buildings thereon, situated in **LEWISTON**, County of **ANDROSCOGGIN**, and State of **MAINE**, bounded and described as follows:

> Beginning at a stone bound on the southeasterly side of Nichols Street at the westerly corner of land formerly owned by Mrs. Carrie Pinkham; thence southeasterly on the Pinkham lot line One Hundred Feet (100') to land formerly of Franklin Company; thence southwesterly on the line of the former Franklin Company land Fifty Feet (50'); thence northwesterly and parallel with the southwesterly line of the Pinkham lot One Hundred Feet (100') to said Nichols Street; thence northeasterly on the southeasterly side of Nichols Street Fifty Feet (50') to the point of beginning.
>
> Being the same premises described in the Warranty Deed from Robert J. Thomas to Robert J. Thomas and Carol F. Thomas dated June 18, 1992 and recorded in the Androscoggin County Registry of Deeds in Book 2866, Page 261.

IN WITNESS WHEREOF, the Grantors have set their hands and seals on this 10th day of August, 1998.

Witness	Robert J. Thomas Robert J. Thomas
Witness	Carol F. Thomas Carol F. Thomas

STATE OF MAINE
ANDROSCOGGIN, SS.

DATE: August 10, 1998

Then personally appeared the above-named **Robert J. Thomas and Carol F. Thomas** and acknowledged the foregoing instrument to be their free act and deed.

Before me,

Notary Public/Attorney at Law
Print Name: Barton M. Kelsey
My Commission Expires: 8/28/02

175885 WARRANTY DEED

141 Nichols

BK2141 PG233

Know all Men by these Presents,

That DAVID A. WAGABAZA, being single,
of Lewiston, County of Androscoggin, Maine,
in consideration of One Dollar and other valuable consideration
paid by the President and Trustees of Bates College, a Maine corporation located at Lewiston, Androscoggin County, Maine,
whose mailing address is Lane Hall, Bates College,

Lewiston, County of Androscoggin, Maine,
the receipt whereof is hereby acknowledged, do hereby **give, grant, bargain, sell and convey** unto the said
President and Trustees of Bates College, its successors
and assigns forever, a certain lot or parcel of land situated on the southeasterly line of Nichols Street bounded and described as follows:

MAINE REAL ESTATE TRANSFER TAX PAID

Commencing at a point on the southeasterly line of Nichols Street, which point is the most westerly corner of land conveyed by Ammi R. Nash to Danville L. McIntire by deed dated April 22, 1878; thence in a southeasterly direction 100 feet by land so conveyed to McIntire to a point in the line of land now or formerly of the Franklin Company; thence in a southwesterly direction 50 feet by land now or formerly of Franklin Company to a point; thence in a northwesterly direction 100 feet to the line of Nichols Street; thence in a northeasterly direction by the southeasterly line of Nichols Street 50 feet to the point of beginning.

Being all the same premises conveyed to this Grantor by People's Savings Bank by deed dated November 24, 1982 and recorded in the Androscoggin County Registry of Deeds in Book 1610, Page 308.

To have and to hold the aforegranted and bargained premises with all the privileges and appurtenances thereof to the said President and Trustees of Bates College, its successors and assigns, to its and their use and behoof forever.

And I do **covenant** with the said Grantee, its successors and assigns, that I am lawfully seized in fee of the premises, that they are free of all encumbrances that I have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that I and my heirs shall and will **warrant and defend** the same to the said Grantee, its successors and assigns forever, against the lawful claims and demands of all persons.

And ~~xxxxxx of said Grantor xxxxxxxxxxxxxxxxxxxx~~ ~~xxxxxx releases all rights to the premises being conveyed.~~

In Witness Whereof, I the said David A. Wagabaza have hereunto set my hand(s) and seal(s) this 18th day of August, 1987.

Signed, Sealed and Delivered in presence of

Jacqueline Grenier

David A. Wagabaza 8/18/87

DAVID A. WAGABAZA

State of Maine, County of Androscoggin, ss. August 18, 1987.

Then personally appeared the above named David A. Wagabaza and acknowledged the foregoing instrument to be his free act and deed.

SEAL

Before me,

Jacqueline Grenier
~~Attorney at Law~~ Notary Public

JACQUELINE GRENIER
Printed Name

ANDROSCOGGIN SS
RECEIVED AUG 26 1987
AT 9 H. 50 M. A. M.

45 Campus

BOOK 1681 PAGE 0202 MAINE SHORT FORM WARRANTY DEED 14355

We, ROBERT E. DILLINGHAM and ALICE C. DILLINGHAM, being husband and wife, of Lewiston in the County of Androscoggin and State of Maine, for consideration paid, grant to the PRESIDENT AND TRUSTEES OF BATES COLLEGE, a Maine corporation located in said Lewiston, with WARRANTY COVENANTS, a certain lot or parcel of land with the buildings thereon situated in said Lewiston, bounded and described as follows:

> BEGINNING at the intersection of the southwesterly line of Campus Avenue with the northwesterly line of Bardwell Street and thence the line runs in a southwesterly direction along said line of Bardwell Street a distance of one hundred seventy-seven (177) feet to a point; thence the line runs in a northwesterly direction a distance of one hundred one (101) feet to a point; thence the line runs in a northeasterly direction a distance of one hundred seventy-seven (177) feet to said line of Campus Avenue; thence the line runs in a southeasterly direction along said line of Campus Avenue a distance of one hundred one (101) feet to the point of beginning.
>
> The above premises are conveyed subject to the restriction that no building shall be erected thereon nearer the line of Campus Avenue than twelve (12) feet nor nearer the line of Bardwell Street than ten (10) feet.
>
> For the source of title of thesegrantors, see deed from the Trustees of the will of Louis B. Costello dated October 19, 1959, recorded in the Androscoggin County Registry of Deeds in Book 815, Page 450.

ALSO hereby conveying all rights, easements, privileges, and appurtenances belonging to the premises hereinabove described.

ROBERT E. DILLINGHAM and ALICE C. DILLINGHAM both join as grantors and release all rights by descent and all other rights.

WITNESS our hands and seals this 28th day of September, 1983.

Jacqueline Grenier
Witness
to both

Robert E. Dillingham
Robert E. Dillingham

Alice C. Dillingham
Alice C. Dillingham

STATE OF MAINE
ANDROSCOGGIN, SS.

Personally appeared the above named ROBERT E. DILLINGHAM, known to me, this 28th day of September, 1983, and acknowledged before me the foregoing instrument to be his free act and deed.

Jacqueline Grenier
Notary Public/Attorney-at-Law
JACQUELINE GRENIER

ANDROSCOGGIN SS.
RECEIVED OCT 31 1983
AT 4 H. 30 M. P. M.

SEAL

151 Nichols

BOOK 903 PAGE 58 (101)

Know all Men by these Presents,

THAT I, FLORENCE A. PINKHAM, of Sparta, County of Sussex , State of New Jersey

in consideration of One Dollar and other valuable consideration
paid by THE PRESIDENT AND TRUSTEES OF BATES COLLEGE, a Maine corporation located at Lewiston, County of Androscoggin, State of Maine

the receipt whereof I do hereby acknowledge, do hereby REMISE, RELEASE, BARGAIN, SELL AND CONVEY, and forever QUIT-CLAIM unto the said

successors THE PRESIDENT AND TRUSTEES OF BATES COLLEGE, its
~~heirs~~ and assigns forever,

A certain parcel or tract of land, with the buildings thereon, situated in LEWISTON, in the County of Androscoggin and State of Maine, bounded and described as follows, to-wit:

Commencing on the southerly side of Campus Avenue (formerly Skinner Street) on the line between land now or formerly of the Franklin Company and land now or formerly of Annie R. Nash; thence running south forty-nine degrees (49°) west on the line between said Franklin Company and said Nash one hundred (100) feet; thence turning and running northerly parallel with said Campus Avenue one hundred (100) feet to Nichols Street; thence turning and running northerly on the line of said Nichols Street one hundred (100) feet to Campus Avenue; thence turning and running south forty-one degrees forty-five minutes (41° 45') east on the line of said Campus Avenue one hundred (100) feet to the point of beginning.

Being part of the premises described in Quit-Claim Deed from Carrie R. Pinkham to this Grantor, dated July 6, 1939, recorded in Androscoggin County Registry of Deeds, Book 501, Page 92.

TO HAVE AND TO HOLD the same, together with all the privileges and appurtenances thereunto belonging, to the said

THE PRESIDENT AND TRUSTEES OF BATES COLLEGE, its

successors ~~heirs~~ and assigns forever.

AND I do COVENANT with the said Grantee, its successors ~~heirs~~ and assigns, that I will WARRANT and FOREVER DEFEND the premises to the said Grantee, its successors ~~heirs~~ and assigns forever, against the lawful claims and demands of all persons claiming by, through or under me.

IN WITNESS WHEREOF, I, the said FLORENCE A. PINKHAM, unmarried,

~~joining in this deed as Grantor, and relinquishing and conveying~~ right by descent and all other ~~rights in the above described premises~~, have hereunto set my hand and seal this 23rd day of September in the year of our Lord one thousand nine hundred and sixty-three.

SIGNED, SEALED AND DELIVERED IN PRESENCE OF

Florence A. Pinkham

STATE OF ~~MAINE~~ NEW JERSEY, ss. September 23, 1963. Personally appeared the above named FLORENCE A. PINKHAM and acknowledged the foregoing instrument to be her free act and deed.

Before me,

Harold H. Luckman

Justice of the Peace Notary Public

NOTARY PUBLIC
My Commission Expires January 18, 1965

STATE OF MAINE, ANDROSCOGGIN ss. REGISTRY OF DEEDS

Received OCT -7 1963 at 9 H. 45 M. A M., and recorded from the original in Book 903, Page 58

ATTEST ..... REGISTER

104 Bardwell

19019

BK3497 PG029

DEED OF SALE BY PERSONAL REPRESENTATIVE
(TESTATE)

KNOW ALL MEN BY THESE PRESENTS

THAT, **MARY CHAREST**, of Freeport, Cumberland County, Maine, duly appointed and acting personal representative of the Estate of Jeanette S. Brennan, a/k/a Jeannette M. Brennan, deceased (testate), as shown by the probate records of Androscoggin County, Maine, Docket No. 95-286, and having given notice to each person succeeding to an interest in the real property described below at least ten (10) days prior to the sale, by the power conferred by the Probate Code, and every other power, FOR CONSIDERATION PAID, hereby grants to **THE PRESIDENT AND TRUSTEES OF BATES COLLEGE**, a Maine corporation with a principal place of business in Lewiston, Androscoggin County, Maine, a certain lot or parcel of land with any buildings thereon, situated on Bardwell Street in Lewiston, Androscoggin County, Maine, being more particularly described on the attached Exhibit A.

ALSO HEREBY conveying all rights, easements and privileges pertaining thereto.

MAINE REAL ESTATE TRANSFER TAX PAID

WITNESS MY HAND and seal this 5th day of September, 1995.

Witness

Mary Charest
Mary Charest, Personal Representative of the Estate of Jeannette S. Brennan

STATE OF MAINE
ANDROSCOGGIN, SS.

Personally appeared before me the above-named Mary Charest, Personal Representative of the Estate of Jeannette S. Brennan, this _____ day of September, 1995, and acknowledged the foregoing instrument to be her free act and deed in her said capacity.

Jacqueline Grenier
Notary Public

Jacqueline Grenier
Type or Print Name

My commission expires: 2/2/99

NJR/pmc:BatesCol.AF1

over -

EXHIBIT A

Two certain lots or parcels of land, both situated in said Lewiston, bounded and described as follows, to wit:

First. COMMENCING at a point in the Northwesterly line of a proposed street known as Bardwell Street, fifty (50) feet Southwesterly from the Southerly corner of land conveyed by the Franklin Company to this Grantor, by deed dated July 3, 1914;

THENCE, Northwesterly parallel to the Southwesterly line of said Grantor's land, one hundred and one (101) feet;

THENCE, Southwesterly parallel to the Northwesterly line of Bardwell street fifty (50) feet;

THENCE, Southeasterly parallel to the Southwesterly line of said Costello land one hundred and one (101) feet to Bardwell Street;

THENCE, Northeasterly by the Northwesterly line of said Bardwell Street fifty (50) feet to the point of beginning.

Second. COMMENCING at a point in the Northwesterly line of a proposed street, known as Bardwell Street, one hundred (100) feet Southwesterly from the Southerly corner of land conveyed by the Franklin Company to this Grantor, by deed dated July 3, 1914;

THENCE, Northwesterly parallel to the Southwesterly line of said Costello land one hundred and one (101) feet;

THENCE, Southwesterly parallel to the Northwesterly line of Bardwell Street, fifty (50) feet;

THENCE, Southeasterly parallel to the Southwesterly line of said Grantor's land one hundred and one (101) feet to Bardwell Street;

THENCE, Northeasterly by the Northwesterly line of said Bardwell Street, fifty (50) feet to the point of beginning.

Subject to the grading and drainage provision and the building restriction as were set forth and contained in a certain deed from L. B. Costello and Guy A. Bigelow dated December 3, 1923, and recorded in the Androscoggin County Registry of Deeds in Book 340, Page 9, insofar as said provision and restriction, or either of them, may now be in force and effect.

BEING all and the same premises described in the deed of Raymond H. Parsons to Francis J. Brennan and Jeannette M. Brennan dated September 16, 1963, and recorded in Book 901, Page 301.

Francis J. Brennan died intestate on February 22, 1994. His widow and sole surviving joint tenant died testate on March 6, 1995.

NJR/pmc:BatesCol.AF0

95 OCT 16 PM 1:40

ATTEST:
REGISTER OF DEEDS

.96 Bardwell

BK2859 PG238

11378

MAINE SHORT FORM WARRANTY DEED

FRANKLIN ENTERPRISES, a Maine partnership with its principal place of business at 199 Lisbon Street in Lewiston, County of Androscoggin and State of Maine, for consideration paid, grants to **THE PRESIDENT AND TRUSTEES OF BATES COLLEGE**, a Maine corporation with its principal place of business in Lewiston in said County and State, with **WARRANTY COVENANTS**, a certain lot or parcel of land situated in Lewiston, County of Androscoggin and State of Maine, being more particularly described in the attached Exhibit A.

For the source of title of this grantor, see quitclaim deed with covenant from Franklin Company to Franklin Enterprises dated September 10, 1976, recorded in the Androscoggin County Registry of Deeds in Book 1227, Page 7, deed from Franklin Enterprises to Franklin Property Trust dated October 10, 1976, recorded in Book 1226, Page 330, and deed from Franklin Property Trust to this grantor dated November 2, 1976, recorded in Book 1236, Page 280.

MAINE REAL ESTATE TRANSFER TAX PAID

The premises are conveyed subject to any easements and restrictions of record and this deed includes all rights, easements, privileges, and appurtenances belonging to the premises hereinabove described.

This deed is executed this 12th day of May, 1992 by **STANLEY SCLAR**, as Partner of **FRANKLIN ENTERPRISES**.

FRANKLIN ENTERPRISES

Lori Ann Fouchette
Witnessd

By
Stanley Sclar, Partner

STATE OF MAINE
ANDROSCOGGIN, SS.

Personally appeared the above named **STANLEY SCLAR**, Partner as aforesaid, known to me, this 12th day of May, 1992, and acknowledged the foregoing instrument to be his free act and deed in his said capacity.

Lori Kelley
Notary Public/~~Attorney-at-Law~~

Lori Kelley
Printed Name

Jrea98.37

SEAL

OVER

EXHIBIT A

A certain lot or parcel of land situated in Lewiston, County of Androscoggin and State of Maine, with any buildings thereon, bounded and described as follows: COMMENCING on the northwesterly side of Bardwell Street by line of land conveyed by this grantor to Ralph J. and Natasha C. Chances on November 12, 1958 by deed #1980; thence running northwesterly by said Chances land about one hundred one (101) feet, more or less, to land of one Laurence as described in deed recorded in the Androscoggin County Registry of Deeds in Book 564, at Page 404; thence running northeasterly by said Laurence land about twenty (20) feet to line of land of Richard and Elizabeth Beaumont as described in said Registry in Book 1065, at Page 88; thence continuing northeasterly by line of said Beaumont seventy-five (75) feet, more or less, to land of Gordon and Linda Wilcox described in deed recorded in said Registry in Book 1169, at Page 272; thence continuing northeasterly by line of said Wilcox seventy-five (75) feet, more or less, to line of land of Eva F. Ladouceur by deed recorded in said Registry in Book 957, at Page 401; thence continuing northeasterly by said Ladouceur land about twenty (20) feet to land conveyed by this grantor to Louis B. Costello on May 4, 1922 by deed #1613; thence southeasterly by said Costello land one hundred one (101) feet, more or less, to Bardwell Street; thence southwesterly by the northwesterly side of Bardwell Street one hundred ninety (190) feet, more or less, to the point of beginning.

ATTEST:

Jeannine D. Bergeron

REGISTER OF DEEDS

92 JUN -5 AM 10: 08

ANDROSCOGGIN, SS.
REGISTRY OF DEEDS

ATTACHMENT 9

Technical & Financial Capacity

SECTION 9

Technical and Financial Capacity

9.0 Financial Capacity

A. Cost Estimate/ Financial Capacity

a. Estimated Costs

The construction cost for the site and facility have been estimated as shown below:

	Item	Estimated Costs
1	Site Work	$ 2,903,296
2	65 Campus Ave	$ 35,654,913
	Total Construction	$ 38,558,209

b. Financial capacity

The project will be funded by Bates College with funds that have been raised for this project and set aside for the project. Attached is a statement from Bates College regarding the commitment and funding sources.

B. Performance Guarantee

The project will include work within the City Right of way including utility services, storm drains and catch basins, curbing, sidewalks and esplanade construction, driveway entrance improvements, cross walks, traffic striping and signage. The following estimate is for the work within the right of way.

	Item	Estimated Cost
1	Utility Trenching	$ 28,500.
2	Storm Drains	21,600.
3	Catch Basins	7,000.
4	Curbing	31,300.
5	Sidewalk	35,300.
6	Esplanade and planting	11,000.
7	Driveway Entrances	3,200.
8	Crosswalks and Pavement Markings	1,700.
9	Signage	2,500.
	Total	$ 142,100.

Bates will make arrangements for performance guarantees for work conducted within the Right of Way.

9.1 Technical Ability

A. Prior Experience

Bates College has engaged Payette, an architectural firm, to design the proposed new science building project. Payette has extensive experience designing academic science buildings as well as science related research facilities in the health care and health science sectors. Payette has assembled a team of consultants to assist in completing the design of the building. An introduction to Payette and a abbreviated client list is attached.

Wright-Pierce, has been engaged to prepare the site design and site permitting. Wright-Pierce is a civil and environmental engineering firm based in Topsham and has extensive experience with site design and site permitting for public, private and institutional clients.

Bates College has staff who oversees capital improvement projects for the College. Bates has undertaken other large construction projects as well as other capital projects of similar scale to the current project. Bates staff involved in the project include Pamela Wichroski, AIA, Director Capital Planning and Construction and Chris Streifel, Senior Project Manager.

B. Personnel

A resume for Robert Schaeffner, FAIA, LEED AP has a principal with Payette has been attached and includes a listing of his experience of similar and relevant academic projects.

Jan B. Wiegman, P.E., is the technical representative of Wright-Pierce for the project. Wright-Pierce has extensive experience with site development and stormwater permitting projects. Mr. Wiegman's resume is attached to this Section.

Bates

Treasurer's Office

7/26/2018

Maine Department of Environmental Protection
Beth Callahan
17 State House Station
Augusta, ME 04333-0017

Re: Bates College New Science Building Project
Maine Department of Environmental Protection Review

To Whom It May Concern:

The estimated construction cost of the project for the Bates STEM Building is approximately $38M. Bates College has obtained, and set aside, the financial capacity to complete this project. The source of the funding for the building is from donor gift commitments and reserves. Upon completion, the college will have adequate resources to maintain the facility. As a means of further support we have included a copy of the College's audited financial statements for the fiscal year ending June 30th, 2017.

Sincerely,

Geoffrey Swift
Vice President for Finance and Administration and Treasurer

GS/cs

C: Chris Streifel
Pam Wichroski

2 Andrews Road | Lewiston, Maine | 04240-6024 | (207) 786-8339 | (207) 786-8292

BATES COLLEGE

FINANCIAL STATEMENTS

June 30, 2017 and 2016

BATES COLLEGE

JUNE 30, 2017 and 2016

CONTENTS

REPORT OF INDEPENDENT AUDITORS	1
STATEMENTS OF FINANCIAL POSITION	2
STATEMENTS OF ACTIVITIES	3-4
STATEMENTS OF CASH FLOWS	5
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Report of Independent Auditors

To the Trustees of Bates College

We have audited the accompanying financial statements of Bates College, which comprise the statements of financial position as of June 30, 2017 and 2016, and the related statements of activities and cash flows for the years then ended.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on the financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on our judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, we consider internal control relevant to Bates College's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of Bates College's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of Bates College as of June 30, 2017 and 2016, and the changes in its net assets and its cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America.

PricewaterhouseCoopers LLP

October 27, 2017

PricewaterhouseCoopers LLP, 101 Seaport Boulevard Suite 500, Boston, MA 02210
T: (617) 530 5000, F: (617) 530 5001, www.pwc.com

BATES COLLEGE

STATEMENTS OF FINANCIAL POSITION
June 30, 2017 and 2016

	2017	2016
ASSETS		
Cash and cash equivalents	$ 10,488,296	$ 17,869,809
Accounts receivable (net of allowance of $363,011 for 2017 and $367,025 for 2016)	1,742,235	1,912,395
Inventories and prepaid expenses	2,847,411	2,384,613
Contributions receivable - net	71,602,104	13,271,666
Notes receivable	4,636,343	5,809,709
Investments	345,941,330	289,477,687
Beneficial interest in perpetual trusts	5,970,254	5,664,628
Contributions receivable from remainder trusts	6,613,153	6,007,953
Land, buildings and equipment - net	183,438,875	179,784,703
Deposits with bond trustees	5,196,762	20,363,636
TOTAL ASSETS	$ 638,476,763	$ 542,546,799
LIABILITIES AND NET ASSETS		
LIABILITIES		
Accounts payable and accrued expenses	$ 12,863,370	$ 17,485,634
Student deposits and deferred items	3,246,688	3,383,348
Asset retirement obligations	6,025,582	6,007,832
Split interest and annuity obligations	15,997,604	15,870,011
Federal student loan funds repayable	5,601,094	6,346,569
Bonds payable	96,393,791	99,764,751
TOTAL LIABILITIES	$ 140,128,129	$ 148,858,145
COMMITMENTS AND CONTINGENCIES		
NET ASSETS		
Unrestricted	$ 132,211,689	$ 124,087,610
Temporarily restricted	150,529,646	88,472,192
Permanently restricted	215,607,299	181,128,852
TOTAL NET ASSETS	$ 498,348,634	$ 393,688,654
TOTAL LIABILITIES AND NET ASSETS	$ 638,476,763	$ 542,546,799

The accompanying notes are an integral part of these financial statements.

BATES COLLEGE

STATEMENT OF ACTIVITIES
FOR THE YEAR ENDED JUNE 30, 2017
WITH SUMMARIZED FINANCIAL INFORMATION FOR THE YEAR ENDED JUNE 30, 2016

	2017				2016
	Unrestricted	Temporarily Restricted	Permanently Restricted	Total	
OPERATING ACTIVITIES					
Revenues and gains					
Single fee revenue	$ 112,314,729			$ 112,314,729	$ 109,765,408
Scholarship aid	(33,082,456)			(33,082,456)	(31,479,000)
Net revenue from students	$ 79,232,273			$ 79,232,273	$ 78,286,408
Other educational program revenues	874,079			874,079	1,101,975
	$ 80,106,352			$ 80,106,352	$ 79,388,383
Government grants	2,126,412			2,126,412	2,053,392
Contributions and private grants	7,275,752	$ 1,298,248		8,574,000	11,194,146
Endowment return used in accordance with spending policy	1,807,134	10,650,950		12,458,084	12,139,973
Other income	6,038,094	316,831		6,354,925	5,852,201
Net assets released from restrictions	14,203,667	(14,203,667)		-	-
	$ 111,557,411	$ (1,937,638)		$ 109,619,773	$ 110,628,095
Expenses					
Educational and general					
Instructional	$ 40,154,643			$ 40,154,643	$ 39,275,764
Research	1,821,310			1,821,310	1,796,342
Public service	200,168			200,168	291,326
Academic support	15,304,415			15,304,415	14,700,237
Student services	17,137,508			17,137,508	16,395,131
Institutional support	18,676,456			18,676,456	16,354,694
Total educational and general	$ 93,294,500			$ 93,294,500	$ 88,813,494
Auxiliary enterprises	18,779,381			18,779,381	15,761,178
	$ 112,073,881			$ 112,073,881	$ 104,574,672
TOTAL FROM OPERATING ACTIVITIES	$ (516,470)	$ (1,937,638)		$ (2,454,108)	$ 6,053,423
NONOPERATING ACTIVITIES					
Revenues and gains					
Contributions	$ -	$ 44,631,396	$ 31,990,539	$ 76,621,935	$ 23,961,175
Total endowment return	8,170,192	31,868,611	765,749	40,804,552	(12,743,055)
Endowment return used in accordance with spending policy	(1,807,134)	(10,650,950)	-	(12,458,084)	(12,139,973)
Other investment return including change in value of split interest agreements	-	423,526	1,722,159	2,145,685	(1,331,198)
Net assets released from restrictions	2,277,491	(2,277,491)	-	-	-
Expenses					
Loss from early extinguishment of debt	-	-	-	-	(971,381)
TOTAL FROM NONOPERATING ACTIVITIES	$ 8,640,549	$ 63,995,092	$ 34,478,447	$ 107,114,088	$ (3,224,432)
INCREASE IN NET ASSETS	$ 8,124,079	$ 62,057,454	$ 34,478,447	$ 104,659,980	$ 2,828,991
NET ASSETS - BEGINNING OF YEAR	$ 124,087,610	$ 88,472,192	$ 181,128,852	$ 393,688,654	$ 390,859,663
NET ASSETS - END OF YEAR	$ 132,211,689	$ 150,529,646	$ 215,607,299	$ 498,348,634	$ 393,688,654

The accompanying notes are an integral part of these financial statements.

BATES COLLEGE

STATEMENT OF ACTIVITIES
FOR THE YEAR ENDED JUNE 30, 2016

	Unrestricted	Temporarily Restricted	Permanently Restricted	Total
OPERATING ACTIVITIES				
Revenues and gains				
Single fee revenue	$ 109,765,408			$ 109,765,408
Scholarship aid	(31,479,000)			(31,479,000)
Net revenue from students	$ 78,286,408			$ 78,286,408
Other educational program revenues	1,101,975			1,101,975
	$ 79,388,383			$ 79,388,383
Government grants	2,053,392			2,053,392
Contributions and private grants	8,557,653	$ 2,636,493		11,194,146
Endowment return used in accordance with spending policy	1,809,238	10,330,735		12,139,973
Other income	5,570,195	282,006		5,852,201
Net assets released from restrictions	13,320,266	(13,320,266)		-
	$ 110,699,127	$ (71,032)		$ 110,628,095
Expenses				
Educational and general				
Instructional	$ 39,275,764			$ 39,275,764
Research	1,796,342			1,796,342
Public service	291,326			291,326
Academic support	14,700,237			14,700,237
Student services	16,395,131			16,395,131
Institutional support	16,354,694			16,354,694
Total educational and general	$ 88,813,494			$ 88,813,494
Auxiliary enterprises	15,761,178			15,761,178
	$ 104,574,672			$ 104,574,672
TOTAL FROM OPERATING ACTIVITIES	$ 6,124,455	$ (71,032)		$ 6,053,423
NONOPERATING ACTIVITIES				
Revenues and gains				
Contributions	$ 500,072	$ 97,784	$ 23,363,319	$ 23,961,175
Total endowment return	(4,351,048)	(8,781,485)	389,478	(12,743,055)
Endowment return used in accordance with spending policy	(1,809,238)	(10,330,735)	-	(12,139,973)
Other investment return including change in value of split interest agreements	-	(268,488)	(1,062,710)	(1,331,198)
Net assets released from restrictions	1,672,727	(1,672,727)	-	-
Expenses				
Loss from early extinguishment of debt	(971,381)	-	$ -	(971,381)
TOTAL FROM NONOPERATING ACTIVITIES	$ (4,958,868)	$ (20,955,651)	$ 22,690,087	$ (3,224,432)
INCREASE (DECREASE) IN NET ASSETS	$ 1,165,587	$ (21,026,683)	$ 22,690,087	$ 2,828,991
NET ASSETS - BEGINNING OF YEAR	$ 122,922,023	$ 109,498,875	$ 158,438,765	$ 390,859,663
NET ASSETS - END OF YEAR	$ 124,087,610	$ 88,472,192	$ 181,128,852	$ 393,688,654

The accompanying notes are an integral part of these financial statements.

BATES COLLEGE

STATEMENTS OF CASH FLOWS
FOR THE YEARS ENDED JUNE 30, 2017 and 2016

	2017	2016
Cash flows from operating activities:		
Increase in net assets	$ 104,659,980	$ 2,828,991
Adjustments to reconcile the change in net assets to net cash used in operating activities:		
Depreciation	$ 7,630,851	$ 6,652,353
Asset retirement accretion, net of abatements	17,750	3,419
Amortization of bond origination costs and bond premiums	(40,960)	(44,583)
Loss from early extinguishment of debt	-	971,381
Net unrealized and realized (gains) losses on investments	(38,801,652)	13,855,888
Other investment return including change in value of split-interest agreements	(2,145,685)	1,331,198
Contributions received for endowment or other long-term uses	(11,840,840)	(15,796,931)
Contributions received from gifts of securities for operating purposes	(1,086,200)	(809,546)
Proceeds from sale of gifts of securities for operating purposes	1,086,200	809,546
(Increase) decrease in operating assets:		
Accounts receivable	170,160	491,210
Inventories and prepaid expenses	(462,798)	(129,902)
Contributions receivable from current year pledges	(64,781,096)	(10,327,537)
Increase (decrease) in operating liabilities:		
Accounts payable and accrued expenses	345,637	133,073
Student deposits and deferred items	(136,660)	(573,661)
Total adjustments	$ (110,045,293)	$ (3,434,092)
Net cash used in operating activities	$ (5,385,313)	$ (605,101)
Cash flows from investing activities:		
Purchases of plant and equipment	$ (16,252,924)	$ (31,773,843)
Purchases of investments	(83,855,577)	(41,817,829)
Proceeds from sales and maturities of investments	67,556,038	40,047,286
Disbursements of loans to students	(10,731)	(778,449)
Repayments of loans from students	1,184,097	1,209,539
Decrease in escrow deposits with bond trustees	368,039	13,932
Use of bond proceeds deposited with trustees	14,798,835	24,372,095
Net cash used in investing activities	$ (16,212,223)	$ (8,727,269)
Cash flows from financing activities:		
Repayments of principal on bonds payable	$ (3,330,000)	$ (3,155,000)
Proceeds from issuance of bonds	-	172,226
Bond financing costs	-	(163,087)
Cash contributions received for endowment or other long-term purposes	8,607,128	13,184,025
Proceeds from gifts of securities for long-term purposes	3,859,380	2,612,906
Cash received on contributions receivable for long-term purposes	5,824,990	2,163,293
Payments of refundable loan funds	(745,475)	(71,898)
Net cash provided by financing activities	$ 14,216,023	$ 14,742,465
Net (decrease) increase in cash and cash equivalents	$ (7,381,513)	$ 5,410,095
Cash and cash equivalents at beginning of year	17,869,809	12,459,714
Cash and cash equivalents at end of year	$ 10,488,296	$ 17,869,809
Supplemental data		
Contributions of securities and other noncash assets	$ 4,945,580	$ 3,422,452
Accrued construction costs	1,316,581	6,284,482
Advance refunding - Series 2006B	-	30,565,554
Noncash debt issuance costs	-	176,404
Interest paid	4,567,319	4,863,675

The accompanying notes are an integral part of these financial statements.

NOTE 1 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Description of the Entity

Bates College (the "College") is a private, coeducational, liberal arts college located in Lewiston, Maine. The College provides academic, residential and other services to a diverse student population of approximately 1,750.

Basis of Presentation

The accompanying financial statements have been prepared on the accrual basis of accounting and in accordance with accounting principles generally accepted in the United States of America. The College displays its activities and net assets in three classes: unrestricted, temporarily restricted and permanently restricted. These classes are defined as follows:

Unrestricted Net Assets - Net assets that are not subject to donor-imposed stipulations.

Temporarily Restricted Net Assets - Net assets subject to donor-imposed stipulations or legal restrictions that may or will be met either by actions of the College and/or the passage of time.

Permanently Restricted Net Assets - Net assets subject to donor-imposed stipulations that they be maintained permanently by the College.

Revenues are reported as increases in unrestricted net assets unless use of the related assets is limited by donor-imposed restrictions. Expenses are reported as decreases in unrestricted net assets. Realized and unrealized gains and losses on investments and other assets or liabilities are reported as increases or decreases in unrestricted net assets unless their use is restricted by explicit donor stipulations or law.

Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the period. Significant estimates include the valuation of certain investments, split interest obligations, receivables, and estimated service lives of buildings and equipment. Actual results could differ from those estimates.

Cash and Cash Equivalents

The College considers all highly liquid debt instruments with maturities, when purchased, of three months or less to be cash equivalents. Cash and cash equivalents at June 30, 2017 and 2016 included $1,959,340 and $1,661,858 respectively, of monies held for the Perkins loan program.

Contributions Receivable

Unconditional promises to give that are expected to be collected within one year are recorded at net realizable value. Unconditional promises to give that are expected to be collected in future years are recorded at the present value of their expected future cash flows. The discounts on those amounts are computed using rates indicative of the market and credit risk associated with the contribution. Amortization of the discounts is included in contribution revenue. Conditional promises to give are not included as revenues until the conditions are substantially met. Contributions receivable at June 30, 2017 include a concentration of an unconditional promise to give from a single donor.

Investments

Investments are stated at fair value in accordance with Fair Value Measurement standards. Fair value is defined as the exchange price that would be received for an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date.

NOTE 1 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES - CONTINUED

The following describes the hierarchy of inputs used to measure fair value and the primary valuation methodologies used by the College for financial instruments measured at fair value on a recurring basis.

The three levels of inputs are as follows:

Level 1 - Quoted prices in active markets for identical assets or liabilities.

Level 2 - Inputs other than Level 1 that are observable, either directly or indirectly, such as quoted prices for similar assets or liabilities; quoted prices in markets that are not active; or other inputs that are observable or can be corroborated by observable market data for substantially the same term of the assets or liabilities.

Level 3 - Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities.

A financial instrument's categorization within the valuation hierarchy is based upon the lowest level of input that is significant to the fair value measurement.

The College's interests in alternative investments are reported at the net asset value (NAV) reported by the investment managers. The College reviews and evaluates the NAVs provided by the investment managers including, but not limited to, managers' compliance with Fair Value Measurement standards, price transparency and valuation procedures in place, and the ability to redeem at NAV at the measurement date. The College believes that these valuations are a reasonable estimate of fair value as of June 30, 2017 and 2016 but are subject to uncertainty and, therefore, may differ from the value that would have been used had a ready market for the investments existed; such differences could be material. The NAV is used as a practical expedient to estimate the fair value of these investments unless it is probable that all or a portion of the investment will be sold for an amount different from NAV. As of June 30, 2017, the College had no plans or intentions to sell investments at amounts different from NAV.

The amount of gain or loss associated with these investments is reflected in the accompanying financial statements. Investments include funds designated by the Board of Trustees and permanent endowment assets which are held in perpetuity. The College may have exposure to derivative financial instruments through its investments in various limited liability funds.

The College uses the unit market value method for the assignment of income and asset appreciation and depreciation for the investments it pools within the endowment and trust fund categories. Under this method each individual fund subscribes to, or disposes of, units on the basis of the market value per unit. Income as well as capital appreciation or depreciation earned by the pool is assigned to each individual fund on the basis of the number of units the individual fund owns.

Due to the level of risk associated with certain investment securities and level of uncertainty related to the changes in value of these investments, it is at least reasonably possible that changes in value in the near term could materially impact the amounts reported as the fair market value of these investments at June 30, 2017 and 2016, respectively.

Split Interest Agreements

The College is party to various split interest agreements with regards to irrevocable trusts and other agreements. These agreements include perpetual trusts, charitable remainder trusts, charitable gift annuities, pooled income funds and pooled growth funds.

When the College is the trustee for the trust/fund, the assets held are included in investments. When a donor makes a contribution to these funds, contribution revenue is recognized and a liability for the present value of the estimated future payments to the donors and/or other beneficiaries is recorded as split interest and annuity obligations. Split interest and annuity obligations are based upon actuarial estimates and assumptions regarding the duration of the agreement and the rates used to discount the liabilities. Circumstances affecting these assumptions can change the estimate of the liabilities in future periods. Discount rates ranged from 3.2% to 8.0% at June 30, 2017 and 2016, respectively.

NOTE 1 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES - CONTINUED

Assets held by an outside trustee are classified as beneficial interest in perpetual trusts or as contributions receivable from remainder trusts. These assets represent the College's share of the fair market value of the trust assets as of the balance sheet date, net of a liability for the present value of estimated future payments to the donors or other beneficiaries. Distributions of income from the trusts to the College are recorded as revenue and the carrying value of the assets is adjusted for changes in the estimates of future receipts.

Land, Buildings and Equipment

Land, buildings and equipment are stated at cost at date of acquisition or at fair market value at date of donation in the case of gifts. Repairs and maintenance of buildings, grounds, equipment and furnishings as well as insignificant replacements of furnishings and equipment are expensed as incurred.

Land improvements, buildings and equipment are depreciated on the straight-line method over the estimated service lives of respective assets. Estimated service lives are as follows:

Land and building improvements	10 to 15 years
Buildings (masonry)	60 years
Buildings (wooden)	25 years
Equipment	5 to 10 years

When assets are retired or disposed of, the associated cost and accumulated depreciation are removed from the accounts, and gains or losses are included in other income in the statement of activities.

Collections

The College's policy is not to capitalize collections, primarily art objects, as they are held for educational, research, and curatorial purposes. Each of the items is catalogued, preserved and cared for, and activities verifying their existence and assessing their condition are performed continuously. Any proceeds from the sale of collection items are used to acquire other items for the collection.

Deposits With Bond Trustees

Deposits with Bond Trustees consists principally of investments in United States Government obligations and have been deposited with Trustees as required under certain loan agreements. Amounts at June 30, 2017 and 2016 respectively, consist of $4,100,452 and $4,468,491 for debt service, and $1,096,310 and $15,895,145 for construction.

Asset Retirement Obligations

In accordance with standards on *Accounting for Asset Retirement Obligations,* the College recognizes the fair value of a liability for legal obligations associated with asset retirements in the period in which the obligation is incurred. When the liability is initially recorded, the cost of the asset retirement obligation is capitalized by increasing the carrying amount of the related long-lived asset. The liability is accreted to its present value each period, and the capitalized cost associated with the retirement obligation is depreciated over the useful life of the related asset. Upon settlement of the obligation, any difference between the cost to settle the asset retirement obligation and the liability recorded is recognized as a gain or loss in the statement of activities.

NOTE 1 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES - CONTINUED

Investment Return / Spending Policy

The Maine Uniform Prudent Management of Institutional Funds Act (UPMIFA) provides that unless explicitly stated otherwise by the donor, appreciation on investments of donor designated endowment funds, until appropriated pursuant to proper governing board action, must be classified as temporarily restricted net assets.

The investment time horizon for the endowment is long-term, consistent with its expected perpetual life. The financial goals for the endowment are (a) to achieve investment returns, net of all costs of management, over full market cycles at least equal to the sum of the rate of inflation (Higher Education Price Index) and the spending rate, and (b) to provide a predictable and stable flow of funds for the operating budget of the College.

To achieve its long-term return objectives, the College relies on a total return strategy in which investment returns are achieved through both capital appreciation (realized and unrealized gains) and current yield (interest and dividends). The College targets a diversified asset allocation that places greater emphasis on equity based investments to achieve an expected average real return of approximately 5% annually (actual returns in any given year may vary from this amount).

The College's endowment spending policy is also based upon the "total return" concept. The portion to be spent is determined by a budgetary process whereby the objective of the governing board is that the actual spending does not exceed 5% of the estimated average fair market value of the endowment investments. Accordingly, over the long term, the College expects its endowment to grow at the rate of inflation annually, consistent with the financial goals of the endowment.

Financial Instruments

The College has a number of financial instruments including: cash and cash equivalents; contributions and accounts receivable; and accounts payable and accrued expenses. Management of the College estimates that the fair value of financial instruments at June 30, 2017 and 2016 does not differ materially from the aggregate carrying values of its financial instruments recorded in the accompanying statements of financial position. Notes receivable are principally amounts due from students under U.S. Government sponsored loan programs, which are subject to significant restrictions. Accordingly, it is not practicable to determine the fair value of such amounts.

Nonoperating Activities

Nonoperating activities include transactions related to capital activities, endowments, split interest agreements, and a loss from early extinguishment of debt. Nonoperating activities also include the investment return in excess of or less than amounts used for operations in accordance with the College’s endowment spending policy.

Donor-Imposed Restrictions

Contributions received are recorded as unrestricted, temporarily restricted or permanently restricted support, depending on the existence and/or nature of any donor restrictions. All donor-restricted support is reported as an increase in temporarily or permanently restricted net assets, depending on the nature of the restriction. When a restriction expires (that is, when a stipulated time restriction ends or purpose restriction is accomplished), temporarily restricted net assets are reclassified to unrestricted net assets and reported in the statement of activities as net assets released from restrictions.

Sponsored Programs

Revenues associated with federal and state government grants and contracts are recognized as the related costs are incurred. The College records reimbursement of indirect costs relating to government grants and contracts at predetermined negotiated rates for each year.

Allocation of Certain Expenses

The statement of activities presents expenses by functional classification. Operation and maintenance of plant is allocated to program and supporting activities based principally upon square footage of facilities. Depreciation of plant assets is allocated based on the specific use of the asset. Interest expense is allocated to the functional classifications that benefited from the use of the proceeds of the debt.

NOTE 1 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES - CONTINUED

Income Taxes and Tax Status

The College qualifies under the provisions of Section 501(c)(3) of the Internal Revenue Code and is exempt from federal income taxes on all of the College's program related income.

Upcoming Accounting Pronouncements

In August 2016, the FASB issued ASU 2016-14, *Presentation of Financial Statements for Not-for-Profit Entities* , which makes targeted changes to the not-for-profit financial reporting model including changes to the classification of net assets and liquidity disclosures. The ASU also imposes several new requirements related to reporting expenses, including providing information about expenses by their natural classification. The ASU is effective for fiscal years beginning after December 15, 2017 and early adoption is permitted. The College is evaluating the impact of the new guidance on the financial statements.

In February 2016, the FASB issued ASU 2016-02, *Leases* , which requires lessees to recognize lease assets and lease liabilities in the statement of financial position for all leases with terms longer than 12 months. Leases will be classified as either finance or operating, with classification affecting the pattern of expense recognition in the statement of activities. The ASU is effective for the College's year ending June 30, 2020 with a modified retrospective transition approach required for capital and operating leases existing at, or entered into after the earliest comparative period present in the financial statements, with certain practical expedients available. The College is evaluating the impact of the new guidance on the financial statements.

In May 2014 the FASB issued ASU 2014-09, *Revenue from Contracts with Customers* , a principles-based standard to recognize revenue from customer contracts. ASU 2014-09 is effective for the College’s fiscal year 2019. The College is evaluating the impact that the ASU may have on its financial statements.

Subsequent Events

The College evaluated subsequent events through October 27, 2017, the date the financial statements were issued, and determined that there have been no subsequent events for the period after June 30, 2017 that would require recognition in the financial statements or disclosure in the notes of the financial statements.

NOTE 2 - CONTRIBUTIONS RECEIVABLE

Included in contributions receivable are the following unconditional promises to give:

	2017	2016
Capital	$ 47,022,947	$ 180,999
Endowment	31,621,173	11,600,780
Other	5,283,570	2,670,257
Unconditional promises to give before unamortized discount and allowance for uncollectibles	$ 83,927,690	$ 14,452,036
Less: Unamortized discount	10,219,859	611,297
	$ 73,707,831	$ 13,840,739
Less: Allowance for uncollectibles	2,105,727	569,073
Net unconditional promises to give	$ 71,602,104	$ 13,271,666
Amounts due in:		
Less than one year	$ 12,967,577	$ 6,875,771
One to five years	$ 45,960,113	7,576,265
Six to ten years	25,000,000	-
	$ 83,927,690	$ 14,452,036

Discount rates on unconditional promises to give ranged from 2.4% to 3.3% at June 30, 2017 and from 1.8% to 3.36% at June 30, 2016. Conditional promises to give at June 30, 2017 and 2016 were $500,000 and $0 respectively. Total fundraising expenses were $7,210,005 and $6,261,415 for the years ended June 30, 2017 and 2016, respectively.

NOTE 3 - INVESTMENTS

The fair value of investments at June 30 are as follows:

	2017	2016
Cash and cash equivalents *	$ 16,524,830	$ 12,048,198
Equity securities and funds	136,589,190	106,176,831
Venture capital partnerships	8,446,467	6,123,967
Private equity partnerships	25,295,760	33,083,345
Hedge funds	87,567,640	73,734,630
Fixed income securities and funds	57,709,925	43,621,651
Real estate and real estate funds	5,364,991	4,758,309
Commodity and other funds	8,442,527	9,930,756
	$ 345,941,330	$ 289,477,687

* Cash and cash equivalents include amounts to be advanced to underlying funds in the near term.

NOTE 3 - INVESTMENTS - CONTINUED

The following schedule summarizes the total endowment return and other investment return including the change in value of split interest agreements and its classification in the statements of activities for the years ended June 30:

	2017			
	Unrestricted	Temporarily Restricted	Permanently Restricted	Total
Interest and dividends	$ 262,324	$ 1,735,356	$ 5,220	$ 2,002,900
Net unrealized and realized gains *	5,354,203	33,110,446	2,482,688	40,947,337
Reclassified investment gains **	2,553,665	(2,553,665)	-	-
Total investment return	$ 8,170,192	$ 32,292,137	$ 2,487,908	$ 42,950,237
Less: Investment return designated for current operations	1,807,134	10,650,950	-	12,458,084
Investment return greater than spending formula and return for pooled funds and other funds	$ 6,363,058	$ 21,641,187	$ 2,487,908	$ 30,492,153

	2016			
	Unrestricted	Temporarily Restricted	Permanently Restricted	Total
Interest and dividends	$ 153,747	$ 957,359	$ 1,727	$ 1,112,833
Net unrealized and realized losses *	(1,999,485)	(12,512,642)	(674,959)	(15,187,086)
Reclassified investment gains **	(2,505,310)	2,505,310	-	-
Total investment return	$ (4,351,048)	$ (9,049,973)	$ (673,232)	$ (14,074,253)
Less: Investment return designated for current operations	1,809,238	10,330,735	-	12,139,973
Investment return less than spending formula and return for pooled funds and other funds	$ (6,160,286)	$ (19,380,708)	$ (673,232)	$ (26,214,226)

* Direct external management and custodial fees for the endowment investments and other College investments are charged to the investment portfolio and were $1,876,216 and $1,626,093 for the years ended June 30, 2017 and 2016, respectively. Net unrealized and realized gains are presented net of these fees.

** Certain losses which would cause individual endowment funds to be reduced below the historical dollar amount contributed by the donor have been allocated to unrestricted net assets. These losses resulted from unfavorable market fluctuations that occurred shortly after the investment of newly established endowments, and authorized spending in accordance with the endowment spending policy. The total losses allocated to unrestricted net assets were $865,336 and $3,419,001 at June 30, 2017 and 2016, respectively.

NOTE 3 - INVESTMENTS - CONTINUED

Fair value of investments as of June 30, 2017 including investments measured at net asset value as a practical expedient:

	Total	Level 1	Level 2	Level 3	NAV Measurement
Investments					
Cash and cash equivalents	$ 16,524,830	$ 16,524,830	$ -	$ -	$ -
Equity securities and funds	136,589,190	62,916,621	-	-	73,672,569
Venture capital partnerships	8,446,467	-	-	-	8,446,467
Private equity partnerships	25,295,760	-	-	-	25,295,760
Hedge funds	87,567,640	-	-	-	87,567,640
Fixed income securities and funds	57,709,925	57,709,925	-	-	-
Real estate and real estate funds	5,364,991	3,623,758	-	-	1,741,233
Commodity and other funds	8,442,527	3,004,237	-	-	5,438,290
Investment total	$ 345,941,330	$ 143,779,371	$ -	$ -	$ 202,161,959
Other assets					
Beneficial interest in perpetual trusts	5,970,254	-	-	5,970,254	-
Contributions receivable from remainder trusts	6,613,153	-	-	6,613,153	-
Total assets at fair value	$ 358,524,737	$ 143,779,371	$ -	$ 12,583,407	$ 202,161,959

Fair value of investments as of June 30, 2016 including investments measured at net asset value as a practical expedient:

	Total	Level 1	Level 2	Level 3	NAV Measurement
Investments					
Cash and cash equivalents	$ 12,048,198	$ 12,048,198	$ -	$ -	$ -
Equity securities and funds	106,176,831	50,382,019	-	-	55,794,812
Venture capital partnerships	6,123,967	-	-	-	6,123,967
Private equity partnerships	33,083,345	-	-	-	33,083,345
Hedge funds	73,734,630	-	-	-	73,734,630
Fixed income securities and funds	43,621,651	43,621,651	-	-	-
Real estate and real estate funds	4,758,309	3,535,633	-	-	1,222,676
Commodity and other funds	9,930,756	5,436,887	-	-	4,493,869
Investment total	$ 289,477,687	$ 115,024,388	$ -	$ -	$ 174,453,299
Other assets					
Beneficial interest in perpetual trusts	5,664,628	-	-	5,664,628	-
Contributions receivable from remainder trusts	6,007,953	-	-	6,007,953	-
Deposits with bond trustees *	20,363,636	20,363,636	-	-	-
Total assets at fair value	$ 321,513,904	$ 135,388,024	$ -	$ 11,672,581	$ 174,453,299

* Primarily short term investments of bond proceeds for construction at June 30, 2016.

NOTE 3 - INVESTMENTS - CONTINUED

Significant Investment Strategies

Equity Securities and Funds:

The Equities category is globally diversified across public markets including domestic and international developed and emerging market equities. This includes investments in separate accounts, mutual funds and partnerships.

Venture Capital and Private Equity Partnerships:

The Private Equities category includes investments in limited partnerships that invest primarily in unlisted, non-public U.S. and non-U.S. domiciled companies. Private Equity includes venture capital (early-stage) and buyout (later-stage) investments. These investments are generally illiquid, with some partnership commitment terms of up to ten years.

Hedge Funds:

The Hedge Fund category includes investments in funds that invest primarily in the equity, debt, and derivative securities of U.S. and non-U.S. domiciled corporations. Fund managers hold long and short portfolio capital assets. Investments in hedged strategies are made in sub-strategies including event driven, distressed/credit, relative value, long/short equity and multi-strategy funds.

Real Assets, Commodities and Other Funds:

This category includes investments in limited partnerships that invest primarily in unlisted, non-public U.S. and non-U.S. real estate and investments in commingled vehicles that invest in natural resource assets and the equities of natural resource companies.

Roll forward of Investments Classified as Level 3:

	Value at June 30, 2016	Realized/Unrealized Gains/(Losses)	Purchases	Sales	Value at June 30, 2017
Beneficial interest in perpetual trusts	$ 5,664,628	$ 305,626	$ -	$ -	$ 5,970,254
Contributions receivable from remainder trusts	6,007,953	605,200	-	-	6,613,153
Total assets classified as level 3	$ 11,672,581	$ 910,826	$ -	$ -	$ 12,583,407

In accordance with standards for estimating the fair value of investments, the College conducted a review of changes between levels occurring during the years ended June 30, 2017 and June 30, 2016 and there were no leveling changes.

NOTE 3 - INVESTMENTS - CONTINUED

Redemption terms for investments measured at NAV as of June 30, 2017:

Redemption Terms	Equity Securities and Funds	Venture Capital and Private Equity Partnerships	Hedge Funds	Real Estate, Commodity and Other Funds	Total
Within 30 Days	$ -	$ -	$ -	$ 2,799,857	$ 2,799,857
Monthly (10-120 days notice)	37,042,176	-	-	-	37,042,176
Quarterly (30-90 days notice)	-	-	28,483,257	-	28,483,257
Biannually & Annually (45-120 days notice)	31,109,929	-	53,435,643	-	84,545,572
1 - 5 years	3,464,674	3,826,219	931,386	636,442	8,858,721
6 - 10 years	2,055,790	29,916,008	4,717,354	3,743,224	40,432,376
	$ 73,672,569	$ 33,742,227	$ 87,567,640	$ 7,179,523	$ 202,161,959

Redemption terms for investments measured at NAV as of June 30, 2016:

Redemption Terms	Equity Securities and Funds	Venture Capital and Private Equity Partnerships	Hedge Funds	Real Estate, Commodity and Other Funds	Total
Within 30 Days	$ -	$ -	$ -	$ 3,354,165	$ 3,354,165
Monthly (10-120 days notice)	29,396,694	-	-	-	29,396,694
Quarterly (30-90 days notice)	9,355,144	-	28,441,250	-	37,796,394
Biannually & Annually (45-120 days notice)	15,339,751	-	43,141,716	-	58,481,467
1 - 5 years	-	3,975,125	26,144	1,222,677	5,223,946
6 - 10 years	1,703,223	35,232,187	2,125,520	1,139,703	40,200,633
	$ 55,794,812	$ 39,207,312	$ 73,734,630	$ 5,716,545	$ 174,453,299

NOTE 4 - LAND, BUILDINGS AND EQUIPMENT

Land, buildings and equipment consist of the following:

	2017	2016
Land and improvements	$ 4,860,477	$ 4,079,465
Buildings	258,348,717	204,400,469
Equipment	18,238,186	18,681,487
Construction in progress	714,164	45,358,321
	$ 282,161,544	$ 272,519,742
Less: Accumulated depreciation	98,722,669	92,735,039
	$ 183,438,875	$ 179,784,703

NOTE 5 - LINE OF CREDIT

The College has a $5,000,000 unsecured line of credit with interest at monthly LIBOR plus 1.75% with a minimum floor of 2.5% renewable on March 31, 2018. At June 30, 2017 and 2016, there was no balance outstanding on this line and there were no draws during fiscal years 2017 and 2016.

NOTE 6 - BONDS PAYABLE

In December 2008, $15,895,000 of Series 2008D Revenue Bonds were issued by MHHEFA for the benefit of the College. The proceeds from the issue were used to extinguish the Series 2000A bonds which refinanced the construction of a student residence complex and renovations of Carnegie Science Hall, and the 2000B bonds which financed the construction of Pettengill Hall and improvements to the athletic facilities. The refunding converted variable interest rates on the Series 2000A and 2000B bonds to fixed interest rates on the Series 2008D bonds that range from 4.5% to 5.1%, resulting in an average interest rate of 5%. The Series 2008D bonds reach final maturity in 2022.

In April 2010, $13,600,000 of Series 2010A Revenue Bonds were issued by MHHEFA for the benefit of the College. The purpose of the issue was to finance the renovation, overhaul and equipping of two residence halls for use as academic classrooms and offices, and to fund miscellaneous capital improvements and capitalized interest during the construction period. The interest rates for these bonds range from fixed rates of 3.3% to 5.3% resulting in an average interest rate of 5%. These bonds reach final maturity in 2040.

In November 2013, $55,410,000 of Bates College Issue, Series 2013 Revenue Bonds were issued by MHHEFA for the benefit of the College. The proceeds were used to refund the Series 1997A bonds issued to construct a five-story academic building and a two-story maintenance building, and Series 2003B bonds issued to fund an electronic security access system and a new telephone system; to advance refund $3,060,000 of the Series 2006B bonds; to pay for the construction of a student residence complex and renovate two existing residence halls; to pay for capitalized interest during the construction period; to fund miscellaneous capital improvements and equipment; and to pay for the costs of issuance. The interest rates for these bonds range from fixed rates of 3% to 5% resulting in an average interest rate of 4.9%. These bonds reach final maturity in 2043.

On July 8, 2015, $27,790,000 of Bates College Issue, Series 2015 Revenue Bonds were issued by MHHEFA for the benefit of the College for the purpose of advance refunding all of the Series 2006B Revenue Bonds, the purpose of which was to renovate an existing chapel, construct a new residential village and a new dining facility, and fund miscellaneous capital improvements, equipment acquisitions, capitalized interest and costs of issuance. The interest rates for these bonds range from fixed rates of 3% to 5% with an average interest rate of 3.9% and reach final maturity in 2036.

The College has given a collateral interest in all its gross receipts and a negative pledge on the College's central facilities; a debt fund reserve has been established as collateral for the Series 2008D and Series 2010A bonds. The agreements contain various covenants regarding such items as additional permitted encumbrances, submission of financial statements and budgets, permitted dispositions and acquisitions of property, additional debt, and meeting certain debt coverage financial ratios.

Total interest expense for the years ended June 30, 2017 and 2016 was $3,750,601 and $2,344,116, net of interest capitalized of $758,593 and $2,140,203 for the years ended June 30, 2017 and 2016 respectively.

The approximate maturities of these bonds are as follows:

2018	$ 1,885,000
2019	1,730,000
2020	1,710,000
2021	2,205,000
2022	2,295,000
Thereafter	86,211,606
Unamortized original issue premiums and costs of issuance, net	357,185
Total	$ 96,393,791

NOTE 7 - NET ASSETS

Temporarily and permanently restricted net assets are composed of the following general classes of uses or purposes:

	2017		2016	
	Permanently Restricted	Temporarily Restricted	Permanently Restricted	Temporarily Restricted
Endowment, income to support				
Scholarships	$ 68,898,610	$ 44,729,031	$ 63,543,056	$ 35,124,154
Professorships	31,689,766	11,671,609	25,183,827	8,329,657
Library and other academic support	7,184,924	6,941,279	6,902,803	5,639,642
Other purposes	21,322,346	5,392,291	20,716,372	3,864,048
Any operation of the College	36,051,938	20,655,803	33,411,447	15,392,200
Pledges	28,037,655	43,564,449	10,622,753	2,648,913
Beneficial interest in perpetual trusts	5,970,254	-	5,664,628	-
Life income funds	16,176,807	3,141,633	15,083,966	2,876,959
Other purposes	275,000	14,433,551	-	14,596,619
	$ 215,607,299	$ 150,529,646	$ 181,128,852	$ 88,472,192

Changes in endowment net assets:

	Unrestricted	Temporarily Restricted	Permanently Restricted	Total
Endowment net assets, June 30, 2016	$ 31,255,454	$ 69,963,518	$ 149,757,505	$ 250,976,477
Investment income	262,324	1,735,356	5,220	2,002,900
Net realized and unrealized gains	5,354,203	32,572,331	875,118	38,801,652
Gifts and maturities	-	-	14,509,741	14,509,741
Endowment return used in accordance with spending policy	(1,807,134)	(10,650,950)	-	(12,458,084)
Reclassified investment gains	2,553,665	(2,553,665)	-	-
Endowment net assets, June 30, 2017	$ 37,618,512	$ 91,066,590	$ 165,147,584	$ 293,832,686

	Unrestricted	Temporarily Restricted	Permanently Restricted	Total
Endowment net assets, June 30, 2015	$ 36,915,668	$ 89,059,026	$ 135,526,664	$ 261,501,358
Investment income	153,747	957,359	1,727	1,112,833
Net realized and unrealized gains	(1,999,485)	(12,227,442)	371,039	(13,855,888)
Gifts and maturities	500,072	-	13,858,075	14,358,147
Endowment return used in accordance with spending policy	(1,809,238)	(10,330,735)	-	(12,139,973)
Reclassified investment gains	(2,505,310)	2,505,310	-	-
Endowment net assets, June 30, 2016	$ 31,255,454	$ 69,963,518	$ 149,757,505	$ 250,976,477

NOTE 8 - PENSION PLANS

All eligible College employees are covered under the Bates College Retirement Plan which is a 401(a) money purchase plan. Contributions to this plan are by the employer only and were 9% of wages for fiscal years 2017 and 2016. All eligible employees may also participate in the Bates College 403(b) Retirement Plan and may receive a 50% matching employer contribution to the plan, based on the participant's salary reduction contribution up to a maximum of 6% of the participant's compensation.

NOTE 8 - PENSION PLANS - CONTINUED

The College's contributions to these plans were $5,039,230 and $4,900,309 for the years ended June 30, 2017 and 2016, respectively.

Additionally, certain highly paid employees are eligible to participate in the Bates College 457(b) Supplemental Savings Plan. Contributions to this plan are by employees only. Under all plans, retirement benefits are individually funded and vested.

The College currently has an Early Retirement Plan offered to tenured faculty which provides certain incentives to retire. This Plan resulted in an expense of $761,958 and $677,521 for the years ended June 30, 2017 and 2016, respectively.

NOTE 9 - COMMITMENTS AND CONTINGENCIES

Investments in Partnerships

Certain of the College's investments in partnerships involve future cash commitments. These future cash commitments represent venture capital and private equity partnership commitments and amount to approximately $30 million and $26 million at June 30, 2017 and 2016, respectively.

Commitments for Utilities and Construction

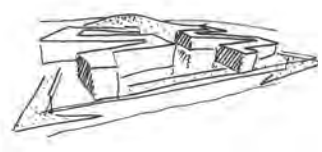
The College has entered into contracts for utilities and capital construction projects with a combined total balance of approximately $662,000 and $5 million at June 30, 2017 and 2016, respectively.

Contingencies

The College is subject to certain legal proceedings and claims which arise in the ordinary course of conducting its activities. In the opinion of management, the College has defensible positions and any ultimate liabilities will not materially affect the financial position of the College.

FIRM INTRODUCTION

We are a collective of 150 designers who are passionate about technologically complex buildings that are among the architectural profession's most programmatically intricate and energy intensive.



WHO WE ARE Our firm's depth of expertise in science and healthcare has produced a body of boldly original and exquisitely crafted buildings that are as profoundly humane in their accommodation of vital social needs as they are pioneering in their pursuit of energy and environmental performance. Located in Boston, surrounded by some of the world's premier medical, academic and research institutions, we are large enough to realize the benefits of a large firm, but small enough to offer the boutique attention a single office provides. We are a multifaceted firm with in-house specialists in medical and laboratory planning/programming, interior design, landscape architecture and building science. Led by ten Principals, our open studio environment helps us to focus our expertise and build a community of enthusiastic, engaged designers.

For over 85 years, our practice maintains an almost exclusive focus on technologically and programmatically complex buildings: hospitals, ambulatory care buildings, and other healthcare facilities; laboratories for basic science and health sciences research; and higher education facilities for science and medicine. These complex building types require a mastery of program and associated technological requirements.

Over the past decade, our work has increasingly focused on fusing building performance — in the areas of energy efficiency, occupant experience and programmatic innovation — with exceptionally well-executed architectural design. What has emerged from this **FUSION OF DESIGN + PERFORMANCE** is an architecture of consistently high quality and sophistication, as evidenced by a significant surge in national recognition, in both areas. It has also led to the development of a uniquely collaborative, participatory and entrepreneurial firm culture.

What Drives Us

PROGRAM Our firm culture is grounded in a deep reading of program as one of the essential subtexts of architecture. A thorough understanding of how laboratories and hospitals work — and more importantly, how people inhabit and use them — is the platform on which we propose new, prototypical configurations of space and systems.

SUSTAINABILITY Sustainability has played an integral role in our practice for well over 30 years. Long before the advent of LEED and climate change, we were aggressive advocates of heat recovery, demand-based ventilation and reduced lighting and plug loads in our research buildings. Guided by our nationally recognized Building Science Group, we continue to be at the forefront of innovative energy reduction strategies as a result of close interdisciplinary collaborations with our design teams, clients and engineers.

LANDSCAPE ARCHITECTURE Our approach to landscape — whether densely urban or pastorally rural — plays an equally deterministic role in our work. As evidenced by the diverse array of highly site-specific responses exhibited in our projects, we believe that the interrelationship between nature and the building's social geometry — our way of describing a people-centric organization of complex programmatic elements and systems — defines its soul.

COLLABORATIVE DESIGN Our role as architects is to work closely with our clients to develop options that are suited to their specific needs, budget and schedule. We believe our strengths are that we listen, ask questions, develop innovative alternatives for evaluation, and provide the framework for our clients to realize their vision of the building. The only way a building can be truly successful is when the architect and the client become a unified team. We reject the notion of singular authorship and view collaboration with our clients as the path to innovation. While we have grown considerably in both the extent of our reach and the depth of our talent, our foundation remains grounded in mutual respect, trust and shared values. We espouse a culture of collaborative inquiry, vigorous debate and the synthesis of the best ideas, irrespective of origin.

PROCESS Rigorously executed architecture requires persistent practice. Modeling — both physical and digital — is a critically important part of our culture, and takes on many different forms within the firm. Parametric tools, employed in conjunction with conventional models and physical mock-ups constructed in our fabrication facility, allow us to articulate how and why proposed solutions address client concerns. Our Building Science Group is embedded within each project at its outset, contributing to the earliest design objectives and their sustainability merits.

Academic Science Clients

The Aga Khan University
Albert Einstein College of Medicine
Amherst College
Boston College
Boston University
Brandeis University
Bridgewater State University
Brock University
Brown University
Bryn Mawr College
Cape Cod Community College
Carnegie Mellon University
Case Western Reserve
Clemson University
College of William and Mary
Columbia University
Connecticut College
Cornell University
Dartmouth College
Drew University
Drexel University
Duke University
Emory and Henry College
Franklin and Marshall College
George Washington University
Georgetown University
Gordon College
Harvard University
Houghton College
Hudson Valley Community College
Indiana University
Johns Hopkins University
Massachusetts Institute of Technology
Middlebury College
National University of Ireland, Galway
Northeastern University
Oberlin College
Ohio Wesleyan University
The Pennsylvania State University
Polytechnic Institute of New York Univ.
Princeton University
Radford University
Roanoke College
Rutgers University
Salem State University
Skidmore College
Skolkovo Inst. of Science & Technology
Smith College
Tufts University
Tulane University
University of Alabama at Birmingham
The University of Chicago
University of California, Los Angeles
The University of Chicago
University of Colorado
University of Indianapolis
University of Kentucky
University of Maine
University of Maryland
University of Massachusetts
University of Pennsylvania
University of Pittsburgh
University of Rhode Island
University of Washington
The University of Texas
University of Utah
Utah State University
Vanderbilt University
Virginia Commonwealth University
Washington and Lee University
Wellesley College
Wesleyan University
West Virginia University
Wheaton College, Illinois
Williams College
Yale University

ROBERT J. SCHAEFFNER, FAIA, LEED AP PRINCIPAL

I believe the best design ideas are those that transcend the original problem statement by addressing a broader spectrum of challenges while capturing the imagination. Really strong ideas always prevail.

EDUCATION

Bachelor of Architecture, 1981, Rhode Island School of Design, Providence, RI

Bachelor of Fine Arts in Architecture, 1980, Rhode Island School of Design, Providence, RI

New Jersey Institute of Technology, School of Architecture, Newark, NJ, 1976-78

RECENT TEACHING & LECTURES

"Engineering and Life Science Integration: Emerging Prototype Facilities for Research and Teaching Programs," *Tradeline College and University Science and Engineering Facilities Conference*, April 2016

"Chemistry Teaching Labs: Facility Planning Requirements for the Spectrum of Disciplines," *Tradeline College and University Science Facilities Conference*, 2015

"Ventilation Deflation: Strategies to Reduce HVAC Energy Consumption in Laboratory Buildings," *ArchitectureBoston Expo/ABX,* 2015

"Heat Recovery – Efficiency and Safety; Integrated Science Building," *Designing for Sustainability in the Built Environment at UMass Amherst,* March 2010

"Science Learning Centers: How to Make them Work," *Tradeline Conference*, 2000

PUBLICATIONS

"Taking Center Stage: Tomorrow's Chemistry Teaching Laboratory," *Innovations and Renovations: Designing the Teaching Laboratory* (American Chemical Society Symposium Series), April 2014

"Shedding Light on the Sciences," *Academic Source Guide/ Lab News*, November 2009

"Recovering from Sputnik: What Should Colleges do with their Outdated Science Buildings," *Planning for Higher Education*, Winter 1997-1998

RELEVANT EXPERIENCE

Bates College, New Science Building 54,000 GSF .

Northeastern University, Interdisciplinary Science and Engineering Complex: 234,000 GSF.

Amherst College, New Science Center, 255,000 GSF.

Beneski Earth Sciences Building and Museum of Natural History: 60,000 GSF.

Lafayette College, Integrated Science Center, 100,000 GSF.

Alexandria Real Estate Equities, Lab/Office Building at 75/125 Binney Street: 340,000 GSF.

Georgetown University, Science Facilities Master Plan and Regents Hall Science Center: 154,000 GSF Phase I: Includes biology, chemistry and physics teaching and research spaces.

Connecticut College, New London Hall Addition and Renovation: 41,800 GSF to house biology, botany and computer science.

Skidmore College, Center for Integrated Sciences: 198,632 GSF.

Utah State University, Biological Sciences Building and BRN Remodel/ Addition: 120,000 GSF.

University of Massachusetts, Amherst, Integrated Sciences Building: 162,675 GSF. Includes biology and chemistry research and teaching spaces. This project shapes the northern terminus of the Stockbridge area of campus.

CNS Research & Education Greenhouse: 16,000 GSF new, 4,500 GSF renovation.

Princeton University, Frick Chemistry Laboratory: 265,000 GSF. *In association with Hopkins Architects.*

Jadwin Hall Level A Classroom Renovations: 25,000 GSF.

Center for Theoretical Physics: 29,000 GSF renovation.

Guyot Hall Addition and Alterations: 150,000 GSF addition and 30,000 GSF renovation to include teaching and research labs for biology and geoscience.

Princeton Environmental Institute (PEI): 16,500 SF renovation.

Frick Chemistry Laboratories, Department of Chemistry: 143,000 GSF.

Chemical Engineering Quadrangle, 20,000 SF: Renovations to various areas of seven wings in the Engineering Quadrangle including classrooms, laboratories, support space and library.

Schultz Laboratory: 48,000 SF addition for molecular biology department. Exterior design consultant: Venturi, Scott Brown and Associates.

Moffett Laboratory Renovation: 50,000 SF for cell biology research.

Lewis Thomas Laboratory: 115,000 SF new headquarters for department of molecular biology. Exterior design consultant: Venturi, Scott Brown and Associates.

The University of Miami, Integrated Science Building, 70,000 GSF.

ARIAD Pharmaceuticals, Laboratory and Office Fit-Out Phase 1: 244,000 SF, Phase 2: 106,112 SF.

Brock University, Cairns Family Health and Biosciences Research Complex: 140,000 SF research building.

Utah State University, Life Sciences Research Center: 110,000 GSF: Includes biomedical, biotechnology and engineering research laboratories, vivarium and biocontainment facilities. Design consultant to ajc architects.

Wesleyan University, Molecular Life Science Building: 221,000 GSF for biology, molecular biology and chemistry departments. Project on hold at end of Design Development phase.

Johns Hopkins University School of Medicine, Broadway Research Building: 371,900 GSF: Flagship research facility.

Oberlin College, New Science Center: 230,209 GSF includes 150,000 SF addition and 80,209 SF of comprehensive renovations for the departments of biology, neuroscience, chemistry, physics and the science library.

Middlebury College, McCardell Bicentennial Hall: 215,000 GSF. New building including biology, chemistry, physics, geology, geography, psychology and computer science.

College of Wooster, Severance Chemistry Building: 14,000 SF addition and 28,000 SF renovation.

Harvard University, Chemistry Link Building: 33,000 GSF.

University of Vermont, College of Medicine: 120,000 SF.

Massachusetts General Hospital, Wellman Research Building: 144,000 GSF.

Payette, Studio Fit-Out, Atlantic Wharf, 290 Congress Street, 5th Floor: 41,430 SF.

Confidential Corporate Client, Site Expansion: New 43,000 GSF Addition and 42,000 GSF Renovation for biology and chemistry research.

Boston Scientific, Preclinical Research Laboratory: 80,000 GSF.

Transkaryotic Therapies, 180,000 GSF fit-out of existing structure for R&D Laboratories.

Biogen, Building 6A: Corporate Laboratory, Office and Cogeneration Facility: 141,360 SF.

Building 6: Corporate Research Facility: 180,000 SF.

Building 9: Research Facility: 205,000 GSF. Project on hold.

Building 8: Biological Research Facility: 280,000 SF.

Massachusetts State Police, Crime Lab Consolidation Study and Feasibility Expansion Plan.

Forensic and DNA Laboratory Study: 250,000 GSF.

Brigham and Women's Hospital, Advanced Multimodal Image Guided Operating Rooms: 5,700 GSF Integrated OR, MRT, PET Scan and MRI Suite for diagnostic oncology.

Radiation Oncology Vault and CT Simulator/LDR Room: 4,000 SF new Varian Silhouette Linear Accelerator room and CT Simulator with Low Dose Radiation Room.

MRI Renovation: 5,700 SF. Renovation of an existing MRI imaging and treatment suite. Includes a new GE 3T Signa Excite and Siemens 3T Trio and upgrades to an existing ultrasound treatment room, adjacent CT reading room and support spaces.

JAN B. S. WIEGMAN, PE
Project Manger

PROJECT ASSIGNMENT: Project Manager

Education
M.S., Civil Engineering Rice University

B.S. Civil Engineering University of New Hampshire

Professional Registration
Maine

Experience
35 Years

Joined Firm
2011

Professional Certification
MaineDOT Local Project Administrator

Professional Affiliations
American Society of Civil Engineers

EXPERIENCE SUMMARY

Mr. Wiegman has over 34 years of engineering design, permitting and project management experience on a wide variety of civil, structural and transportation projects. Most recently, he has been managing several large-scale site development and transportation related projects and giving technical guidance on a wide variety of projects including pedestrian projects and transportation.

RELEVANT PROJECT EXPERIENCE

Site Development/Permitting

- Chewonki Foundation Campus Expansion, Wiscasset, ME
- Bates College STEM Building, Lewiston, ME
- Zoning Change, Bates College, Lewiston, ME
- Long Term Care Facility, The Cedars, Portland, ME
- Wayfair Parking Lot Construction, Brunswick Landing, Brunswick, ME
- Acadia Harvest Inc. Aquaculture Facility, Gouldsboro, ME
- CLC YMCA Expansion Project Site Planning, Damariscotta, ME
- Bear Self Storage, Site Plan, Auburn, ME
- Commerce Way Industrial Subdivision, Brunswick Landing, Brunswick, ME
- Coastal Maine Botanical Gardens, Expansion, Boothbay, ME
- Demolition Contract 2 Brunswick Landing, Brunswick, ME
- New England Tent and Awning Drying Facility, Brunswick, ME
- Pelican Street Parking Lot Reconstruction, Brunswick Landing, Brunswick, ME
- Burbank Street Parking Lot Reconstruction, Brunswick Landing, Brunswick, ME
- 25 Building Demolition Plan - Brunswick Landing, Brunswick, ME
- Subdivision Permitting Brunswick Landing, Brunswick, ME
- Residence Halls Project, Bates College, Lewiston, ME
- Greater Androscoggin Humane Society Site Plan, Lewiston, ME
- Wetlands Permitting South Oakfield Road Improvements, Oakfield, ME
- Topsham Commerce Park Subdivision, Topsham, ME
- Onshore Aquaculture Facility, Gouldsboro, ME
- Wetland Permitting Centerline Brook Crossing, Oakfield, ME
- Anaerobic Digester – Brunswick Landing, Brunswick, ME
- Boat Yard Facility Planning, Brunswick, ME
- Hockey Facility Sketch Plans, Brunswick, ME
- Boathouse Land Use Study, Bates College, Greene, ME
- Parking Lot Expansion - CLC YMCA, Damariscotta, ME

*experience from previous employer

- Brunswick Landing Planning Permit, Brunswick, ME
- Brunswick Landing Subdivision, Brunswick, ME
- Onshore Aquaculture Facility, Harpswell, ME
- Pool Addition - CLC YMCA, Damariscotta, ME
- The Lofts at No. 4 Mill, Sanford, ME
- Fed-Ex Distribution Center, Lewiston, ME*
- US Postal Service Center, Great Neck, NY*
- Lufthansa Constellation Hangar, Auburn, ME*
- Sanford Gateway Center, Sanford, ME*
- Whole Foods, Portland, ME*
- The Lofts at No. 4 Mill, Sanford, ME
- Bath Savings Institution, South Portland, ME*
- University Credit Union, Portland, ME*
- Nappi Distributors, Gorham, ME*
- St Mary's Regional Medical Center, Operating Room Addition, Lewiston, ME*
- Advanced Auto, Auburn, ME*
- Apple Valley Estates, Lewiston, ME*
- Birch Hill Apartments, Lewiston, ME*
- Scarborough Gallery, Scarborough, ME*
- CVS Pharmacy, Wells, Kennebunk, Augusta and Lewiston, ME*
- Grocery Store Site Development - ME, NH, VT, MA, NY, VA, NC*

Transportation

- Tufts Pond Road Reconstruction Plan, Kingfield, ME
- Admiral Fitch Avenue Lane Reconfiguration, Brunswick, ME
- Route 1 Construction Detour, Woodland Mill, Baileyville, ME
- North Street Rehabilitation, Phase 2, Bath, ME
- North Street Drainage Improvements, Bath, ME
- North Street Rehabilitation, Phase 1, Bath, ME
- Elm Street Sidewalk, Newport, ME
- Main Street Sidewalk and Street Lighting, Biddeford, ME
- South Oakfield Road Improvements and Permitting, Oakfield, ME
- High Street Rehabilitation, Bath, ME
- Hillside Street Reconstruction, Yarmouth, ME
- South Oakfield Road Improvements Review, Oakfield, ME
- Old Alfred Road Sidewalk, Waterboro, ME
- Route 25 and 35 Sidewalks, Standish, ME
- Route 1 Weigh Station Improvements, Kittery, ME

- US Route 1/Lewis Road Intersection Improvements, Kittery, ME
- Hutchins Street Reconstruction, Berlin, NH
- Roadway Reconstruction, Fitchburg, MA
- Walnut Hill Road at Hoyt Road, Intersection Improvements, Bethel, CT
- Roadway Reconstruction, Hartford, CT
- Drainage Design, Route 2/17, Dixfield, ME*
- Route 9/196 Intersection Improvements, Lisbon, ME*
- Franklin Pasture Bike Path, Lewiston, ME*
- Maine Turnpike Exit 86 Interchange, Sabattus, ME*

Sewer

- Engineered Septic System, Coastal Maine Botanical Gardens, Boothbay, ME
- Sewer Improvement Contract #2, Brunswick Landing, Brunswick, ME
- Sewer Outfall Review, Old Town, ME
- Inflow/Infiltration Removal Contract 1- Brunswick Landing, Brunswick, ME
- Sewer System Evaluation - Brunswick Landing, Brunswick, ME

Stormwater

- Phosphorous Treatment Plan Coastal Maine Botanical Gardens, Boothbay, ME
- Willow Street Drainage Study, Bath, ME
- Stormwater Management Plan – Cobalt Court Subdivision, Windham, ME
- Stormwater Management Plan – Lilac Lane Subdivision, Gorham, ME
- Stormwater Management Plan – Laura Lane Subdivision, Gorham, ME
- Storm Drain Improvement, Pepperell Road, Kittery, ME
- Stormwater Management Plan - CLC YMCA, Damariscotta, ME
- Stormwater Plan – Bangor Concert Venue, Bangor, ME
- Culvert Analysis - Back Narrows Road, Boothbay, ME
- Phosphorous Treatment Plan - The Lofts at No. 4 Mill, Sanford, ME
- Water Quality Treatment Unit O&M Manual, Lebanon, NH
- Stormwater Infiltration Plan - Sanford Gateway Center, Sanford, ME*
- Stormwater Treatment Plan - Scarborough Gallery, Scarborough, ME*
- Stormwater Treatment Plan - Nappi Distributors, Gorham, ME*
- Stormwater Infiltration Plan - New Balance Factory Outlet, Oxford, ME*
- Stormwater Pollution Prevention Plan (SWPPP) Soil Erosion and Water Pollution Control Plans, Various Locations, ME*

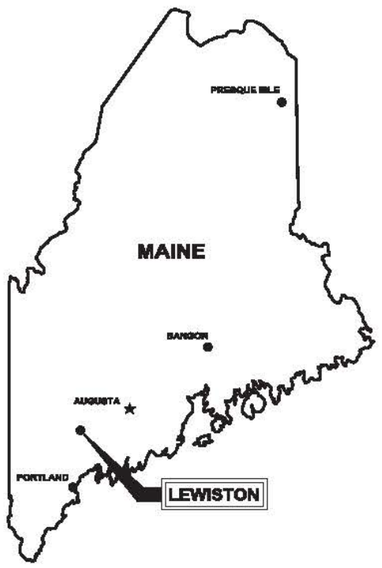
Building Improvements and Funding Approvals

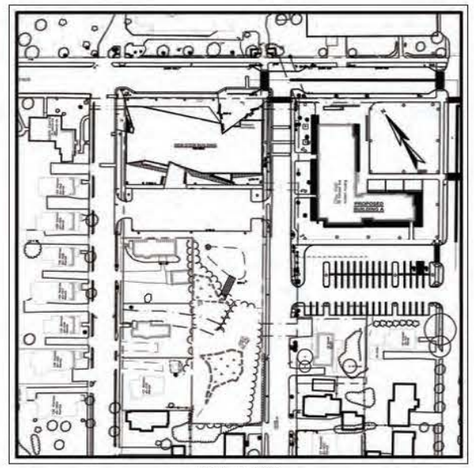
- Hangar 4 Building Improvements, Brunswick Landing, Brunswick, ME
- Building Demolition Contract #2 Brunswick Landing, Brunswick, ME
- Metering and Life Safety Improvements - Brunswick Landing, Brunswick, ME
- Paint Booth Project, Kestrel Aviation, Brunswick, ME
- TechPlace Building Improvements - Brunswick Landing, Brunswick, ME
- Building Demolition Contract #1- Brunswick Landing, Brunswick, ME

Dam Improvements

- Lovejoy Pond Dam Evaluation, Wayne, ME
- KLPD Dam Inspections, Kennebunk, ME
- Kesslen Dam Concrete Rehabilitation - KLPD, Kennebunk, ME
- Kesslen Dam Gate Improvements - KLPD, Kennebunk, ME
- Calef Lake Dam Replacement, Auburn, NH
- Sebasticook Lake Dam Gate Replacement, Newport, ME
- Dam Breach Analysis Upper and Lower Reservoir Dams, Goffstown, NH
- Pleasant Lake Dam Improvements, New London, NH

SITE PLAN REVIEW
FOR
BATES COLLEGE
STEM PROJECTS
AUGUST 2018





SITE PLAN
SCALE: 1"=80'

LOCATION PLAN
SCALE: 1"=1,000'

STATE OF MAINE
JAN
B.S.
WIEGMAN
No. 5852
PROFESSIONAL ENGINEER

DRAWING INDEX

GENERAL

-------	COVER SHEET

CIVIL

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C4.0	PROPOSED SITE LAYOUT PLAN
C5.0	PROPOSED GRADING AND DRAINAGE PLAN
C6.0	PROPOSED SITE UTILITIES PLAN
C7.0	EROSION CONTROL PLAN
C7.1	EROSION CONTROL NOTES AND DETAILS
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L1.0	MATERIALS MANAGEMENT PLAN
L2.0	PLANTING PLAN
L3.0	SITE SECTIONS
L4.0	SITE DETAILS

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APPROVED BY
CITY OF LEWISTON PLANNING BOARD

CHAIRPERSON DATE

WP PROJECT No. 14021A

GENERAL NOTES

1. BELOW GRADE UTILITY INFORMATION IS BASED ON INFORMATION PROVIDED BY EACH UTILITY. LOCATION OF PUBLIC UTILITIES SHOWN IS ONLY APPROXIMATE AND MAY NOT BE COMPLETE. PRIVATE UNDERGROUND UTILITIES SUCH AS, BUT NOT LIMITED TO, SEWER LINES, WATER LINES AND BURIED ELECTRICAL SERVICE ENTRANCES ARE NOT SHOWN. THE CONTRACTOR SHALL ASCERTAIN THE LOCATION AND SIZE OF EXISTING UTILITIES IN THE FIELD WITH THE RESPECTIVE UTILITY REPRESENTATIVE PRIOR TO COMMENCING WORK. UTILITY CONTACTS ARE AS FOLLOWS.

   ELECTRIC:
   CENTRAL MAINE POWER
   57 OLD WINTHROP ROAD
   AUGUSTA, MAINE 04330
   207-626-9445

   CABLE TELEVISION:
   TIME WARNER CABLE
   37 ALFRED PLOURDE PARK WAY
   LEWISTON, ME 04240
   207-783-9902

   WATER/SEWER/DRAIN:
   CITY OF LEWISTON PUBLIC WORKS
   103 ADAMS AVE
   LEWISTON ME 04240
   207-513-3003

   TELEPHONE:
   FAIRPOINT
   5 DAVIS FARM ROAD
   PORTLAND, ME 04103
   207-878-0854

   DIG SAFE:
   TEL. 1-800-DIGSAFE

   TELEPHONE:
   OXFORD NETWORKS
   491 LISBON STREET
   LEWISTON, ME 04240
   207-333-3471

   GAS:
   UNITIL
   376 RIVERSIDE INDUSTRIAL PARKWAY
   PORTLAND, ME 04103
   207-541-2568

   ALL UTILITY COVERS OR SIMILAR STRUCTURES TO MATCH THE NEW PAVEMENT GRADE AND THE RELOCATION OF UTILITY POLES WILL BE PERFORMED BY THE APPROPRIATE UTILITY OR ITS AUTHORIZED REPRESENTATIVE. THE CONTRACTOR SHALL COOPERATE WITH THE UTILITY IN EVERY WAY TO EXPEDITE SUCH ADJUSTMENTS. CONTRACTOR TO COORDINATE ALL UTILITY RELOCATION AND INSTALLATION WITH THE APPROPRIATE UTILITY COMPANY.
2. ALL TEST PITS SHALL BE EXCAVATED PRIOR TO CONSTRUCTION LAYOUT AT THE APPROXIMATE LOCATIONS NOTED ON THE PLANS AND AT UTILITY CROSSING MARKED IN THE FIELD BY UTILITY COMPANIES, AND ACTUAL LOCATIONS OF SUBSURFACE UTILITIES SHALL BE REPORTED TO THE ENGINEER. WHERE APPROPRIATE, MINOR ADJUSTMENTS TO THE ALIGNMENTS OF PROPOSED LINES SHALL BE MADE TO ACCOMMODATE EXISTING UTILITIES. ALL ADJUSTMENTS (NORTHINGS, EASTINGS AND ELEVATIONS) MUST BE DEPICTED IN THE RECORD AS-BUILT DRAWING DATA SUBMITTED TO THE ENGINEER FOR INCLUSION IN THE RECORD AS-BUILT DRAWINGS.
3. COMPACTION TESTS SHALL BE PERFORMED IN ACCORDANCE WITH MDOT SPECIFICATIONS. ANY SETTLEMENT OCCURRING WITHIN ONE YEAR OF SUBSTANTIAL COMPLETION OF THE PROJECT WILL BE CORRECTED BY THE CONTRACTOR IN A MANNER ACCEPTABLE TO THE ENGINEER AT NO ADDITIONAL EXPENSE TO THE OWNER.
4. BORING LOGS, PROBE LOGS AND THE GEOTECHNICAL REPORT ARE INCLUDED AS AN ATTACHMENT TO THE SPECIFICATIONS.
5. ALL EXISTING SEWER AND STORM DRAIN LINES ENCOUNTERED DURING CONSTRUCTION ARE TO REMAIN IN SERVICE EXCEPT AS OTHERWISE INDICATED. ANY EXISTING SEWERS, STORM DRAIN LINES OR CULVERTS DAMAGED DURING CONSTRUCTION AND NOT TO BE REPLACED SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
6. DO NOT SCALE DRAWINGS UNLESS OTHERWISE NOTED. WRITTEN DIMENSIONS AND STATIONING SHALL PREVAIL. REPORT ANY DISCREPANCIES IMMEDIATELY TO THE ENGINEER.
7. ALL STRUCTURES AND PIPELINES LOCATED ADJACENT TO THE TRENCH EXCAVATION SHALL BE PROTECTED AND FIRMLY SUPPORTED BY THE CONTRACTOR UNTIL THE TRENCH IS BACKFILLED. INJURY TO ANY SUCH STRUCTURES CAUSED BY, OR RESULTING FROM, THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. ALL UTILITIES REQUIRING REPAIR, RELOCATION OR ADJUSTMENT AS A RESULT OF THE PROJECT SHALL BE COORDINATED THROUGH THE RESPECTIVE UTILITY.
8. IN THOSE INSTANCES WHERE POWER OR TELEPHONE POLE SUPPORT IS REQUIRED, THE CONTRACTOR SHALL PROVIDE A MINIMUM 48-HOUR NOTIFICATION TO CENTRAL MAINE POWER, TIME WARNER, OR FAIR POINT RESPECTIVELY. NO ADDITIONAL PAYMENT WILL BE PROVIDED FOR TEMPORARY BRACING OF UTILITIES. THE CONTRACTOR SHALL COORDINATE RELOCATION OF TELEPHONE POLES WITH CENTRAL MAINE POWER.
9. CONTRACTOR SHALL INSTALL AND MAINTAIN PERMANENT AND TEMPORARY TRAFFIC CONTROL DEVICES AS NECESSARY AND IN A MANNER CONSISTENT WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.).
10. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING TRAFFIC FLOW AT ALL TIMES. THE CONTRACTOR IS REQUIRED TO SUBMIT A TRAFFIC CONTROL PLAN TO THE OWNER AND ENGINEER PRIOR TO COMMENCING CONSTRUCTION. THE POLICE DEPARTMENT AND FIRE DEPARTMENT ARE TO BE NOTIFIED AT LEAST 24 HOURS IN ADVANCE OF ANY STREET CLOSING OR DETOUR.
11. THE OWNER SHALL BE RESPONSIBLE FOR OBTAINING ANY NECESSARY RIGHTS-OF-WAY AND EASEMENTS. THE CONTRACTOR SHALL VERIFY THAT THE NECESSARY EASEMENTS HAVE BEEN SECURED BY THE OWNER. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO BE FAMILIAR WITH THE APPLICABLE PROVISIONS OF EACH EASEMENT AS THEY APPLY TO THE WORK PRIOR TO BIDDING AND ABIDE BY THOSE PROVISIONS DURING CONSTRUCTION. COPIES OF ANY SUCH RIGHTS-OF-WAY AND EASEMENTS ARE AVAILABLE FOR REVIEW FROM BATES COLLEGE.
12. OPEN TRENCHES IN THE ROADWAY MUST BE BACK FILLED AT THE END OF THE WORKDAY, UNLESS PERMISSION TO LEAVE THEM OPEN IS GIVEN IN WRITING BY THE CITY OF LEWISTON. ALL STREETS MUST BE PAVED PRIOR TO THE WINTER SHUTDOWN. TEMPORARY PAVEMENT SHALL BE CONSIDERED INCIDENTAL.
13. CONTRACTOR SHALL CONTROL DUST TO A TOLERABLE LIMIT. CONTRACTOR SHALL NOT TRACK OR SPILL EARTH AND DEBRIS ON PUBLIC STREETS OUTSIDE THE PROJECT AREA. STREETS OPENED TO THE PUBLIC SHALL BE KEPT SWEPT AND FREE OF DEBRIS.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESETTING ALL EXISTING PROPERTY MONUMENTATION THAT IS DISTURBED BY HIS OPERATIONS AT NO EXPENSE TO THE OWNER. THIS WORK IS TO BE DONE BY A LAND SURVEYOR LICENSED IN THE STATE OF MAINE. PROPERTY BOUNDS FOUND ARE SHOWN ON LAYOUT PLANS, THIS MAY NOT BE INCLUSIVE OF ALL BOUNDS THAT EXIST IN THE PROJECT AREA. IF ANY ADDITIONAL BOUNDS ARE FOUND, THE CONTRACTOR SHALL DOCUMENT THE LOCATION AND NOTIFY THE ENGINEER.
15. SUITABLE EXCAVATED MATERIAL MAY BE INCORPORATED IN THE PROJECT. EXCESS MATERIAL WILL BECOME PROPERTY OF THE CONTRACTOR. SILT FENCE AND STABILIZATION OF EXCESS SOIL IS ALSO REQUIRED. THE CONTRACTOR SHALL DISPOSE OF UNSUITABLE AND EXCESS MATERIAL IN ACCORDANCE WITH THE APPLICABLE SECTIONS OF THE CONTRACT DOCUMENTS AND ALL STATE, FEDERAL AND LOCAL REGULATIONS.
16. CONSTRUCT HANDICAP RAMPS AT ENDS OF ALL SIDEWALKS, FOR DRIVEWAYS OR ROADWAYS AND AS OTHERWISE SHOWN ON THE PLANS. SIDEWALKS AND HANDICAP RAMPS SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT (ADA).
17. THE CONTRACTOR IS TO TAKE SPECIAL CARE NOT TO DAMAGE TREES WITHIN THE CONSTRUCTION AREA UNLESS THEY ARE NOTED TO BE REMOVED.
18. APPROXIMATE LIMIT OF WORK ON PLANS IS INTENDED TO SHOW GENERAL SCOPE OF THE WORK. ACTUAL LIMITS OF THE WORK ARE TO BE DETERMINED IN THE FIELD TO MEET PROJECT NEEDS AS DETERMINED BY THE OWNER AND THE ENGINEER.
19. PAVEMENT IS TO BE SAWCUT AT ALL SIDE ROADS, PAVED DRIVES, PAVED SIDEWALKS, AS WELL AS THE BEGINNING AND END OF THE PROJECT LIMITS. PAVEMENT GRINDING BEYOND THE SAW CUT WILL BE REQUIRED AT ALL LOCATIONS.
20. SAW CUT LINES FOR PAVED DRIVEWAY & SIDEWALK MATCHES ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY SAW CUT LOCATION FOR DRIVEWAY & WALKWAY MATCHES.
21. CURB CUT LOCATIONS FOR DRIVEWAYS SHALL BE FIELD VERIFIED. ADJUST CURB CUTS IF APPROPRIATE.
22. THE CONTRACTOR SHALL NOTIFY RESIDENTS 48 HOURS IN ADVANCE OF WHEN CONSTRUCTION WILL DISRUPT ACCESS TO THE RESIDENTS PROPERTY, INCLUDING DRIVEWAYS, WALKWAYS, ETC. DURING NOTIFICATION, CONTRACTOR SHALL VERIFY WITH OWNER ANY KNOW BOUNDARY MARKER LOCATIONS.
23. EXISTING SIGNS THAT ARE IMPACTED BY THIS PROJECT SHALL BE RESET PER CITY STANDARDS AND IN ACCORDANCE WITH MDOT AND M.U.T.C.D. ADDITIONAL SIGNS MY BE REQUIRED AS DIRECTED BY THE ENGINEER.
24. THE INVERTS INDICATED ARE THE INVERTS AT THE INSIDE FACE OF THE MANHOLE.
25. FLOWS FROM DEWATERING EFFORTS SHALL NOT BE DISCHARGED TO SANITARY SEWERS.

EXISTING SITE NOTES:

1. THE LOCATIONS OF UNDERGROUND UTILITIES AND STRUCTURES, AS SHOWN ON THE DRAWINGS, ARE APPROXIMATE AND MAY NOT BE COMPLETE. NO GUARANTEE IS MADE THAT UTILITIES OR STRUCTURES WILL BE ENCOUNTERED WHERE SHOWN OR THAT ALL UNDERGROUND UTILITIES AND STRUCTURES ARE SHOWN. ALL LOCATIONS AND SIZES OF EXISTING UTILITIES AND STRUCTURES SHALL BE VERIFIED IN THE FIELD WITH TEST PITS AS REQUIRED PRIOR TO BEGINNING CONSTRUCTION OF NEW FACILITIES OR PIPING THAT MAY BE AFFECTED. THE CONTRACTOR WILL REALIGN NEW PIPE LOCATIONS AS REQUIRED TO CONFORM TO EXISTING LINES AND AS APPROVED BY THE ENGINEER.
2. CONTRACTOR TO NOTE THAT, IN GENERAL, ALL EXISTING CONDITION INFORMATION ON THE DRAWINGS ARE SHOWN WITH A LIGHTER LINE WEIGHT AND WITH A SLANTED TYPE TEXT.
3. UNLESS OTHERWISE NOTED, THERE IS NO KNOWN ASBESTOS WITHIN THE AREA OF WORK. IF THE PRESENCE OF ASBESTOS IS DISCOVERED, THE CONTRACTOR SHALL NOTIFY THE OWNER AND THE ENGINEER IMMEDIATELY. DISPOSAL OF ASBESTOS SHALL BE IN ACCORDANCE WITH STATE OF MAINE REGULATIONS.

DEMOLITION NOTES:

1. REFER TO THE EXISTING SITE PLAN, DWG C3.0, FOR ADDITIONAL INFORMATION REGARDING EXISTING FACILITIES. REFER TO DWG C4.0 FOR LIMITS OF WORK.
2. ALL PIPING, EQUIPMENT AND MATERIALS TO BE DEMOLISHED AND/OR REMOVED FROM SERVICE SHALL BE COORDINATED WITH THE OWNER AND ENGINEER BEFORE COMMENCING THAT WORK. EXISTING PIPES AND CONDUIT DESIGNATED AS "ABANDONED" MAY BE REMOVED IF THE CONTRACTOR SO CHOOSES. IF ABANDONED PIPE CONFLICTS WITH PROPOSED YARD PIPING, THEN A PORTION OF THE ABANDONED PIPE SHALL BE REMOVED AND THE NEW ENDS OF ABANDONED PIPE CAPPED, OR PLUGGED WITH CONCRETE.
3. ALL EXISTING PIPING AND UTILITIES WHICH ARE BENEATH PROPOSED STRUCTURES, AND ARE TO BE ABANDONED, SHALL BE REMOVED TO A MINIMUM OF 5 FEET OUTSIDE OF THE STRUCTURE. PIPE AND UTILITIES BENEATH PROPOSED STRUCTURES THAT ARE TO REMAIN SHALL BE CONCRETE ENCASED, UNLESS OTHERWISE INDICATED.
4. SEVERING OF EXISTING UTILITIES FOR ABANDONMENT, OR REMOVAL OF A SEGMENT FROM SERVICE, SHALL BE PERFORMED IN SUCH A MANNER AS TO ALLOW THE REMAINING ACTIVE SEGMENT TO CONTINUE IN ITS INTENDED SERVICE. CAP ACTIVE SEGMENTS WITH APPROPRIATE FITTINGS, JOINT RESTRAINT, ETC. TO ENSURE THEIR INTEGRITY. PLUG ENDS OF ABANDONED PIPE SEGMENTS WITH CONCRETE UNLESS SPECIAL CIRCUMSTANCES DICTATE PLUGGING ABANDONED PIPES WITH BLIND FLANGES, RESTRAINED MECHANICAL JOINT PLUGS, ETC. AS APPROPRIATE.

DEMOLITION NOTES (CONTINUED):

5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING AND DISPOSING OF ALL DEMOLISHED PIPING, EQUIPMENT AND MATERIALS. DISPOSAL SHALL BE IN ACCORDANCE WITH ALL STATE AND LOCAL REGULATIONS. THE OWNER RESERVES THE RIGHT TO RETAIN ANY SUCH PIPING, EQUIPMENT AND MATERIALS DESIGNATED FOR DEMOLITION FOR HIS USE. SUCH MATERIALS TO BE RETAINED SHALL BE PROPERLY STORED IN AN ON-SITE LOCATION. COORDINATE LOCATION AND MATERIALS TO BE SALVAGED WITH THE OWNER/ENGINEER.
7. THE CONTRACTOR SHALL KEEP A RECORD OF DEMOLITION AS PART OF THE PROJECT RECORD DOCUMENTS.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE APPROPRIATE DISPOSAL OF FLOWS RESULTING FROM PRECIPITATION AND HIS DEWATERING OPERATIONS.

SITE GRADING NOTES:

1. STRIPPING OF TOPSOIL (LOAM) SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION 311100. REFER TO DWG C3.0, FOR LIMIT OF WORK AND STRIPPING.
2. CONTRACTOR SHALL MINIMIZE CLEARING OPERATIONS. CLEARING AND GRUBBING SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION 311100. CLEARING LIMITS SHALL BE AS INDICATED ON THE DRAWINGS, BUT AT ALL TIMES WITHIN PROPERTY LINES OR EASEMENTS. ALL GRUBBINGS AND EXCESS EXCAVATED MATERIAL ARE THE PROPERTY OF THE CONTRACTOR AND WILL BE DISPOSED OF AT A SITE PROVIDED BY THE CONTRACTOR IN COMPLIANCE WITH ALL STATE AND LOCAL LAWS.
3. ALL AREAS THAT ARE EXCAVATED, FILLED OR OTHERWISE DISTURBED BY THE CONTRACTOR AND ARE NOT TO BE PAVED OR FILLED WITH GRAVEL OR RIPRAP SHALL BE LOAMED, GRADED, LIMED, FERTILIZED, SEEDED AND MULCHED. ALL AREAS TO RECEIVE 4" OF TOPSOIL EXCEPT AREAS ADJACENT TO STREAMS, WHICH WILL REQUIRE 6" OF TOPSOIL.
4. THE CONTRACTOR SHALL NOT HAVE ANY RIGHT OF PROPERTY IN ANY MATERIALS TAKEN FROM ANY EXCAVATION. SUITABLE EXCAVATED MATERIAL MAY BE INCORPORATED IN THE PROJECT, WITH EXCESS MATERIAL DISPOSED OF AT A LOCATION PROVIDED BY THE CONTRACTOR. THESE PROVISIONS SHALL IN NO WAY RELIEVE THE CONTRACTOR OF HIS OBLIGATIONS TO PROPERLY DISPOSE OF AND REPLACE ANY MATERIAL DETERMINED BY THE ENGINEER TO BE UNSUITABLE FOR BACKFILLING. THE CONTRACTOR SHALL DISPOSE OF UNSUITABLE AND EXCESS MATERIAL IN ACCORDANCE WITH THE APPLICABLE SECTIONS OF THE CONTRACT DOCUMENTS.
5. THE CONTRACTOR SHALL PROVIDE PROPER EROSION CONTROL AND DRAINAGE MEASURES IN ALL AREAS OF WORK, AND CONFINE SOIL SEDIMENT TO WITHIN THE LIMITS OF EXCAVATION AND GRADING. PRIOR TO BEGINNING EXCAVATION WORK, EROSION CONTROL FENCE OR BERM SHALL BE INSTALLED AT THE DOWN GRADIENT PERIMETER OF THE ACTUAL LIMITS OF GRUBBING AND/OR GRADING, AND AS SHOWN ON THE DRAWINGS. EROSION CONTROL MEASURES SHOWN ON THE DRAWINGS ARE A MINIMUM, CONTRACTOR SHALL TAKE ALL OTHER NECESSARY MEASURES. EROSION CONTROL FENCE SHALL ALSO BE INSTALLED AT THE DOWN GRADIENT PERIMETER OF THE TOPSOIL STOCKPILES. ALL DISTURBED EARTH SURFACES SHALL BE STABILIZED IN THE SHORTEST PRACTICAL TIME AND TEMPORARY EROSION CONTROL DEVICES SHALL BE EMPLOYED UNTIL SUCH TIME AS ADEQUATE SOIL STABILIZATION HAS BEEN ACHIEVED. TEMPORARY STORAGE OF EXCAVATED MATERIAL SHALL BE STABILIZED IN A MANNER THAT WILL MINIMIZE EROSION. ALL INSTALLED EROSION CONTROL FACILITIES SHALL BE REMOVED AT THE END OF THE PROJECT. REFER TO SPECIFICATION SECTION 312500.
6. ALL STORM DRAINAGE INLETS SHALL BE PROTECTED BY HAY BALE FILTERS TO PREVENT ENTRY OF SEDIMENT FROM RUNOFF WATERS DURING CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND DISPOSAL OF ALL COLLECTED SEDIMENT, AND THAT WHICH COLLECTS IN THE STORM DRAIN SYSTEM.
7. TEST PIT AND/OR BORING LOGS FOR THE PROJECT SITE ARE INCLUDED IN THE GEOTECHNICAL REPORT.
8. ALL ELEVATIONS REFER TO THE NATIONAL GEODETIC VERTICAL DATUM. ORIENTATION IS GRID NORTH MAINE STATE PLANE COORDINATE SYSTEM. PROJECT BENCH MARK WILL BE PROVIDED BY THE ENGINEER.
9. CONTRACTOR SHALL NOT TRACK OR SPILL EARTH, DEBRIS OR OTHER CONSTRUCTION MATERIAL ON PUBLIC OR PRIVATE STREETS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE IMMEDIATE ASSOCIATED CLEAN UP.
10. ALL CATCH BASINS, MANHOLES, VALVE PITS, VALVE BOXES AND OTHER BURIED FACILITIES WITH SURFACE ACCESS SHALL BE ADJUSTED TO MATCH FINAL GRADES, UNLESS OTHERWISE INDICATED.
11. WHEREVER PROPOSED STRUCTURES ARE LOCATED PARTLY WITHIN A PAVED AREA AND PARTLY IN A NON-PAVED AREA, A BITUMINOUS CONCRETE PAVED APRON 2 FT WIDE SHALL BE SUPPLIED AROUND THE PROPOSED COVER. PAVEMENT SHALL SLOPE AWAY FROM THE COVER
12. CONTRACTOR SHALL REMOVE AND REPLACE, OR REPAIR, ALL CURBS, SIDEWALKS, PAVEMENT AND OTHER ITEMS DAMAGED BY HIS CONSTRUCTION ACTIVITIES TO AT LEAST THEIR ORIGINAL CONDITION, TO THE SATISFACTION OF THE OWNER AND ENGINEER.
13. WHERE EXISTING PAVEMENT IS REMOVED AND REPLACED, MATCH EXISTING GRADES TO THE EXTENT POSSIBLE. COORDINATE FINE GRADING WITH THE ENGINEER.
14. ALL ROAD AND PARKING AREA SURFACES SHALL PITCH 1/4 INCH PER FOOT MINIMUM UNLESS OTHERWISE NOTED. ALL VEGETATED AREAS ABOVE MEAN HIGH WATER ELEVATION THAT ARE EXCAVATED, FILLED OR OTHERWISE DISTURBED BY THE CONTRACTOR AND ARE NOT TO BE PAVED OR FILLED WITH RIPRAP SHALL BE LOAMED, GRADED, LIMED, FERTILIZED, SEEDED AND MULCHED AT NO ADDITIONAL EXPENSE TO THE OWNER.
15. INITIAL PAVING SHALL BE CONDUCTED WITHIN TWO WEEKS OF COMPLETION OF PLACEMENT OF FINAL BACKFILL UNLESS OTHERWISE AUTHORIZED BY ENGINEER. INITIAL PAVEMENT SHALL BE INSTALLED AND MAINTAINED BY CONTRACTOR FOR A MINIMUM PERIOD OF 2 MONTHS BEFORE FINAL PAVEMENT IS PLACED. FINAL PAVEMENT MAY BE PLACED OVER THE INITIAL PAVING PROVIDED INITIAL PAVING COURSE IS IN GOOD REPAIR. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING AND SHIMMING THE INITIAL PAVEMENT AS NECESSARY TO ACCEPT THE FINAL PAVING COURSE. IF CONDITIONS WARRANT, THE CONTRACTOR MAY BE REQUIRED TO REMOVE AND REPLACE INITIAL PAVING PRIOR TO FINAL PAVING.
16. TREES TO REMAIN SHALL BE PROTECTED TO THE DRIP LINE USING FIXED BARRIERS SUCH AS JERSEY BARRIERS OR DRIVEN FENCE.

SITE LAYOUT NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LAYOUT OF ALL PROPOSED WORK AS SHOWN ON THE DRAWINGS. THE ENGINEER WILL PROVIDE TWO POINTS THAT DEFINE THE HORIZONTAL CONTROL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THIS PROVIDED LAYOUT INFORMATION THROUGHOUT THE COURSE OF CONSTRUCTION. REPORT ANY LAYOUT DISCREPANCIES IMMEDIATELY TO THE ENGINEER.
2. ENGINEER WILL PROVIDE HORIZONTAL CONTROL POINTS TO ESTABLISH THE CONSTRUCTION BASELINE. THE POINTS TO BE PROVIDED ARE SHOWN ON THE LAYOUT PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING AND REESTABLISHING THESE POINTS FOR THE DURATION OF THE PROJECT. CONTRACTOR SHALL LAYOUT ALL CONSTRUCTION AS SHOWN ON THE DRAWINGS USING THE CONSTRUCTION BASELINE. THE LAYOUT SHALL BE REVIEWED BY THE ENGINEER PRIOR TO CONSTRUCTION. ANY DEVIATIONS FROM THE ROADWAY OR UTILITY LAYOUTS MUST BE APPROVED BY THE ENGINEER/OWNER.
3. IN GENERAL, THE GIVEN STRUCTURE LOCATIONS ARE TO THE OUTSIDE FACE OF THE STRUCTURE FOUNDATION WALL, NOT FOOTINGS. REFER TO THE ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR BUILDING AND STRUCTURE DIMENSIONS. RADII SHOWN FOR ROADS ARE TO EDGE OF PAVEMENT.
4. THE LOCATION AND LIMITS OF ALL ON-SITE WORK AND STORAGE AREAS SHALL BE REVIEWED/COORDINATED WITH, AND ACCEPTABLE TO, THE OWNER AND ENGINEER. THE CONTRACTOR SHALL LIMIT HIS ACTIVITIES TO THESE AREAS.
5. BOLLARD LOCATIONS SHOWN ARE APPROXIMATE. REFER TO THE ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR THE PRECISE LOCATION OF BOLLARDS NEAR NEW STRUCTURES. COORDINATE BOLLARD LOCATION WITH THE ENGINEER. SEE DWG C4.0 FOR DETAIL.

PROJECT OWNER

PRESIDENT AND TRUSTEES OF BATES COLLEGE
2 ANDREWS WAY
LEWISTON, ME 04240

PROPERTY INCLUDED IN DEVELOPMENT

TAX MAP	PARCEL #
MAP 194	LOT 165
MAP 194	LOT 166
MAP 194	LOT 167
MAP 194	LOT 168
MAP 194	LOT 169
MAP 194	LOT 170

ENTIRE SITE IS IN THE INSTITUTIONAL – OFFICE DISTRICT

	ALLOWED	PROPOSED 45 CAMPUS
MAX. IMPERVIOUS COVER	75%	48%
MAX. LOT COVERAGE	75%	22%

PROPOSED USE: INSTITUTIONAL: ACADEMIC BUILDING/ CLASSROOMS

NOTE:

1. IF DEVELOPMENT HAS NOT OCCURRED, AS DEFINED WITHIN THE SCOPE OF THE ZONING AND LAND USE CODE WITHIN TWO YEARS, DEVELOPMENT REVIEW APPROVAL SHALL EXPIRE, PURSUANT TO ARTICLE XIII. SECTION II.
2. PRIOR TO A CERTIFICATE OF OCCUPANCY BEING ISSUED A PROFESSIONAL ENGINEER MUST PROVIDE A STAMPED STATEMENT INDICATING THAT THE STORMWATER IMPROVEMENTS HAVE BEEN COMPLETED IN ACCORDANCE WITH THE APPROVED PLANS.

SITE PIPING NOTES:

1. ALL PIPE LINES SHALL SLOPE UNIFORMLY BETWEEN ELEVATIONS INDICATED ON THE DRAWINGS. NO CRESTS IN PIPING WILL BE PERMITTED. ALL HORIZONTAL AND VERTICAL BENDS IN PRESSURIZED LINES SHALL BE SUITABLY RESTRAINED WITH THRUST BLOCKS OR RETAINER GLANDS (RETAINER GLANDS ALLOWED FOR DUCTILE IRON PIPE ONLY). PROVIDE ALL BENDS (HORIZONTAL AND VERTICAL) AS REQUIRED TO MEET THE GRADES AND ALIGNMENT INDICATED ON THE DRAWINGS.
2. THE CONTRACTOR SHALL ASCERTAIN THE LOCATION AND SIZE OF EXISTING PIPING AND UTILITIES IN THE FIELD BY TEST PIT EXCAVATION PRIOR TO COMMENCING INSTALLATION OF ANY OF THE NEW PIPING AFFECTED. WHERE NEW PIPE CONNECTS TO EXISTING PIPING OR STRUCTURAL PENETRATION, CONTRACTOR SHALL VERIFY ELEVATION BY TEST PIT, AS REQUIRED, PRIOR TO INSTALLATION OF ANY OF THE ASSOCIATED/AFFECTED NEW PIPING. IDENTIFIED CONFLICTS WITH EXISTING PIPING AND UTILITIES WILL BE REVIEWED WITH THE ENGINEER PRIOR TO COMMENCING INSTALLATION. THE HORIZONTAL ALIGNMENT OF NEW PIPING MAY BE ADJUSTED IN THE FIELD SUBJECT TO PRIOR REVIEW AND ACCEPTANCE OF THE ENGINEER. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY LAYOUT OF ALL PROPOSED WORK AS SHOWN ON THE DRAWINGS AND REPORT ANY LAYOUT DISCREPANCIES IMMEDIATELY TO THE ENGINEER.
3. TRENCH INSULATION SHALL BE USED WHERE DEPTH OF COVER IS LESS THAN 5 FEET.
4. MANHOLES AND CATCH BASINS ARE 4 FEET IN DIAMETER UNLESS OTHERWISE NOTED. THE TOP OF FRAMES SHALL BE SET FLUSH WITH FINISH GRADE, UNLESS OTHERWISE NOTED ON DRAWINGS.
5. REFER TO SPECIFICATION SECTION 310000 FOR PIPE AND STRUCTURE BEDDING AND BACKFILL REQUIREMENTS.
6. COMPACTION TESTS WILL BE PERFORMED IN ACCORDANCE WITH SPECIFICATION SECTION 310000. ANY SETTLEMENT OCCURRING WITHIN ONE YEAR OF FINAL COMPLETION OF THE WORK SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
7. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE REGULATIONS OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA).
8. WHERE NEW PIPING IS TO BE CONNECTED TO EXISTING PIPING, THE CONTRACTOR SHALL FURNISH AND INSTALL ALL ADAPTERS, FITTINGS, AND ADDITIONAL PIPE AS REQUIRED TO COMPLETE THE CONNECTION. CONTRACTOR SHALL VERIFY LOCATION, ELEVATION, ORIENTATION AND MATERIAL OF CONSTRUCTION. TEST PITS SHALL BE USED AS REQUIRED.
9. ALL EXISTING UTILITIES ENCOUNTERED DURING CONSTRUCTION ARE TO REMAIN IN SERVICE UNLESS OTHERWISE NOTED ON THE DEMOLITION PLAN, DWG C3.0 CONTRACTOR SHALL RE-SHAPE INVERTS AS REQUIRED WHEN CONNECTING INTO EXISTING MANHOLES.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL AND DISPOSAL OF ALL DEMOLITION MATERIALS.
11. ALL STRUCTURES AND PIPELINES LOCATED ADJACENT TO ANY TRENCH EXCAVATION SHALL BE PROTECTED AND FIRMLY SUPPORTED BY THE CONTRACTOR UNTIL THE TRENCH IS BACKFILLED. DAMAGE TO ANY SUCH STRUCTURES CAUSED BY OR RESULTING FROM THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. ALL UTILITIES REQUIRING REPAIR, RELOCATION OR ADJUSTMENT AS A RESULT OF THE PROJECT SHALL BE COORDINATED THROUGH THE OWNER.
12. PIPING ON THE SITE PIPING PLAN HAS BEEN SHOWN BROKEN FOR CLARITY ONLY. PIPE BREAKS DO NOT INDICATE RELATIVE ELEVATIONS OF PIPING.
13. ELECTRICAL CONDUIT RUNS ARE INDICATED ON THE UTILITY DRAWING.
14. FORCE MAINS SHALL SLOPE UNIFORMLY BETWEEN ELEVATIONS INDICATED ON THE DRAWINGS. NO CRESTS IN NEW PIPING WILL BE PERMITTED UNLESS OTHERWISE NOTED ON THE DRAWINGS. ALL BENDS SHALL BE SUITABLY RESTRAINED BY CAST-IN-PLACE CONCRETE THRUST BLOCKS. DUCTILE IRON RETAINER GLANDS MAY BE USED IN LIEU OF THRUST BLOCKS ON DUCTILE IRON FORCE MAINS ONLY. THE NUMBER OF JOINTS ON EACH SIDE OF THE BENDS REQUIRING RETAINER GLANDS SHALL BE DETERMINED BY STANDARDS SET FORTH BY THE DUCTILE IRON PIPE RESEARCH ASSOCIATION. TEST PRESSURE FOR THE PRESSURE AND LEAKAGE TEST SHALL BE 100 PSI.
15. ALL UNDERGROUND UTILITIES ENCOUNTERED DURING CONSTRUCTION WILL BE IN SERVICE OR OUT OF SERVICE. IF OUT OF SERVICE WHEN ENCOUNTERED, THE CONTRACTOR SHALL REMOVE COMPLETELY AND DISPOSE OF DEBRIS. IF A UTILITY IS TO BE TAKEN OUT OF SERVICE AS A RESULT OF THIS PROJECT, THAT UTILITY WILL ALSO BE REMOVED COMPLETELY AFTER THE UTILITY IS DISCONTINUED. ALL WORK COVERED BY THIS NOTE WILL BE INCIDENTAL TO THE COST OF THE PIPE INSTALLATION AND SHALL BE PERFORMED AT NO ADDITIONAL COST TO THE OWNER.
16. WHERE SEWER MAINS AND HOUSE SERVICE CONNECTIONS CROSS WATER MAINS THEY SHALL BE INSTALLED UNDER THE WATER MAIN WHENEVER POSSIBLE. A MINIMUM SEPARATION OF 18 INCHES BETWEEN THE BOTTOM OF THE WATER LINE AND TOP OF THE SEWER SHALL BE MAINTAINED. WHERE SITE CONDITIONS DICTATE LESS THAN THE ABOVE REFERENCED 18 INCH SEPARATION THE FOLLOWING CONSTRUCTION METHODS ARE REQUIRED: THE WATER MAIN SHALL BE RELOCATED TO PROVIDE THE 18" SEPARATION, AND ONE FULL LENGTH OF PIPE SHALL BE CENTERED AT THE POINT OF CROSSING TO LOCATE JOINTS AS FAR AS POSSIBLE FROM THE WATER MAIN. THE CONTRACTOR SHALL RELOCATE THE WATER MAIN TO THE SATISFACTION OF THE LEWISTON DEPARTMENT OF PUBLIC WORKS.
17. PROVIDE 2" RIGID INSULATION OVER WATER AND SEWER MAINS AND SERVICES WHEN COVER IS LESS THAN 5.5 FEET AND WHERE DIRECTED BY THE ENGINEER (SEE DETAILS).
18. WHERE APPROPRIATE, MINOR ADJUSTMENTS TO THE ALIGNMENT OF PROPOSED UTILITIES SHALL BE MADE TO ACCOMMODATE EXISTING UTILITIES. COORDINATE ADJUSTMENTS WITH ENGINEER.
19. CONTRACTOR SHALL COORDINATE LOCATION OF SEWER SERVICE WYES TO AVOID CONFLICT BETWEEN SEWER SERVICES, WATER LINES AND SERVICES, AND NEW STORM DRAINAGE PIPING.
20. A MINIMUM VERTICAL OR HORIZONTAL SEPARATION OF 6 INCHES BETWEEN THE WATER LINES (INCLUDING SERVICES) AND STORM DRAINAGE PIPES AND STRUCTURES, SHALL BE MAINTAINED. 2" RIGID INSULATION SHALL BE INSTALLED WHEN THE SEPARATION IS LESS THAN 4 FEET. 4" RIGID INSULATION SHALL BE INSTALLED FOR UNDER 18" SEPARATION.
21. PIPE RESTRAINT FOR WATER MAINS: ALL BENDS, TEES, REDUCERS, HYDRANTS, AND PLUGS SHALL BE RESTRAINED BY USING CONCRETE THRUST BLOCKS AND "GRIP RINGS" OR OTHER METHOD AS SHOWN ON THE DRAWINGS. ANCHOR TEES SHALL BE USED FOR ALL HYDRANT BRANCHES EXCEPT IN LOCATIONS WHERE GATE VALVES CAN NOT BE CONNECTED DIRECTLY TO TEE, IN WHICH CASE "GRIP RINGS" OR TIE RODS SHALL BE USED.
22. WATER LINE AND APPURTENANCE CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF LEWISTON REGULATIONS. SEWER MANHOLE AND PIPELINE CONSTRUCTION AND TESTING SHALL BE IN ACCORDANCE WITH CITY OF LEWISTON REQUIREMENTS.
23. WATER MAIN WILL BE TESTED AT 1.5 TIMES THE WORKING PRESSURE OR 200 PSI WHICHEVER IS GREATER. TEST DURATION WILL BE TWO HOURS.
24. ALL SEWER PIPE SHALL BE PVC MEETING THE REQUIREMENTS OUTLINED IN THE SPECIFICATIONS UNLESS OTHERWISE INDICATED ON THE DRAWINGS.

LEGEND

EXISTING		PROPOSED
	PROPERTY/ROW LINE	
	SETBACK LINE	
	EASEMENT LINE	
	CENTERLINE	
	EDGE OF PAVEMENT	
	CURBING	
	EDGE OF GRAVEL	
	EDGE OF CONCRETE	
122	CONTOUR	123
	BUILDING	
	STONEWALL	
	TREELINE	
	CHAIN LINK FENCE	
	STOCKADE FENCE	
	BARB WIRE FENCE	
	RETAINING WALL	
	GUARDRAIL	
8" S	SEWER	8"S
4" FM	SEWER FORCE MAIN	4"FM
4" G	GAS	4"G
4" W	WATER	8"W
15" SD	STORM DRAIN	15"SD
6" UD	UNDERDRAIN	6"UD
12" CMP	CULVERT	12" CMP
UGE	UNDERGROUND ELECTRIC	UGE
OHE	OVERHEAD ELECTRIC	OHE
	IRON PIPE/REBAR	
	DRILLHOLE	
	MONUMENT	
	SURVEY CONTROL POINT	
124.6	SPOT ELEVATION	134.5
SMH	SEWER MANHOLE	SMH
DMH	DRAINAGE MANHOLE	DMH
CB CB	CATCH BASIN	CB CB
EMH	ELECTRIC MANHOLE	EMH
TMH	TELEPHONE MANHOLE	TMH
	GATE VALVE	
	CURB STOP	
	YARD HYDRANT	
	HYDRANT	
	UTILITY POLE	
	UTILITY POLE W/ GUY	
	UTILITY POLE W/ LIGHT	
	LIGHT POLE	
	BOLLARD	
	FLAGPOLE	
	CONIFEROUS TREE	
	DECIDUOUS TREE	
	SHRUB	
	EDGE OF WATER	
	STREAM	
	EDGE OF WETLANDS	
	FLOODPLAIN	
	WETLANDS	
	DRAINAGE FLOW	
	DRAINAGE SWALE	
	PAVEMENT MARKINGS	
	SIGN	
MB	MAILBOX	
	TEMPORARY BENCH MARK	
TP-2	TEST PIT	
B-3	TEST BORING	
P-4	TEST PROBE	
MW	MONITORING WELL	
	LIMIT OF WORK	
	SILT FENCE	
	RIPRAP	
	RAILROAD	
	MATCHLINE	
	ROCK OUTCROP	

CIVIL ABBREVIATIONS

&	AND	NGVD	NATIONAL GEODETIC VERTICAL DATUM
⌀, DIA	DIAMETER	N/A	NOT AVAILABLE/APPLICABLE
#, NO	NUMBER	NTS	NOT TO SCALE
APP'D	APPROVED	OD	OUTSIDE DIAMETER
BLDG	BUILDING	PC	PERFORATED CLAY
CB	CATCH BASIN	PSF	POUNDS PER SQUARE FOOT
CEN	CENTER	PSI	POUNDS PER SQUARE INCH
CFS	CUBIC FEET PER SECOND	PS	PRIMARY SLUDGE
CI	CAST IRON	PT	POINT OF TANGENCY
CL	CENTERLINE	PVC	POLYVINYL CHLORIDE
CMP	CORRUGATED METAL PIPE	RCP	REINFORCED CONCRETE PIPE
CO	CLEANOUT	RD	ROOF DRAIN
CONC	CONCRETE	REQ'D	REQUIRED
COR	CORNER	S	SLOPE, SEWER
CY	CUBIC YARD	SD	STORM DRAIN
DEMO	DEMOLITION	SF	SQUARE FEET
DMH	DRAIN MANHOLE	SMH	SANITARY SEWER MANHOLE
DI	DUCTILE IRON	SQ	SQUARE
DR	DRAIN	STA	STATION
DWG	DRAWING	T, XFMR	TRANSFORMER
EL	ELEVATION	TBM	TEMPORARY BENCH MARK
EMH	ELECTRIC MANHOLE	THK	THICKNESS
FM	FORCE MAIN	TOS	TOP OF STRUCTURE
FT	FEET	TYP	TYPICAL
G	GAS	UD	UNDERDRAIN
HYD	HYDRANT	UG	UNDERGROUND
IN	INCH	UGE	UNDERGROUND ELECTRIC
INF	INFLUENT	VC	VITRIFIED CLAY
INV	INVERT	W/	WITH
LBS	POUNDS	W	POTABLE WATER
MAX	MAXIMUM		
MH	MANHOLE		
MIN	MINIMUM		
MW	MONITORING WELL		
N	NORTH		

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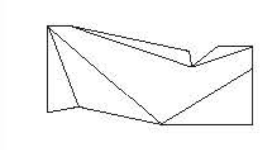
6-5-18

NOT FOR CONSTRUCTION

#	DATE	DESCRIPTION
4	08/03/18	ISSUED FOR LEWISTON SITE PLAN REVIEW
3	08/03/18	100% DESIGN DEVELOPMENT
2	06/18/18	50% DESIGN DEVELOPMENT
1	03/18/18	SCHEMATIC DESIGN



BATES

Bates College STEM Projects

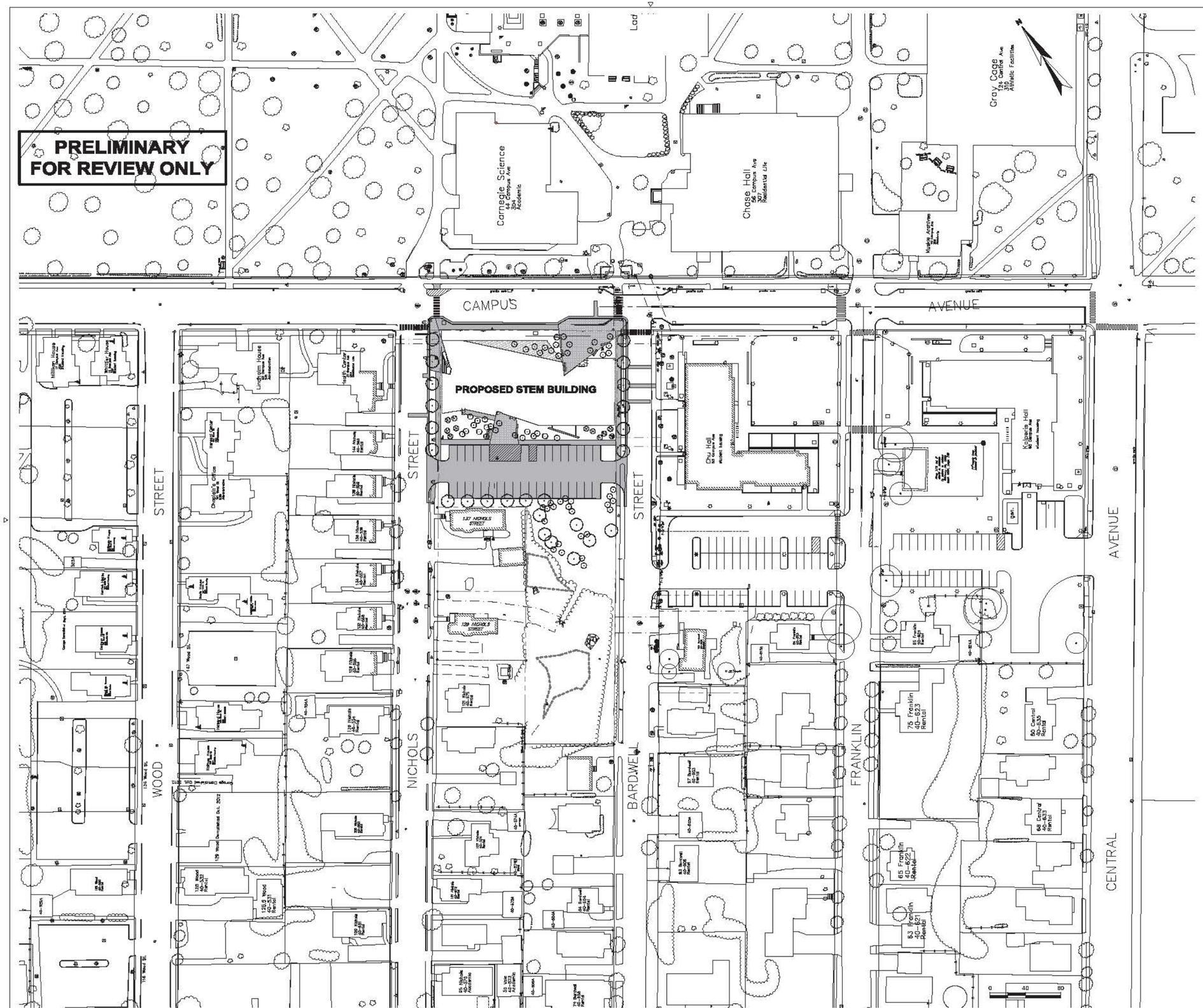
GENERAL NOTES, LEGEND AND ABBREVIATIONS

Drawing Scale
1/8" = 1'-0"

Project Number
14021A

Date Issued
7/12/2018

C1.0



SITE LOCATION PLAN
SCALE: 1"=40'

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#	DATE	DESCRIPTION
4	08/03/18	ISSUED FOR LEWISTON SITE PLAN REVIEW
3	06/03/18	100% DESIGN DEVELOPMENT
2	05/10/18	50% DESIGN DEVELOPMENT
1	02/14/18	SCHEMATIC DESIGN

BATES

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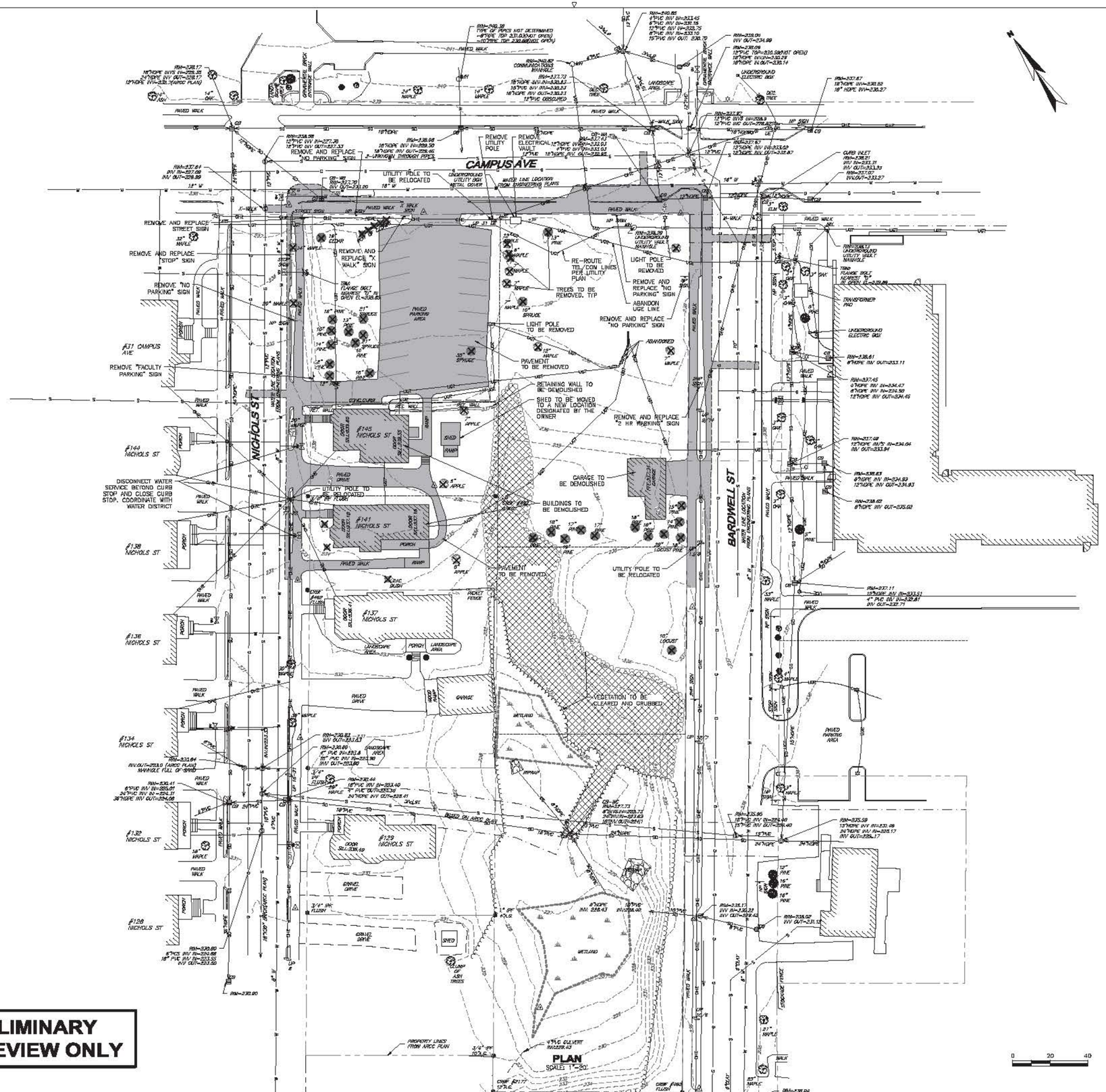
SITE LOCATION PLAN

Drawing Scale	NTS
Project Number	14021A
Date Issued	7/12/2018

C2.0



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#	DATE	DESCRIPTION
4	06/03/19	ISSUED FOR LEWISTON SITE PLAN REVIEW
3	04/03/19	100% DESIGN DEVELOPMENT
2	04/12/18	50% DESIGN DEVELOPMENT
1	03/16/18	SCHEMATIC DESIGN

BATES

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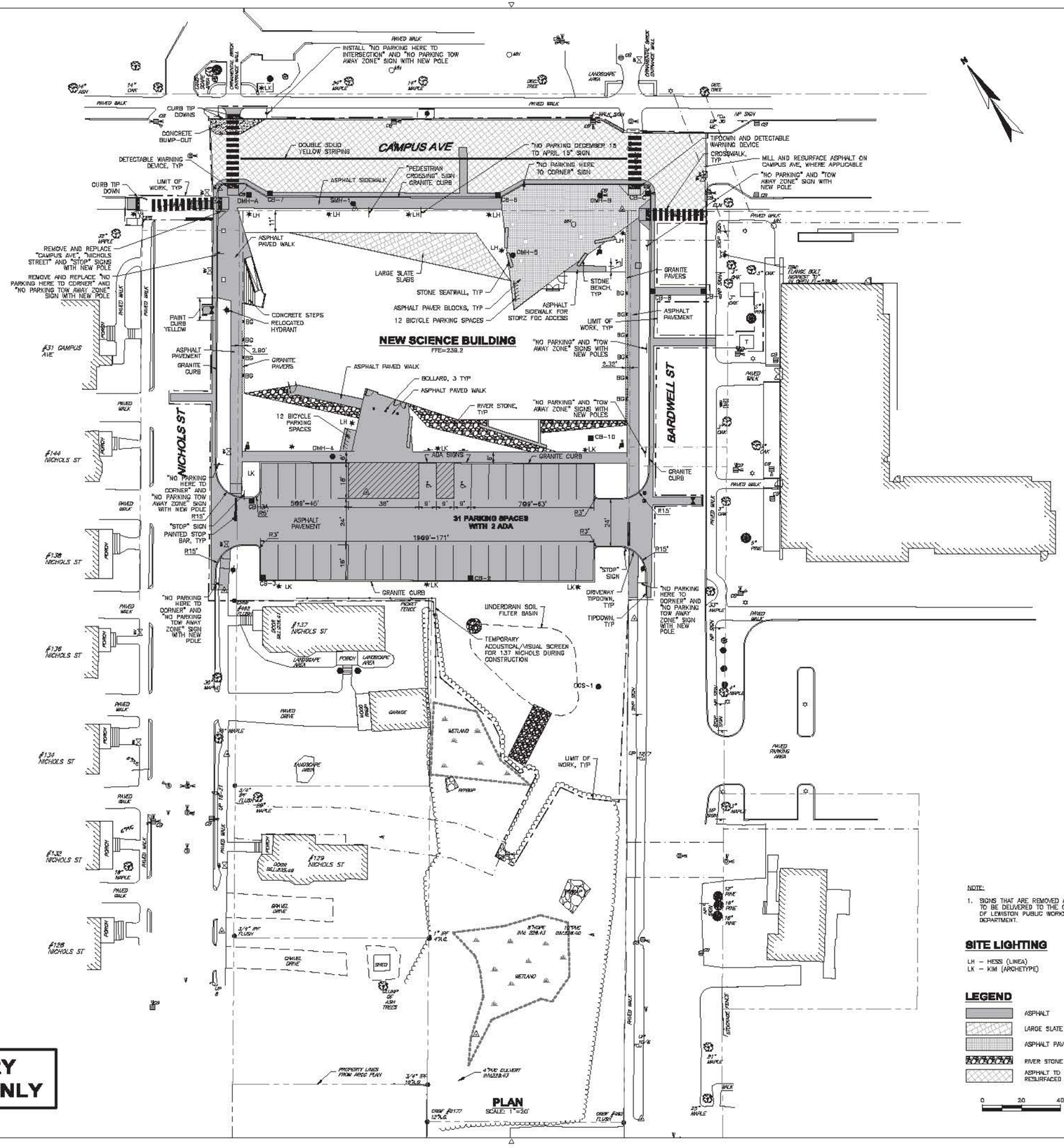
EXISTING CONDITIONS AND DEMOLITION PLAN

Drawing Scale
NTS

Project Number
14021A

Date Issued
7/15/2019

C3.0



NOTE:

1. SIGNS THAT ARE REMOVED ARE TO BE DELIVERED TO THE CITY OF LEWISTON PUBLIC WORKS DEPARTMENT.

SITE LIGHTING

LH – HESS (LINEA)
LK – KIM (ARCHETYPE)

LEGEND

- ASPHALT
- LARGE SLATE SLABS
- ASPHALT PAVER BLOCKS
- RIVER STONE
- ASPHALT TO BE RESURFACED

0 20 40

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#	DATE	DESCRIPTION
5	10/12/18	RESPONSE TO COMMENTS
4	09/19/18	ISSUED FOR LEWISTON SITE PLAN REVIEW
3	06/03/18	100% DESIGN DEVELOPMENT
2	05/15/18	50% DESIGN DEVELOPMENT
1	03/16/18	SCHEMATIC DESIGN

BATES

Bates College STEM Projects

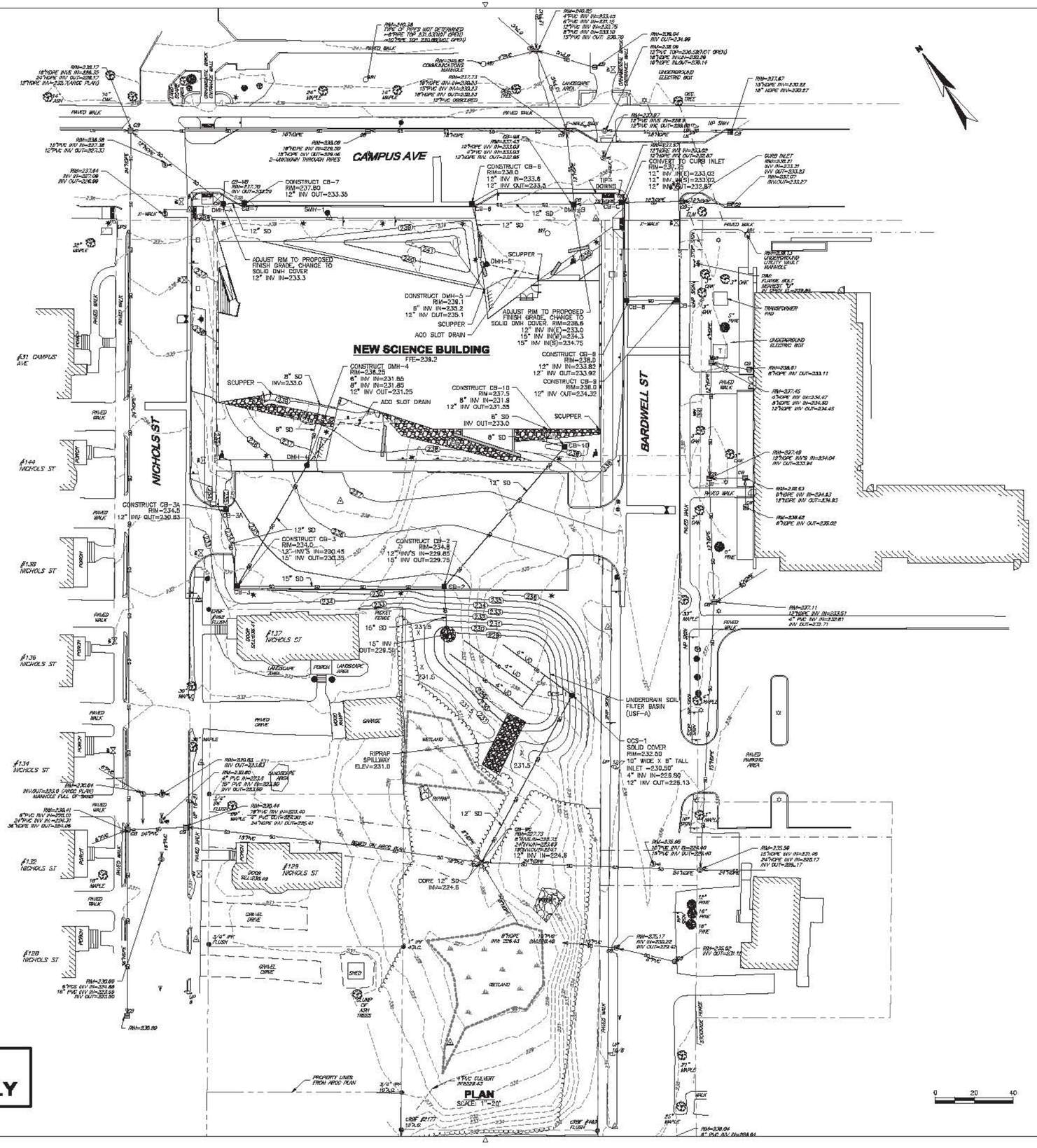
PROPOSED SITE LAYOUT PLAN

Drawing Scale
1"=20'

Project Number
14021A

Date Issued
10/12/2018

C4.0



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#	DATE	DESCRIPTION
5	10/12/18	RESPONSE TO COMMENTS
4	09/19/18	ISSUED FOR LEWISTON SITE PLAN REVIEW
3	06/22/18	100% DESIGN DEVELOPMENT
2	05/15/18	50% DESIGN DEVELOPMENT
1	03/16/18	SCHEMATIC DESIGN

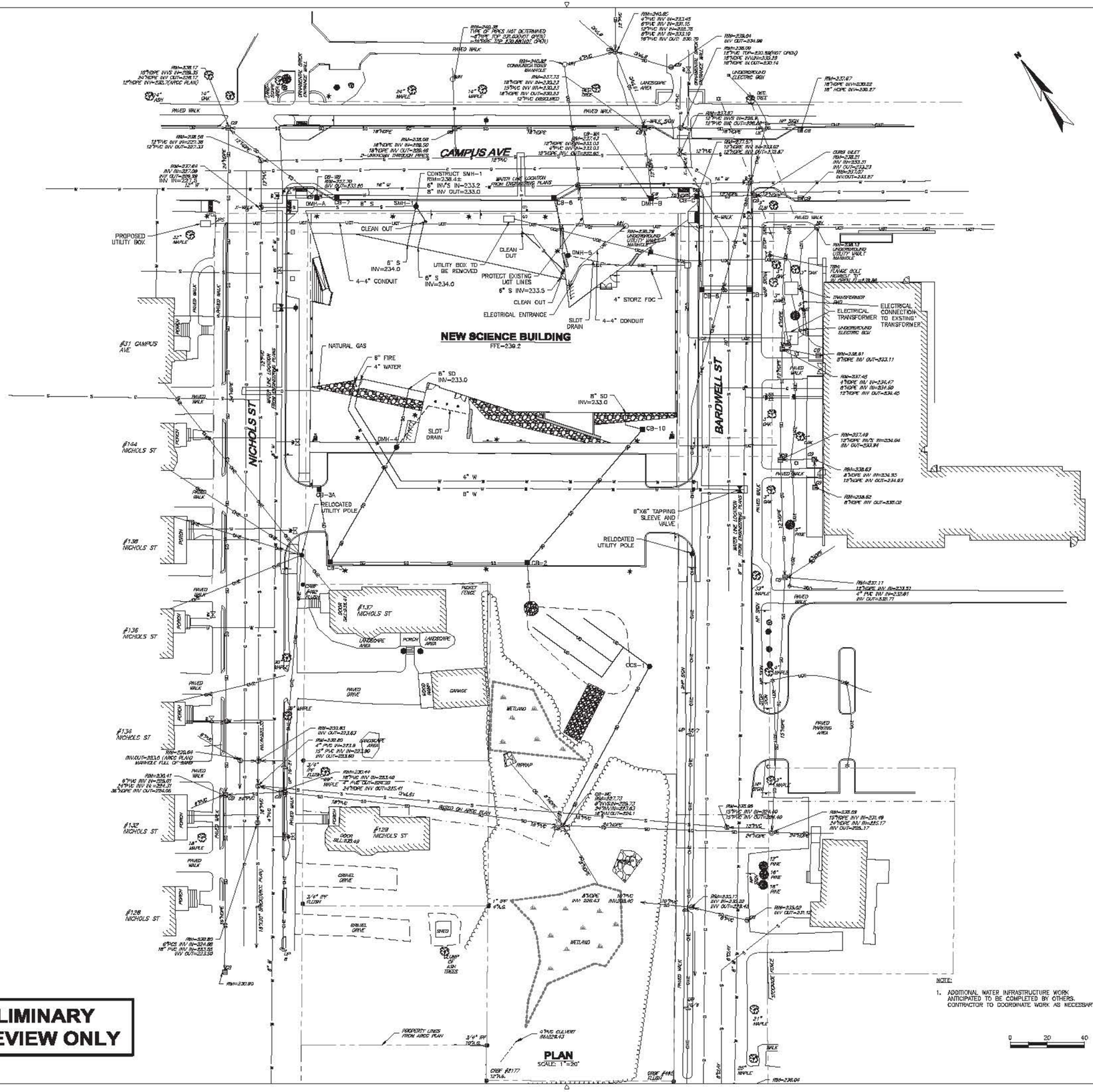
BATES

Bates College STEM Projects

PROPOSED GRADING AND DRAINAGE PLAN

Drawing Scale	1" = 20'
Project Number	14021A
Date Issued	7/12/2018

C5.0



NOTE:

1. ADDITIONAL WATER INFRASTRUCTURE WORK ANTICIPATED TO BE COMPLETED BY OTHERS. CONTRACTOR TO COORDINATE WORK AS NECESSARY.

0 20 40

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NOT FOR CONSTRUCTION

#	DATE	DESCRIPTION
5	10/12/18	RESPONSE TO COMMENTS
4	09/18/18	ISSUED FOR LOMBARDIN SITE PLAN REVIEW
3	06/22/18	100% DESIGN DEVELOPMENT
2	06/12/18	50% DESIGN DEVELOPMENT
1	02/16/18	SCHEMATIC DESIGN

BATES

Bates College STEM Projects

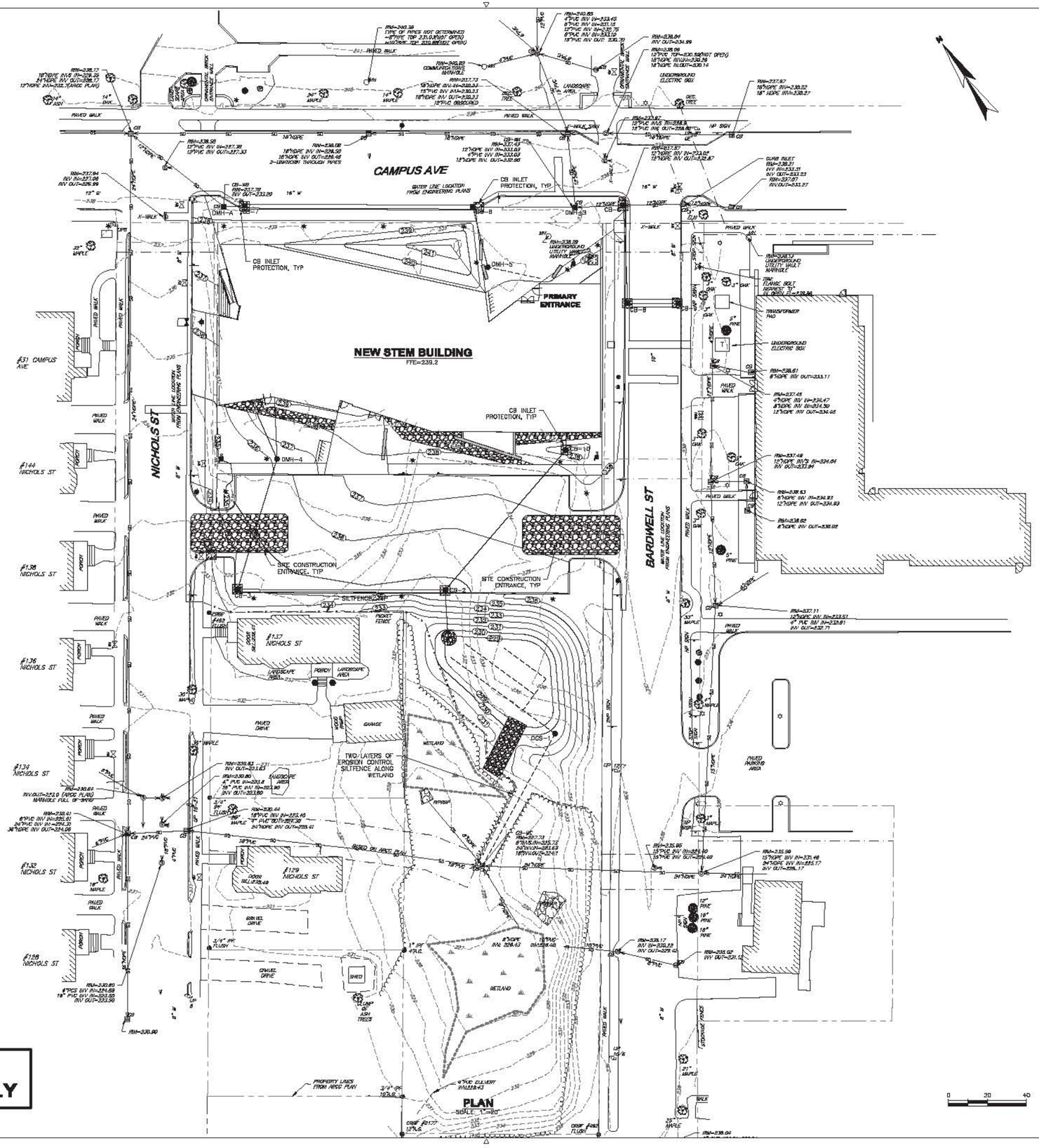
PROPOSED SITE UTILITIES PLAN

Drawing Scale
NTS

Project Number
14021A

Date Issued
7/12/2019

C6.0



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#	DATE	DESCRIPTION
4	08/03/18	ISSUED FOR LEWISTON SITE PLAN REVIEW
3	06/01/18	100% DESIGN DEVELOPMENT
2	05/15/18	50% DESIGN DEVELOPMENT
1	02/16/18	SCHEMATIC DESIGN

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SOIL EROSION AND SEDIMENT CONTROL PLAN

Drawing Scale
NTS

Project Number
14021A

Date Issued
7/12/2018

C7.0

THIS PLAN HAS BEEN DEVELOPED AS A STRATEGY TO CONTROL SOIL EROSION AND SEDIMENTATION DURING AND AFTER CONSTRUCTION. THIS PLAN IS BASED ON THE STANDARDS AND SPECIFICATIONS FOR EROSION PREVENTION IN DEVELOPING AREAS AS CONTAINED IN THE "MAINE EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES", MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION DATED MARCH 2003.

THE PROPOSED LOCATIONS OF SILTATION AND EROSION CONTROL STRUCTURES ARE SHOWN ON THE SITE PLAN.

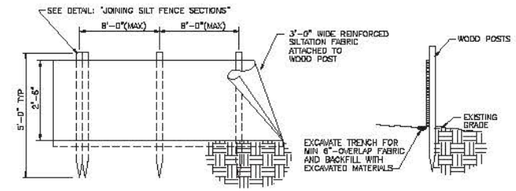
1. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE DONE IN ACCORDANCE WITH THE "MAINE EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES", MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION, DATED MARCH 2003.
2. THOSE AREAS UNDERGOING ACTUAL CONSTRUCTION WILL BE MAINTAINED IN AN UNTREATED OR UNVEGETATED CONDITION FOR THE MINIMUM TIME REQUIRED. IN GENERAL AREAS TO BE VEGETATED SHALL BE PERMANENTLY STABILIZED WITHIN 15 DAYS OF FINAL GRADING AND TEMPORARILY STABILIZED WITHIN 30 DAYS OF INITIAL DISTURBANCE OF THE SOIL
3. SEDIMENT BARRIERS (SILT FENCE, STONE CHECK DAMS, ETC.) SHOULD BE INSTALLED PRIOR TO ANY SOIL DISTURBANCE OF UPGRADIENT DRAINAGE AREAS.
4. INSTALL SILT FENCE AT TOE OF SLOPES TO FILTER SILT FROM RUNOFF. SEE SILT FENCE DETAIL FOR PROPER INSTALLATION. SILT FENCE WILL REMAIN IN PLACE PER NOTE #5.
5. ALL EROSION CONTROL STRUCTURES WILL BE INSPECTED, REPLACED AND/OR REPAIRED EVERY 7 DAYS AND IMMEDIATELY FOLLOWING ANY SIGNIFICANT RAINFALL OR SNOW MELT OR WHEN NO LONGER SERVICEABLE DUE TO SEDIMENT ACCUMULATION OR DECOMPOSURE. SEDIMENT DEPOSITS MUST BE REMOVED WHEN THEY REACH APPROXIMATELY ONE HALF THE HEIGHT OF THE BARRIER. SEDIMENT CONTROL DEVICES SHALL REMAIN IN PLACE AND BE MAINTAINED BY THE CONTRACTOR UNTIL AREAS UPSLOPE ARE PERMANENTLY STABILIZED.
6. NO SLOPES, EITHER PERMANENT OR TEMPORARY, SHALL BE STEEPER THAN TWO HORIZONTAL TO ONE VERTICAL (2 TO 1) UNLESS STABILIZED WITH RIPRAP OR OTHER STRUCTURAL MEANS.
7. IF FINAL SEEDING AND SODDING IS NOT EXPECTED PRIOR TO THE ANTICIPATED DATE OF THE FIRST KILLING FROST, USE TEMPORARY ANNUAL RYEGRASS SEEDING AND MULCHING ON ROUGH GRADED SUBSOIL TO PROTECT THE SITE AND DELAY PERMANENT LOAMING, FINE GRADING, AND SEEDING OR SODDING UNTIL SPRING.
8. WHEN FEASIBLE, TEMPORARY SEEDING OF DISTURBED AREAS THAT HAVE NOT BEEN FINISH GRADED SHALL BE COMPLETED 30 DAYS PRIOR TO THE FIRST KILLING FROST.
9. DURING THE CONSTRUCTION PHASE, INTERCEPTED SEDIMENT WILL BE RETURNED TO THE SITE AND REGRADED ONTO OPEN AREAS. POST SEEDING SEDIMENT, IF ANY, WILL BE DISPOSED OF IN AN ACCEPTABLE MANNER.
10. REVEGETATION MEASURES WILL COMMENCE UPON COMPLETION OF CONSTRUCTION EXCEPT AS NOTED ABOVE. ALL DISTURBED AREAS NOT OTHERWISE STABILIZED WILL BE GRADED, SMOOTHED, AND REVEGETATED.
11. ALL TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED ONCE THE SITE IS STABILIZED.
12. STABILIZATION SCHEDULE BEFORE WINTER:

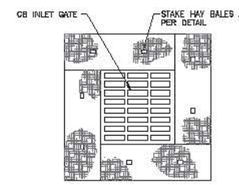
SEPTEMBER 15	ALL DISTURBED AREAS MUST BE SEEDED AND MULCHED. ALL SLOPES MUST BE STABILIZED, SEEDED AND MULCHED. SLOPES 3:1 OR GREATER TO BE STABILIZED WITH EROSION CONTROL MATTING AND SEEDED. ALL DISTURBED AREAS TO BE PROTECTED WITH AN ANNUAL GRASS MUST BE SEEDED AT A SEEDING RATE OF 3 POUNDS PER 1,000 SQUARE FEET AND MULCHED.
OCTOBER 1	ALL GRASS-LINED DITCHES AND CHANNELS MUST BE STABILIZED WITH MULCH OR EROSION CONTROL BLANKET.
NOVEMBER 15	ALL STONE-LINED DITCHES AND CHANNELS MUST BE CONSTRUCTED AND STABILIZED. SLOPES THAT ARE COVERED WITH RIPRAP MUST BE CONSTRUCTED BY THAT DATE.
DECEMBER 1	ALL DISTURBED AREAS WHERE THE GROWTH OF VEGETATION FAILS TO BE AT LEAST THREE INCHES TALL OR AT LEAST 75% OF THE DISTURBED SOIL IS COVERED BY VEGETATION, MUST BE PROTECTED FOR OVER-WINTER.

1. WINTER CONSTRUCTION PERIOD DEFINED: NOVEMBER 1 THROUGH APRIL 15
2. WINTER EXCAVATION AND EARTHWORK SHALL BE DONE SUCH THAT NO MORE THAN 1 ACRE OF THE SITE IS WITHOUT STABILIZATION AT ANY ONE TIME.
3. EXPOSED AREA SHOULD BE LIMITED SUCH THAT THE AREA CAN BE MULCHED IN ONE DAY PRIOR TO ANY SNOW EVENT.
4. CONTINUATION OF EARTHWORK OPERATIONS ON ADDITIONAL AREAS SHALL NOT BEGIN UNTIL THE EXPOSED SOIL SURFACE ON THE AREA BEING WORKED HAS BEEN STABILIZED SUCH THAT NO LARGER AREA OF THE SITE IS WITHOUT EROSION CONTROL PROTECTION AS LISTED IN ITEM 2 ABOVE.
5. AN AREA SHALL BE CONSIDERED TO HAVE BEEN STABILIZED WHEN EXPOSED SURFACES HAVE BEEN EITHER MULCHED WITH STRAW AT A RATE OF 100 LB. PER 1,000 SQUARE FEET (WITH OR WITHOUT SEEDING) OR PERMANENTLY SEEDED, MULCHED AND ADEQUATELY ANCHORED BY AN APPROVED ANCHORING TECHNIQUE. IN ALL CASES, MULCH SHALL BE APPLIED SUCH THAT SOIL SURFACE IS NOT VISIBLE THROUGH THE MULCH.
6. BETWEEN THE DATES OF OCTOBER 15 AND APRIL 15T, LOAM OR SEED WILL NOT BE REQUIRED. DURING PERIODS OF ABOVE-FREEZING TEMPERATURES, THE SLOPES SHALL BE FINE GRADED AND EITHER PROTECTED WITH MULCH OR TEMPORARILY SEEDED AND MULCHED UNTIL SUCH TIME AS THE FINAL TREATMENT CAN BE APPLIED. IF THE DATE IS AFTER NOVEMBER 15T AND IF THE EXPOSED AREA HAS BEEN LOAMED, FINAL GRADED AND IS SMOOTH, THEN THE AREA MUST BE STABILIZED WITH MULCH. IF CONSTRUCTION CONTINUES DURING FREEZING WEATHER, ALL EXPOSED AREAS SHALL BE GRADED BEFORE FREEZING AND THE SURFACE TEMPORARILY PROTECTED FROM EROSION BY THE APPLICATION OF MULCH. SLOPES SHALL NOT BE LEFT EXPOSED OVER THE WINTER OR ANY OTHER EXTENDED TIME OF WORK SUSPENSION UNLESS TREATED IN THE ABOVE MANNER. UNTIL SUCH TIME AS WEATHER CONDITIONS ALLOW DITCHES TO BE FINISHED WITH THE PERMANENT SURFACE TREATMENT. EROSION SHALL BE CONTROLLED BY THE INSTALLATION OF BALES OF HAY OR STONE CHECK DAMS IN ACCORDANCE WITH THE STANDARD DETAILS.
7. THE APPLICATION OF MULCH TO FINE GRADED AREAS WILL BE STABILIZED AS FOLLOWS:
   - A) BETWEEN THE DATES OF NOVEMBER 15T AND APRIL 15TH ALL MULCH SHALL BE ANCHORED BY EITHER PEG LINE, MULCH NETTING, ASPHALT EMULSION, CHEMICAL TACK OR WOOD CELLULOSE FIBER.
   - B) MULCH NETTING SHALL BE USED TO ANCHOR MULCH IN ALL DRAINAGE WAYS WITH A SLOPE GREATER THAN 3% FOR SLOPES EXPOSED TO DIRECT WINDS AND FOR ALL OTHER SLOPES GRATER THAN 8%.
   - C) MULCH NETTING SHALL BE USED TO ANCHOR MULCH IN ALL AREAS WITH SLOPES GREATER THAN 15%. AFTER OCTOBER 15T, THE SAME APPLIES FOR ALL SLOPES GREATER THAN 8%.
8. AFTER NOVEMBER 15T THE CONTRACTOR SHALL APPLY MULCH AND ANCHORING ON ALL BARE EARTH AT THE END OF EACH WORKING DAY.
9. DURING WINTER CONSTRUCTION PERIODS ALL SNOW SHALL BE REMOVED FROM AREAS OF MULCHING PRIOR TO PLACEMENT.

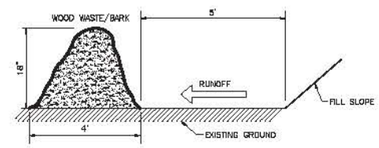
PRELIMINARY FOR REVIEW ONLY

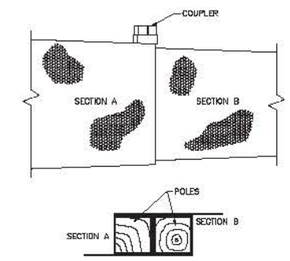
1. WETLANDS AND SURFACE WATERS (EXCEPTING THOSE WHICH ARE TO BE FILLED IN ACCORDANCE WITH STATE AND FEDERAL REGULATIONS) WILL BE PROTECTED WITH SILT FENCE INSTALLED AT THE EDGE OF THE WETLAND OR THE BOUNDARY OF WETLAND DISTURBANCE.
2. IF THE WORK INCLUDES CROSSING OF WETLANDS AND/OR STREAMS, THE CONTRACTOR SHALL TAKE SPECIAL PRECAUTIONS WORKING IN THESE AREAS
3. ANY WETLAND CROSSING WORK SHALL BE COMPLETED BETWEEN THE PERIOD OF MAY 1 AND SEPTEMBER 30
4. ALL EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO COMMENCING CONSTRUCTION WITHIN OR ADJACENT TO WETLAND AREAS.
5. WETLAND VEGETATIVE LAYERS SHALL BE REMOVED AND SALVAGED FOR RESTORATION OF THE DISTURBED AREAS.
6. STORAGE AREAS FOR WETLAND MATERIALS SHALL BE PROPERLY PROTECTED AGAINST EROSION.
7. SEEDING OF THE DISTURBED AREAS WITHIN WETLAND AREAS SHALL UTILIZE MIXTURES APPROPRIATE FOR WETLAND AREAS AS OUTLINED IN THE SPECIFICATIONS.

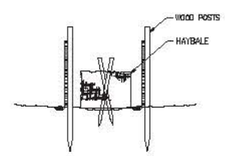


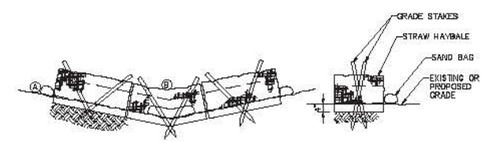


NOTE:
EMBED HAYBALES MINIMUM OF 4".

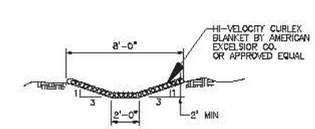


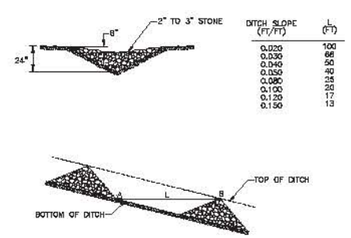




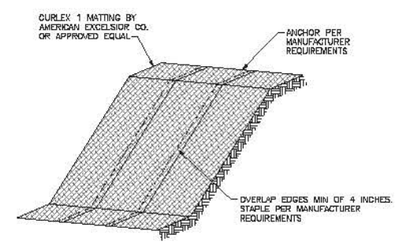


EROSION CHECK TO BE STRAW HAYBALES SECURED TO THE GROUND WITH TWO 4' LONG GRADE STAKES FOR EACH BALE. SAND BAG AS REQUIRED. PLACE SUFFICIENT BALES TO ESTABLISH ELEVATIONS AT (A) AT LEAST 6 INCHES ABOVE OVERFLOW AT (B)

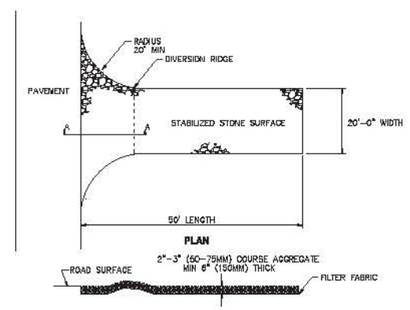




DITCH SLOPE (FT/FT)	L (FT)
0.020	100
0.030	66
0.040	50
0.050	40
0.080	25
0.100	20
0.120	17
0.150	13



INSTALL ON SLOPES 3:1 OR GREATER



SECTION A-A
(TEMPORARY, TO BE REMOVED PRIOR TO FINAL SITE PAVING)

STABILIZED CONSTRUCTION ENTRANCE

NTS

PAYETTE

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Payette Associates Inc.
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Engineering
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MEP / FP/ COM / SEC / Engineer
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Fifth Floor
Boston, MA
02210-1006
Tel: 617-895-1000

Exterior Envelope
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311 Summer Street,
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Boston MA, 02210
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Wind / Air Quality Consultant
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Guelph,
Canada N1K 1B8
Tel: 519-823-1311

Elevator consultant
VDA
101 Summer Street,
4th Floor
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Tel: 617-574-5099

Lighting Consultant
Available Light
10 Derby Square #3
Salem MA 01970
Tel: 978-744-6800

Vibration and Acoustic Consultant
Acentech Inc.
33 Moulton Street
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STATE OF MAINE
JAN
B. S.
WIEGMAN
No. 5352
PROFESSIONAL ENGINEER

Construction Manager
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Tel: 617-259-1007

NOT FOR CONSTRUCTION

#	DATE	DESCRIPTION
4	08/03/18	ISSUED FOR LEWISTON SITE PLAN REVIEW
3	06/13/18	100% DESIGN DEVELOPMENT
2	05/18/18	60% DESIGN DEVELOPMENT
1	02/16/18	SCHEMATIC DESIGN

BATES

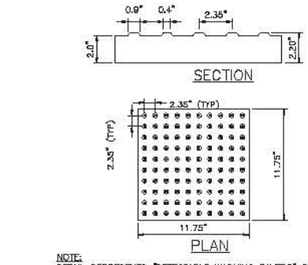
Bates College STEM Projects

EROSION CONTROL NOTES AND DETAILS

Drawing Scale	NTS
Project Number	14021A
Date Issued	7/18/2018

C7.1

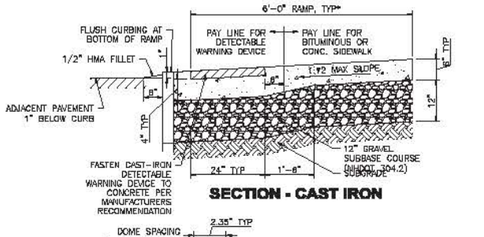
PRELIMINARY FOR REVIEW ONLY



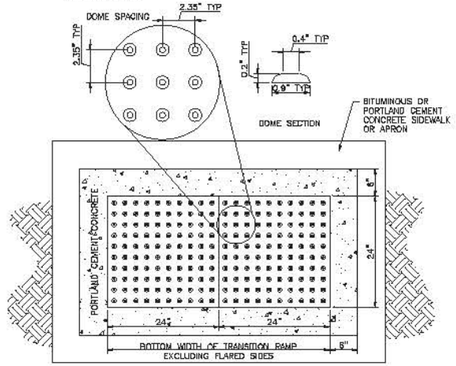
NOTE:
DETAIL REPRESENTS "DETECTABLE WARNING PAVERS" BY HANOVER. EQUIVALENT SUBSTITUTE MAY BE USED SUCH AS IT CONFORMS TO THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT (ADA).

CAST IRON HANDICAP DETECTABLE WARNING PLATE

NTS



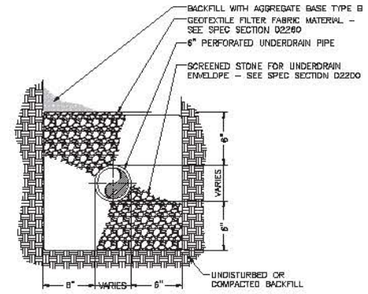
SECTION - CAST IRON



NOTE:
1. ALL DETECTABLE WARNING DEVICES SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG). 2'x2', 2'x4' AND RADIUS DEVICES ARE ACCEPTABLE.
2. INSTALL DETECTABLE WARNING DEVICES AT ALL ROADWAYS, HIGH USE ACCESS WAYS, OR AT THE DIRECTION OF THE ENGINEER.
3. ALL DEVICES SHALL HAVE A MIN. 6" WIDTH PORTLAND CEMENT CONCRETE SURROUND REGARDLESS OF THE SURROUNDING WALK OR APRON MATERIAL.

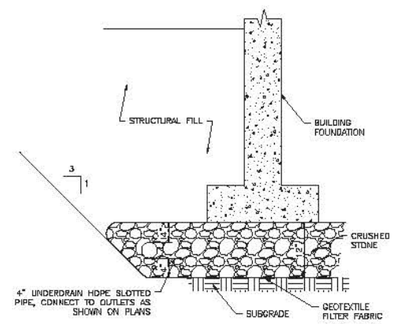
RECTANGULAR CAST IRON HANDICAP DETECTABLE WARNING DEVICE DETAIL

SCALE: NTS



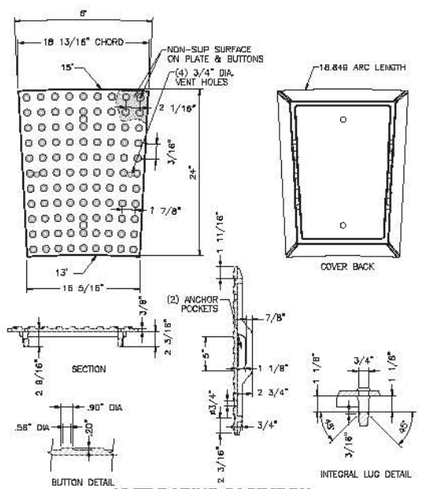
UNDERDRAIN BEDDING

SCALE: NTS



FOUNDATION DRAIN DETAIL

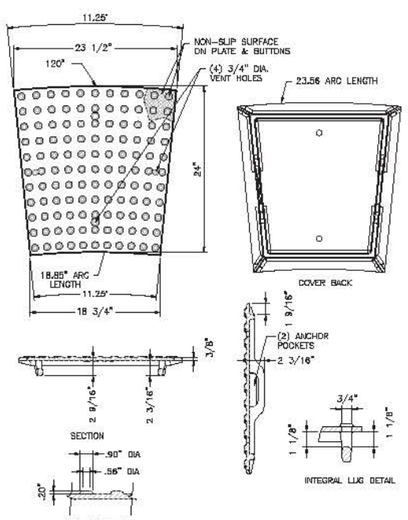
SCALE: NTS



15 FT RADIUS CAST IRON DETECTABLE WARNING PLATE

NTS

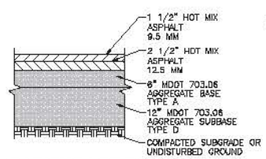
NOTES:
1. REFER TO RECTANGULAR DETECTABLE WARNING DEVICE DETAIL. THIS DRAWING FOR EMBEDMENT AND CONCRETE SURROUND DETAILS.
2. TAKES FIFTEEN (15) PLATES TO COMPLETE FULL 90° TURN.
3. DETECTABLE WARNING PLATES TO BE BEDDED IN CONCRETE.



NOTES:
1. REFER TO RECTANGULAR DETECTABLE WARNING DEVICE DETAIL. THIS DRAWING FOR EMBEDMENT AND CONCRETE SURROUND DETAILS.
2. TAKES FIFTEEN (15) PLATES TO COMPLETE FULL 90° TURN.
3. DETECTABLE WARNING PLATES TO BE BEDDED IN CONCRETE.

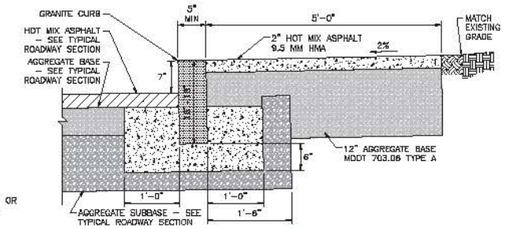
10 FT RADIUS CAST IRON DETECTABLE WARNING PLATE

NTS



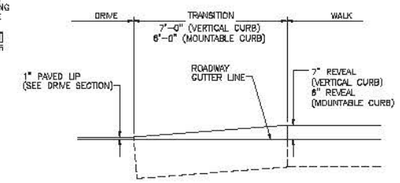
PARKING LOT PAVEMENT

SCALE: "NTS"



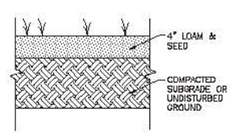
GRANITE CURB WITH BITUMINOUS SIDEWALK

SCALE: NTS



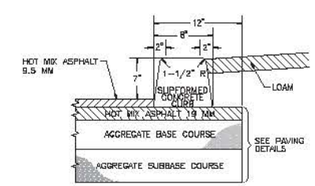
GRANITE CURBING TRANSITION AT DRIVES

NTS



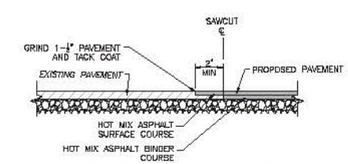
LOAM AND SEED

SCALE: NTS



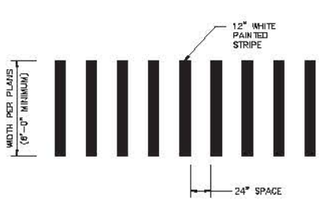
BITUMINOUS CURB

SCALE: NTS



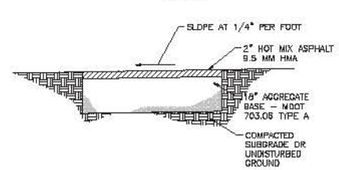
SHIPLAP PAVEMENT JOINT

SCALE: NTS



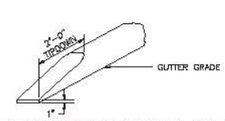
CROSSWALK LAYOUT

SCALE: NTS



BITUMINOUS SIDEWALK

SCALE: NTS



BITUMINOUS TERMINAL CURB

SCALE: NTS

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Elevator consultant
VDA
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Lighting Consultant
Available Light
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Salem MA 01970
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Vibration and Acoustic Consultant
Acentech Inc.
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Cambridge MA 02138
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Construction Manager
Consigli
253 Summer Street
Boston, MA 02210
Tel: 617-259-1007

STATE OF MAINE — JAN 9.S. WIEGMAN No. 5852 — LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

#	DATE	DESCRIPTION
5	10/12/18	RESPONSE TO COMMENTS
4	09/19/18	ISSUED FOR LEWISTON SITE PLAN REVIEW
3	06/03/18	100% DESIGN DEVELOPMENT
2	05/15/18	50% DESIGN DEVELOPMENT
1	03/16/18	SCHEMATIC DESIGN

BATES

Bates College STEM Projects

CIVIL DETAILS I

Drawing Scale	NTS
Project Number	14021A
Date Issued	7/12/2018

C8.0

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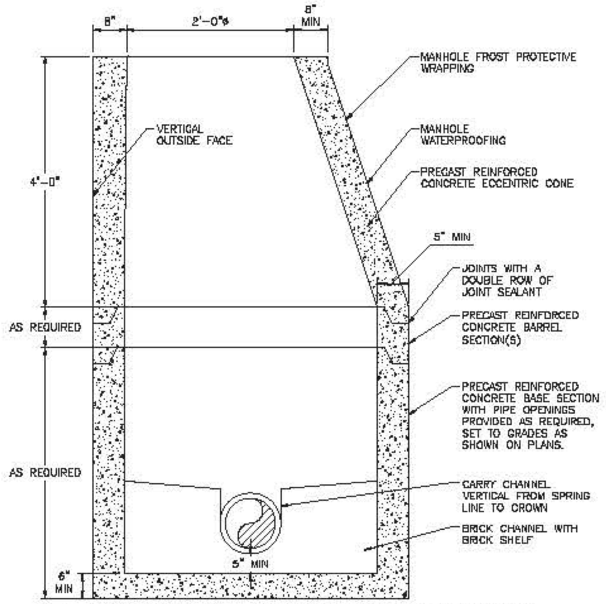
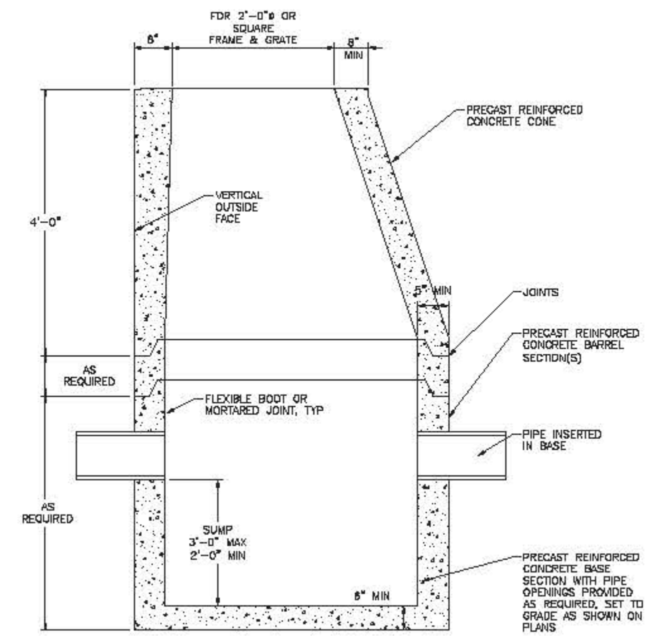


NOTES:
1. MANHOLE CHANNELS REQUIRING A CHANGE IN DIRECTION ARE TO BE BUILT ON A SMOOTH CURVE OF THE LONGEST POSSIBLE RADIUS. IF SIDE PIPES ENTER CHANNEL, SHAPE TO RECEIVE ADDED SIDE FLOW.
2. USE A FLAT SLAB TOP MANHOLE WHEN THE HEIGHT DIFFERENCE BETWEEN THE HIGHEST INVERT AND RIM IS LESS THAN 6'-0" AND WHEN MANHOLE DIAMETER IS GREATER THAN 4'-0".

TYPICAL 4-FT MANHOLE

SCALE: "NTS"



NOTE: USE FLAT SLAB TOP CATCH BASIN WHERE REQUIRED TO MATCH GRADE

4-FT CATCH BASIN

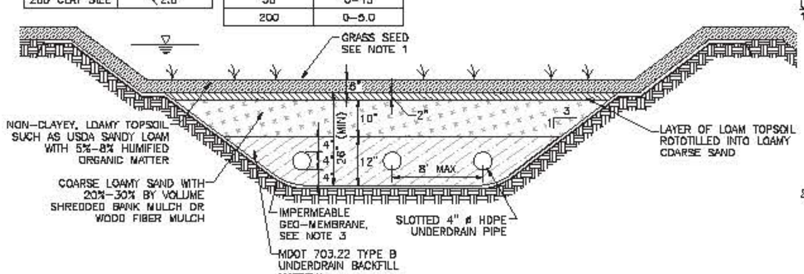
SCALE: NTS

TABLE I	
SPECIFICATIONS FOR LOAMY COARSE SAND	
SEIVE #	% PASSING BY WEIGHT
10	85–100
20	70–100
60	15–40
200	8–15
200 CLAY SIZE	<2.0

TABLE II	
MDOT 703.22 TYPE B UNDERDRAIN BACKFILL	
SEIVE #	% PASSING BY WEIGHT
1"	95–100
0.5"	75–100
4	50–100
20	15–80
50	0–15
200	0–5.0

TABLE III	
SEED MIXTURE	
CREEPING RED FESUCE	20 LBS/ACRE (0.5 LBS/1,000 S.F.)
TALL FESCUE	20 LBS/ACRE (0.5 LBS/1,000 S.F.)
BIRDSFOOT TREFOIL	8 LBS/ACRE (0.2 LBS/1,000 S.F.)

UNDERDRAIN SOIL FILTER TABLE					
(A) SOIL FILTER REFERENCE	(B) ELEVATION OF SOIL FILTER	(C) OVERFLOW SPILLWAY ELEVATION	(D) RIM ELEVATION OUTLET STRUCTURE	(E) UNDERDRAIN INVERT ELVATION	MIN SURFACE AREA AT SOIL FILTER ELEVATION (SF)
USF A	229.0	230.75	230.5	226.8	1,790



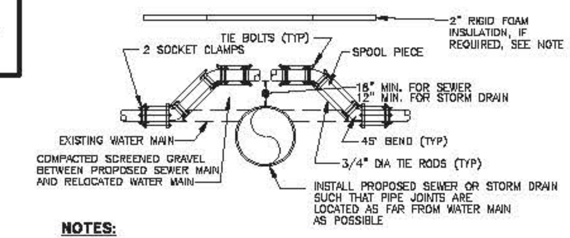
NOTES:
1. GRASS SEED MIXTURE SHALL BE DROUGHT TOLERANT CONSERVATION MIX.
2. PLACE FILTER MEDIA AND LOAM TOPSOIL ONLY AFTER SITE HAS BEEN STABILIZED.
3. IMPERMEABLE GEO-MEMBRANE SHALL BE 4 LDRE, PVC OR HDPE IMPERMEABLE LINER OF AT LEAST 20 MIL. THICKNESS.
4. UNDERDRAIN PIPE SHALL SLOPE AT 0.0050 MIN. (SEE DRAWING C5.0)

UNDERDRAIN SOIL FILTER CONSTRUCTION

NTS

UNDERDRAIN CONSTRUCTION, TESTING AND SUBMITTAL NOTES:

1. CONSTRUCTION OVERSIGHT: INSPECTION OF THE FILTER BASIN MUST BE PROVIDED FOR EACH PHASE OF CONSTRUCTION BY THE DESIGN ENGINEER WITH REQUIRED REPORTING TO THE DEP. ALL MATERIAL INTENDED FOR THE FILTER BASIN MUST BE APPROVED BY THE DESIGN ENGINEER AFTER TESTS BY A CERTIFIED LABORATORY SHOW THAT THE MATERIAL CONFORMS TO ALL DEP SPECIFICATIONS. AT A MINIMUM, INSPECTIONS WILL OCCUR:
   - 1.1. AFTER THE PRELIMINARY CONSTRUCTION OF THE FILTER GRADES AND ONCE THE UNDERDRAIN PIPES ARE INSTALLED (NOT BACKFILLED);
   - 1.2. AFTER THE DRAINAGE LAYER IS CONSTRUCTED AND PRIOR TO THE INSTALLATION OF THE SOIL FILTER MEDIA;
   - 1.3. AFTER THE SOIL FILTER MEDIA HAS BEEN INSTALLED, SEEDED AND MULCHED; AND
   - 1.4. AFTER ONE YEAR, TO INSPECT VEGETATION AND MAKE CORRECTIONS.
2. TESTING AND SUBMITTALS: THE SOURCE OF EACH COMPONENT OF THE SOIL FILTER MEDIA NEEDS TO BE IDENTIFIED PRIOR TO CONSTRUCTION. ALL RESULTS OF FIELD AND LABORATORY TESTING MUST BE SUBMITTED TO THE DEP FOR APPROVAL.
   - 2.1. MEDIA SOURCE: SAMPLES OF EACH TYPE OF MATERIAL SHOULD BE BLENDED FOR THE MIXED FILTER MEDIA AND
   - 2.2. UNDERDRAIN BEDDING MATERIAL. SAMPLES MUST BE A COMPOSITE OF THREE DIFFERENT LOCATIONS (GRABS) FROM
   - 2.3. THE STOCKPILE OR PIT FACE. SAMPLE SIZE REQUIREMENTS WILL BE DETERMINED BY THE TESTING LABORATORY.
   - 2.4. SIEVE ANALYSIS: A SIEVE ANALYSIS CONFORMING TO ASTM C136 SHOULD BE PERFORMED ON EACH TYPE OF THE SAMPLE MATERIAL.
   - 2.5. PERMEABILITY TESTING: TESTING THE PERMEABILITY OF THE SOIL FILTER MEDIA MIXTURE IS RECOMMENDED WITH THE MIXTURE AT A MEASURED BULK DRY DENSITY OF 90-92% BASED ON ASTM D698."

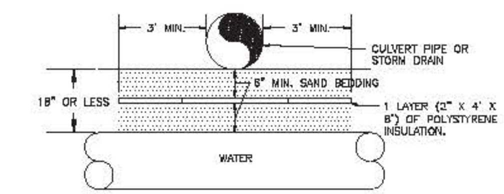


NOTES:

1. WATER MAIN MATERIALS TO BE CLASS 52 DUCTILE IRON. JOINT RESTRAINT TO BE BY MECHANICAL JOINT WITH MEGA-LUGS. ALL PUSH-ON JOINTS SHALL BE RESTRAINED WITH ROD CLAMPS AND TIE BOLTS.
2. TIE RODS, TIE BOLTS, SOCKET CLAMPS AND BRIDLES SHALL BE COATED WITH A BITUMINOUS PAINT AFTER ASSEMBLY OR IF NECESSARY PRIOR TO ASSEMBLY.
3. TIE RODS: 10" DIA WATER MAIN OR LARGER – 4 REQUIRED. 8" DIA WATER MAIN OR SMALLER – 2 REQUIRED.
4. EXISTING WATER MAINS TO BE RELOCATED OVER NEW SEWERS WHEREVER SUFFICIENT GROUND COVER EXISTS (6' MINIMUM COVER). IF SUFFICIENT COVER IS NOT AVAILABLE, A SINGLE LAYER OF 2" RIGID FOAM INSULATION SHALL BE INSTALLED.
5. WATER MAINS OR SERVICES WITHIN 4 FEET HORIZONTALLY OR 18 INCHES VERTICALLY OF ANY CULVERT OR STORM DRAIN PIPE SHALL HAVE INSULATION, SEE CULVERT/STORM DRAIN CROSSING DETAIL

WATER MAIN RELOCATION DETAIL

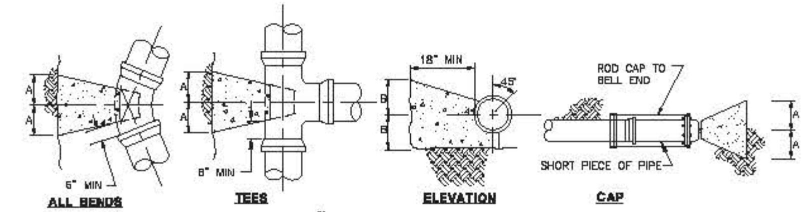
NTS



CULVERT/STORM DRAIN CROSSING DETAIL

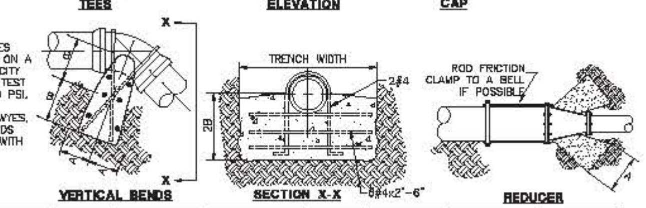
NTS

NOTES:
1. INSULATION TO BE USED WHERE VERTICAL OR HORIZONTAL PIPE SEPARATION IS 18" OR LESS.
2. WATER MAINS OR SERVICES WITHIN 4 FEET HORIZONTALLY OF ANY CULVERT OR STORM DRAIN PIPE SHALL HAVE INSULATION.



NOTES

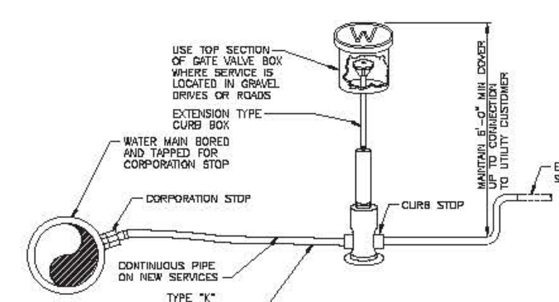
1. THRUST BLOCK SIZES SHOWN ARE BASED ON A SOIL BEARING CAPACITY OF 2000 PSF AND TEST PRESSURES OF 180 PSI.
2. ALL BENDS, TEES, WYES, HYDS. & DEAD ENDS SHALL BE BRACED WITH CONCRETE THRUST BLOCKS.
3. RODDING MAY BE REQUIRED



PIPE SIZE	90° BEND		45° BEND		22 1/2° BEND		11 1/4° BEND		TEE		VERTICAL BEND (DOWN)		PLUG		REDUCER	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
4"	15"	12"	12"	9"	9"	6"	6"	6"	12"	12"	24"	21"	12"	12"	12"	12"
6"	15"	12"	12"	9"	9"	6"	6"	6"	12"	12"	24"	21"	12"	12"	12"	12"
8"	20"	15"	14"	12"	9"	9"	9"	6"	18"	12"	33"	24"	14"	14"	18"	12"
10"	21"	21"	18"	15"	15"	9"	9"	9"	20"	16"	40"	27"	16"	16"	20"	18"
12"	27"	24"	23"	15"	15"	12"	12"	9"	25"	16"	48"	30"	18"	16"	25"	18"
16"	37"	30"	30"	21"	21"	15"	13"	12"	32"	24"	57"	38"	22"	22"	32"	24"

THRUST BLOCKS

NTS



NOTES:
1. WATER SERVICE CONNECTIONS TO BE 1" DIAMETER UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
2. WATER MAINS OR SERVICES WITHIN 5 FEET HORIZONTALLY OR 4 FEET VERTICALLY OF ANY CULVERT OR STORM DRAIN PIPE SHALL HAVE INSULATION. SEE CULVERT/STORM DRAIN CROSSING DETAIL.

WATER SERVICE CONNECTION

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LICENSED PROFESSIONAL ENGINEER

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#	DATE	DESCRIPTION
4	08/03/18	ISSUED FOR LEWISTON SITE PLAN REVIEW
3	08/03/18	100% DESIGN DEVELOPMENT
2	06/13/18	50% DESIGN DEVELOPMENT
1	03/19/18	SCHEMATIC DESIGN

BATES

Bates College STEM Projects

CIVIL DETAILS II

Drawing Scale	NTS
Project Number	14021A
Date Issued	7/12/2018

C8.1

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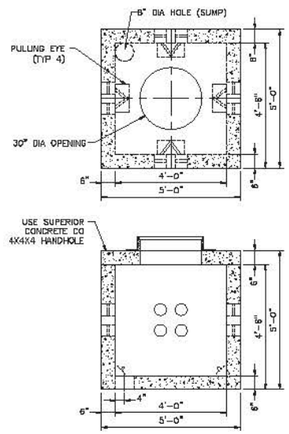
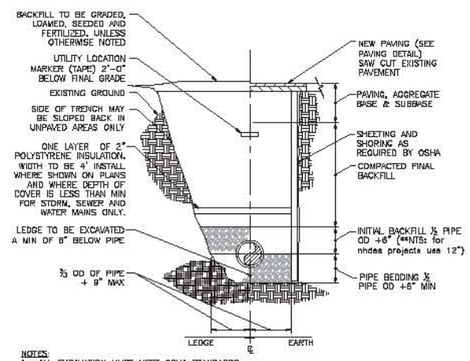
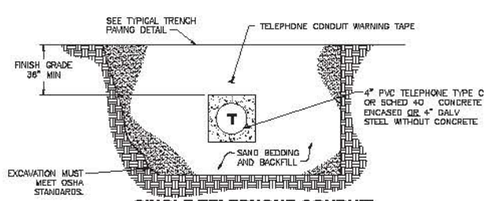


4x4x4 HANDHOLE
SCALE: NTS

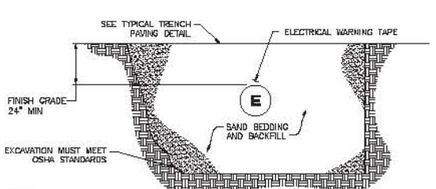


NOTES:
1. ALL EXCAVATION MUST MEET OSHA STANDARDS.
2. INSTALL 3 FOOT LONG IMPERMIOUS MATERIAL DAM IN BEDDING/INITIAL BACKFILL MATERIAL EVERY 100' AND WHERE SHOWN ON PLANS TO PREVENT TRENCH GROUNDWATER FROM BEING CHANNELED ALONG BEDDING/INITIAL BACKFILL.
3. SEE SPECIFICATIONS FOR BEDDING AND BACKFILL REQUIREMENTS.

PIPE TRENCH DETAIL
SCALE: NTS

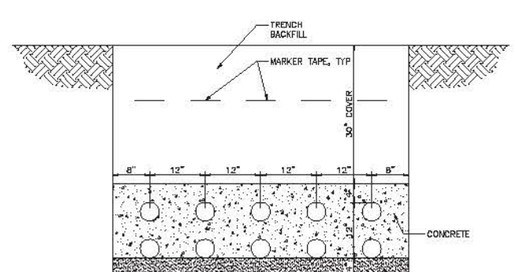


SINGLE TELEPHONE CONDUIT TRENCH SECTION
SCALE: NTS

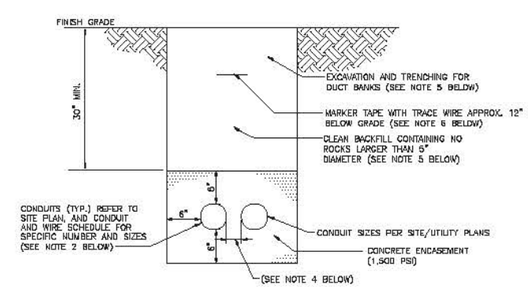


NOTES:
1. ALL CONDUITS TO BE 1½"ø PVC OR STEEL MEETING THE REQUIREMENTS OF THE NEC.
2. CONCRETE ENCASE CONDUITS UNDER STREETS AND WHERE REQUIRED AS NOTED IN THE SPECIFICATIONS.

SINGLE ELECTRICAL CONDUIT TRENCH SECTION
SCALE: NTS



ELECTRICAL SECONDARY CONDUIT TRENCH
SCALE: NTS



COMMUNICATIONS DUCT BANK DETAIL SEE NOTE 3 BELOW
(REFER TO NOTES BELOW FOR ADDITIONAL REQUIREMENTS)
NTS

NOTES: (DUCT BANK DETAIL)
1. DIMENSIONS TYPICAL FOR ALL DUCT BANKS, UNLESS OTHERWISE NOTED.
2. FOR CONDUIT DETAILS, SEE CONDUIT AND WIRE SCHEDULES. REFERENCES C2.2 DENOTES CONDUIT NUMBERS. REFER TO SPECIFIC DUCT BANK SECTIONS AND CONDUIT AND WIRE SCHEDULES FOR DETAILS.
3. THIS TYPICAL DUCT BANK SECTION HAS BEEN SHOWN AS AN EXAMPLE OF THE REQUIREMENTS FOR THE UNDERGROUND INSTALLATION FOR THE DUCT BANK SYSTEM. THIS DENOTES SPECIFIC SPACING, CONCRETE ENCASEMENT REQUIRED FOR DUCT BANK INSTALLATIONS.
4. IT SHALL BE REQUIRED THAT A MINIMUM OF 1'-6" CLEARANCE BE PROVIDED AT ALL TIMES BETWEEN ALL POWER CONDUITS AND ALL SIGNAL AND/OR CONTROL CONDUITS IN ORDER TO AVOID ANY ELECTRICAL NOISE INTERFERENCE WITH THE CABLES OR WIRES WITHIN THESE SIGNAL AND CONTROL CONDUITS.
5. EXCAVATION, TRENCHING AND BACKFILLING SHALL BE FURNISHED AND INSTALLED UNDER DIVISION 31 OF THIS CONTRACT.
6. INSTALL MARKER TAPE WITH TRACE WIRE THE ENTIRE LENGTH OF EACH DUCT BANK.

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2	05/18/18	50% DESIGN DEVELOPMENT
1	03/16/18	SCHEMATIC DESIGN

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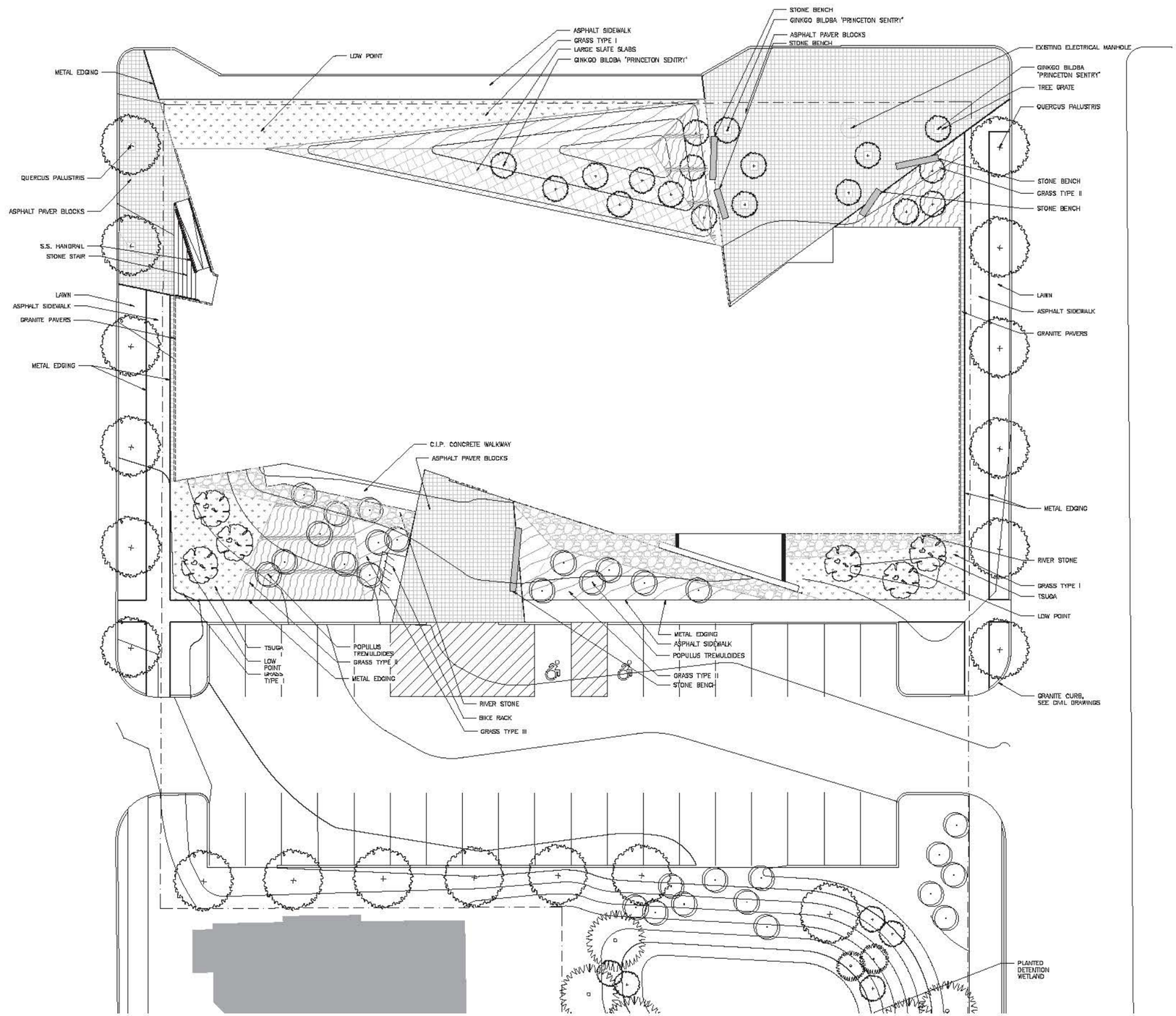
CIVIL DETAILS III

Drawing Scale
NTS

Project Number
14021A

Date Issued
7/12/2018

C8.2



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#	DATE	DESCRIPTION
1	08/03/16	ISSUED FOR LEWISTON SITE PLAN REVIEW

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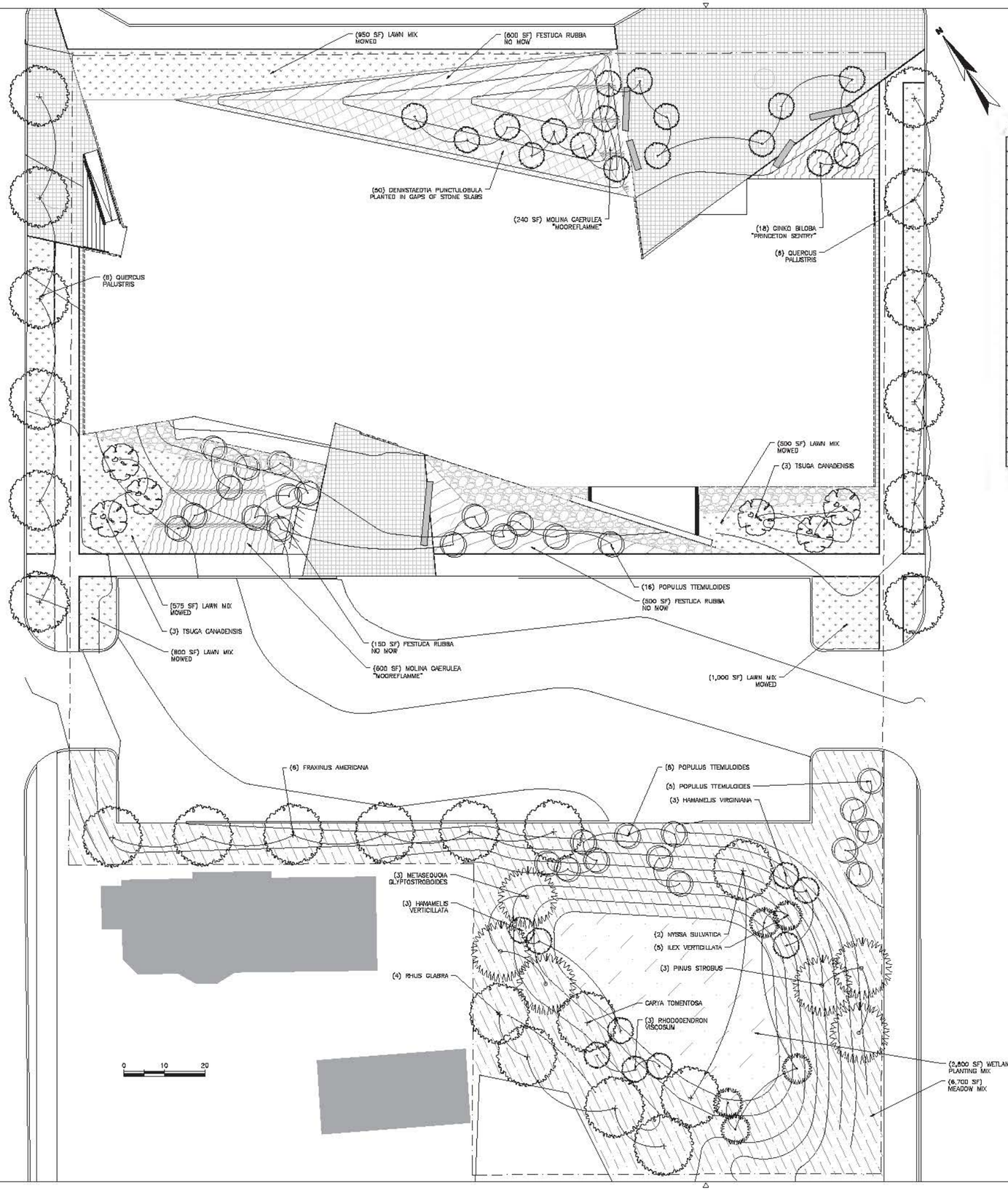
MATERIALS MANAGEMENT PLAN

Drawing Scale	1"=17'-0"
Project Number	14031A
Date Issued	8/3/2016

L1.0



PLANT SCHEDULE (NORTH)

QTY	KEY	BOTANICAL NAME	COMMON NAME	SIZE	NOTES
TREES					
1	---	CARYA TOMENTOSA	MOCKERNUT HICKORY	6"HT	---
18	---	GINKO BILOBA "PRINCETON SENTRY"	PRINCETON SENTRY GINCKO	#11	---
6	---	FRAXINUS AMERICANA	AMERICAN ASH	2.5"CAL	---
3	---	METASEQUOIA GLYPTOSTROBOIDES	DAWN REDWOOD	2.5"CAL	---
2	---	NYSSA SYLVATICA	BLACK GUM	#9	---
3	---	PINUS STROBUS	EASTERN WHITE PINE	6"HT	---
29	---	POPULUS TREMULOIDES	QUAKING ASPEN	#9	---
12	---	QUERCUS PALUSTRIS	PIN OAK	2.5"CAL	---
4	---	RHUS GLABRA	SMOOTH SUMAC	2.5"CAL	---
6	---	TSUGA CANADENSIS	EASTERN HICKORY	#9	---
SHRUBS					
5	---	HAMAMELIS VIRGINIANA	COMMON WITCH HAZEL	#7	---
5	---	ILEX VERTICILLATA	COMMON WINTERBERRY	#7	---
3	---	RHODODENDRON VISCOSUM	SWAMP AZALEA	#7	---
GRASSES AND FERNS					
3800sf	---	---	LAWN SEED MIX	SEED	---
6700sf	---	---	MEADOW MIX	SEED	---
2800sf	---	---	WETLAND PLANTING MIX	#1	---
50	---	DENNSTAEDTIA PUNCTILOBULA	HAY-SCENTED FERN	#1	---
1250sf	---	FESTUCA RUBRA	NO MOW RED FESCUE	#1	---
840sf	---	MOLINA CAERULEA "MOORFLAMME"	MOOR FLAME GRASS	#1	---

LAWN SEED MIX

MEADOW MIX

NO MOW FESTUCA RUBRA

WETLAND PLANTING MIX

MOLINA CAERULEA "MOORFLAMME"

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1	08/03/16	ISSUED FOR LEWISTON SITE PLAN REVIEW

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PLANTING PLAN

Drawing Scale
1"=10'-0"

Project Number
14031A

Date Issued
8/3/2016

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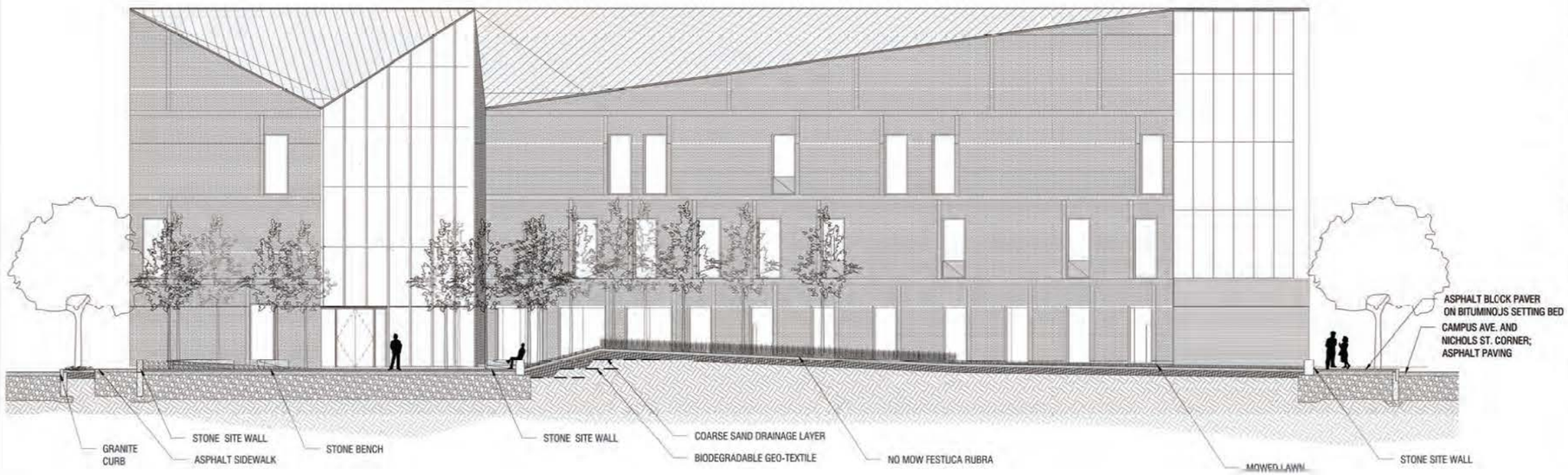

2 SITE SECTION
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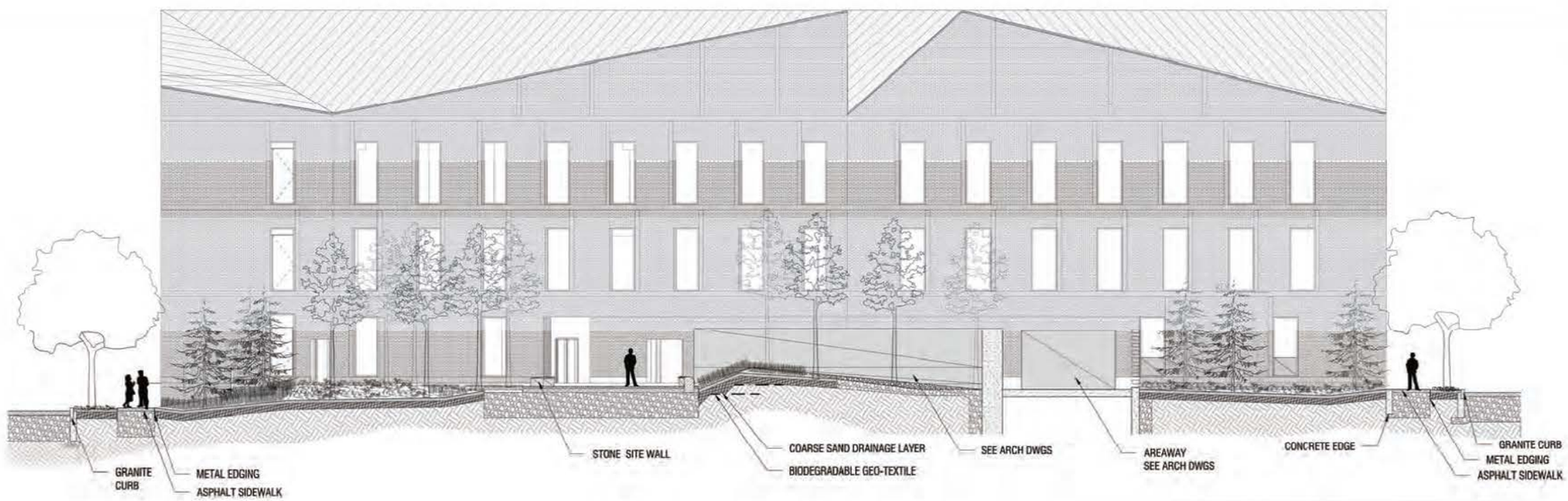

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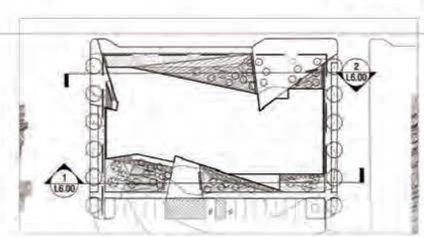
PRELIMINARY FOR REVIEW ONLY



N

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#	DATE	DESCRIPTION
1	08/02/18	ISSUED FOR LEWISTON SITE PLAN REVIEW

BATES

Bates College STEM Projects

SITE SECTIONS

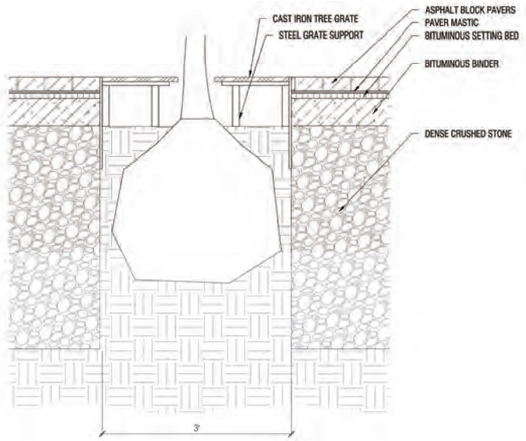
Drawing Scale
1"=10'-0"

Project Number
14021A

Date Issued
8/3/2018

L3.0

PRELIMINARY
FOR REVIEW ONLY



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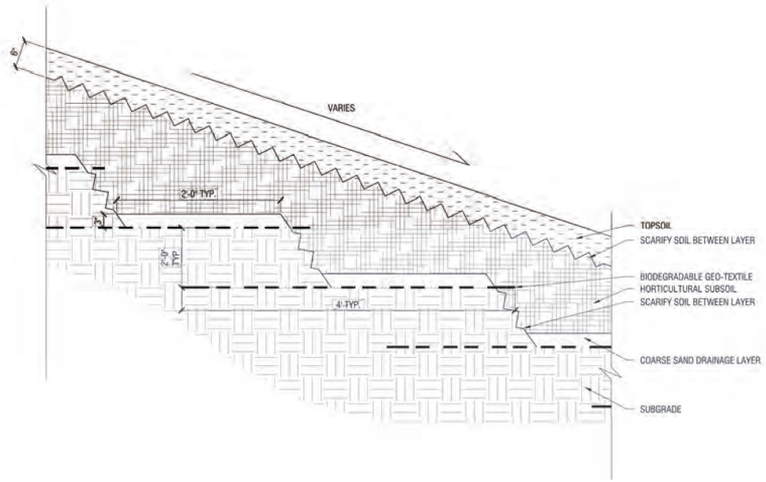

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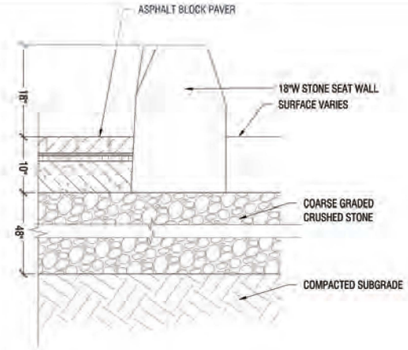

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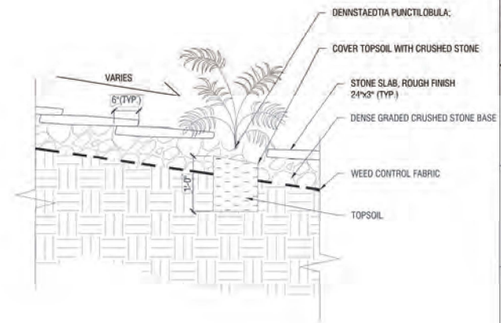

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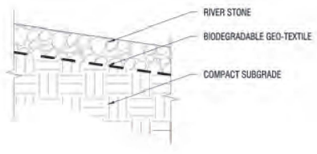

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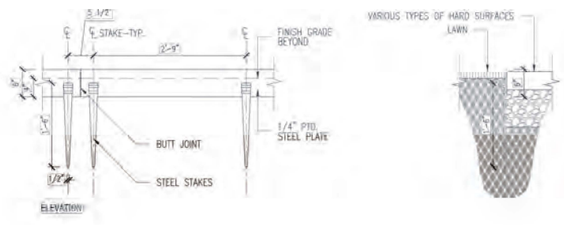

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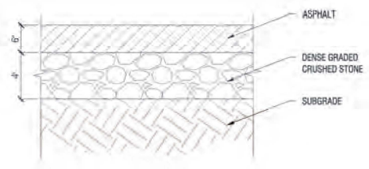

PEDESTRIAN ASPHALT PAVING
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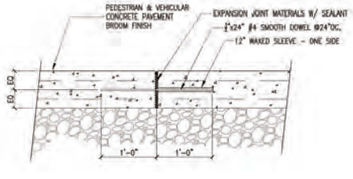

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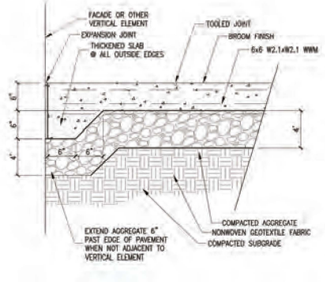

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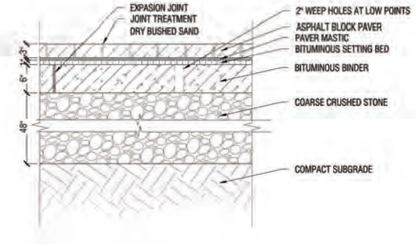

ASPHALT PAVER BLOCK DETAIL
SCALE: NTS

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NOT FOR CONSTRUCTION

#	DATE	DESCRIPTION
4	08/03/18	ISSUED FOR LEWISTON SITE PLAN REVIEW

BATES
Bates College STEM Projects

SITE DETAILS

Drawing Scale
1"=10'-0"

Project Number
14021A

Date Issued
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L4.0

STORMWATER MANAGEMENT PLAN

Bates College STEM Building
Campus Avenue, Nichols Street, and Bardwell Street
Lewiston, Maine

1.1 INTRODUCTION

This Stormwater Management Plan has been prepared to address the stormwater runoff impacts for stormwater quality associated with the development of the proposed STEM Building at the Bates College campus in Lewiston, Maine.

2.1 EXISTING CONDITIONS

The project site is a 67,213-square-foot (1.54 acres) set of parcels that is part of a densely-developed neighborhood comprised of a mix of college-related office buildings, and single- and multi-family residences. The project area and is generally bounded on the southeast by Bardwell Street, on the northeast by Campus Avenue, and on the northwest by Nichols Street. The existing site includes a several buildings, landscaping, walkways, underground utilities, and a parking area. The existing uses are summed in Table 1, below:

Table 1: Existing Land Use

Existing Use	Area (SF)
Ex Buildings	2,783
Ex Parking Lot	5,900
Ex driveways	1,270
Ex Landscaped	1,000
Ex grassed area	37,234
Undeveloped Area	19,026
TOTAL	**67,213**

2.1.1 Land Cover

See “2.1 Existing Conditions”, above.

2.1.2 Site Topography

The site grading is constrained by the grading of the surrounding streets. The development footprints must relate to the grades in the streets and in general the slopes on the proposed

development are gently sloping and match into the surrounding streets and property lines. In general, the existing site slopes to the south where there are currently depressions that collect a large portion of the stormwater from the site before draining into the City's storm drain system in Nichols Street. Locations on-site nearest to roadways typically slope gently towards the surrounding streets, and into the drainage systems within the surrounding streets.

2.1.3 Surface Water Features

There are no surface waters on or adjacent to the developed portion of the site. The site is not tributary to any lakes or surface waters listed as critically impaired by phosphorus.

2.1.4 Soils

See "Section 11. Soils", of this application.

3.1 PROPOSED CONDITIONS

The construction of the new building will involve the demolition of the existing buildings and paved areas, as noted in Section 2.1. The proposed conditions will redevelop the parcel through the installation of a new building, driveways, walkways, and parking areas; utility improvements; the installation of a proposed stormwater control BMP; and the re-grading and landscaping the remainder of the site. These uses are summarized in Table 2, below:

Table 2: Proposed Land Use

Proposed Use	Area (SF)
New STEM Building	15,000
Brick Frontage	1,750
Front walks	210
Parking	10,260
Back Walks	2,380
Parking Ramps	800
Landscaped Areas	3,500
Prop Trees	400
Rock/Hardscaping	2,607
Grassed	11,280
Undeveloped	19,026
TOTAL	**67,213**

Treatment of the stormwater runoff will be achieved in part by directing runoff from the site to a grassed underdrained soil filter (GUSF). In general, the proposed drainage patterns will not be substantially altered from the existing condition, with most stormwater runoff being conveyed to the southern portion of the site, and areas adjacent to the roadways sloping gently away from the proposed building to meet roadway grade.

3.1.1 Alteration to Land Cover

In general terms, the project will be increasing the total amount of impervious surface area through incorporation of a building, parking lot, and walkways. Specific amounts of impervious and pervious surfaces in the existing and proposed conditions are noted in Section 2.1 and Section 3.1 of this report. Additional impervious surfaces will be treated through the redevelopment standard, which is later discussed in Section 4.2.3 of this report.

3.1.2 Downstream Waterbodies

Surface runoff from the development is directed into the City's storm drain system. The storm drain system discharges into the Androscoggin River, and ultimately the Atlantic Ocean.

4.1 REGULATORY REQUIREMENTS

4.1.1 City of Lewiston

The proposed project will require Development Review approval by the City of Lewiston Planning Board. According to the "Zoning and Land Use Code of the City of Lewiston, Maine," (the "Code"), "Sec. 4. Approval Criteria, (f) Stormwater Management" of Appendix A – Zoning and Land Use Code, Article XIII. Development Review and Standards, *"…All projects including one acre or more of disturbed land shall meet the requirements of this subsection 4(f) and the requirements of the Site Location of Development Law, 38 MRSA, 481--490, the Maine Stormwater Management Law, 38 M.R.S.A. Section 420-D, and regulations promulgated there under…"*.

4.1.2 Maine Department of Environmental Protection (MDEP)

The MDEP Rules Chapter 500 describes stormwater management requirements for new development and redevelopment projects which involve modification to an existing Site Location of Development Permit (SLDP). These rules describe performance standards divided into five major categories: Basic Standards, General Standards, Phosphorous Standards, Urban Impaired Stream Standards and Flooding Standards.

A. Basic Standards: As a modification of an existing SLDP, the proposed project must meet the Basic Standards.
B. General Standards: As a modification of an existing SLDP, the proposed project must meet the General Standards.
C. Phosphorous Standards: A project is subject to the phosphorous standards when it is in the watershed of a lake most at risk as identified in Chapter 502. This project is not in the watershed of a lake that is identified as being Most at Risk in Chapter 502 and therefore the project is not subject to the Phosphorous Standards.
D. Urban Impaired Stream Standard: Stormwater from this project is not tributary to an "Urban Impaired Stream" as defined by MDEP Chapter 502 and, therefore is not subject to the Urban Impaired Stream Standards.
E. Flooding Standard: As a modification of an existing SLDP, the proposed project must meet the Flooding Standard.

4.2 WATER QUALITY TREATMENT

4.2.1 General Considerations

Stormwater quality treatment for the project will be provided through a Grassed Underdrained Soil Filter (GUSF). In general, the building roof area, a majority of the parking lot area, and tributary developed areas convey surface runoff to the proposed GUSF. The treatment system and the associated contributing drainage areas are shown on the attached Post Development Stormwater Plan. The details for the treatment system are shown on the attached plan set.

4.2.2 BMP Design Considerations

A. The underdrained soil filter was designed and sized in accordance with "Section 7.1.3 General Design Criteria", of MDEP Volume III. BMP Technical Design Manual:

   a. Treatment Volume - A grassed underdrained soil filter (USF) must detain and filter a runoff volume equal to 1.0 inch times the subcatchment's impervious area plus 0.4 inch times the subcatchment's landscaped developed area.
   b. Filter Area - The surface area of the filter must be no less than the sum of 5% of the impervious area and 2% of the landscaped area draining to the filter;
   c. Basin Size - The size of a filter bed should never exceed 3,000 sq. ft. in basin bottom area; and
   d. Peak Storage Depth of The Channel Protection Volume - May not exceed 18 inches and should be designed to drain dry within 24 to 48 hours. Additional storage may be provided to retain flood volumes, but shall not be considered treatment volume under the Quality standard.
   e. Confirmation of this sizing is provided in Table 8 of this report.

4.2.3 Required and Proposed Project Stormwater Runoff Quality Treatment

1. The proposed development is subject to the General Standard. The project classifies as Redevelopment under section 4.C.(2)(d) of the General Standards of Chapter 500. As a redevelopment, pollutant rankings are assigned to the existing and proposed surfaces of the project's disturbed area. This information has been collated in Table 3 and Table 4, below. Please note that the Undeveloped Area in Table 1 and Table 2 has been excluded from this calculation, as this area is not to be disturbed by construction activities:

Table 3: Existing Pollutant Ranking Calculation

Existing Use	Area (sf)	Pollutant Ranking	Weighted Pollutant Ranking
Ex Buildings	2783	2	0.12
Ex Parking Lot	5900	4	0.49
Ex driveways	1270	3	0.08
Ex Landscaped	1000	1	0.02
Ex grassed area	37,234	2	1.55
TOTAL	**48,187**	**-**	**2.25**

Table 4: Proposed Pollutant Ranking Calculation			
Proposed Use	**Area (Sf)**	**Pollutant Ranking**	**Weighted Pollutant Ranking**
New STEM Building	15000	*3*	0.93
Brick Frontage	1750	2	0.07
Front walks	210	2	0.01
Parking	10260	*4*	0.85
Back Walks	2380	2	0.10
Parking Ramps	800	*4*	0.07
Landscaped Areas	3500	1	0.07
Prop Trees	400	1	0.01
Rock/Hardscaping	2607	2	0.11
Grassed	11,280	2	0.47
TOTAL	**48,187**	**-**	**2.69**

2. The pollutant ranking increases from 2.25 to 2.69 from the existing condition to the proposed condition. Therefore, 60% of the proposed site's disturbed area needs to be treated for water quality measures under 4.C.(2)(d)(i)e. Table 5, below, shows this calculation:

Table 5: Treated Area Calculation		
Total Disturbed Area	48,187	SF
60% of Area	28,912	SF
Treated Area	***34,486***	*SF*

3. Priority for treatment must be given to areas with the highest pollutant ranking which, for this site, is the parking lot and building roof. A vegetated soil filter (Grassed Underdrained Soil Filter (GUSF)) was incorporated to treat this area. The area being conveyed to the GUSF is noted as 34,486 SF, and calculations for priority Pollutant Source Rankings treated by the GUSF are indicated below as Table 6 and Table 7:

Table 6: Pollutant Source Ranking "4"			
Pollutant Source	**Total Area (SF)**	**Treated Area (SF)**	**Percentage**
Parking Lot Area	10,260	8,955	87%
Parking Ramps	800	450	56%
TOTAL	11,060	9,405	**85%**

Table 7: Pollutant Source Ranking "3"			
Pollutant Source	**Total Area (SF)**	**Treated Area (SF)**	**Percentage**
Roof Area	15,000	15,000	100%
TOTAL	15,000	15,000	**100%**

The following Table 8 shows the GUSF with associated drainage area, treatment volumes and required treatment volumes and demonstrates that the GUSF is sized appropriately to accommodate the stormwater from its subcatchment.

TABLE 8: Grassed Underdrained Soil Filter 1				
Basin Design				
Treatment Volume	Total SF	Multiplier	Volume	Unit
Impervious Area	25,904	1.0	2,159	cf
Developed Area	8,582	0.4	286	cf
Total Treatment Volume Required			**2,445**	**cf**
Treatment Volume Provided			**2,685**	**cf**
Surface Area at Filter Elevation	1,790	sf		
Water Quaility Volume (18-inch Ponding)	2,685	cf		
Surface Area Check				
Impervious Area	25904	5%	1,295	sf
Non-Impervious Developed Area	8582	2%	172	sf
Total Surface Area Required, min.			**1,467**	**sf**

The following Table 9 includes a summary of all Stormwater BMPs used on the proposed site:

Table 9: Summary Treatment Table			
Subcatchment	**Total Area (SF)**	**% Treated Area**	**BMP**
Grassed Underdrained Soil Filter 1	34,486	100%	GUSF 1
TOTALS	**34,486**	**100%**	

4.3 RUNOFF ANALYSIS

A runoff analysis was completed to compare pre-development runoff rates to post-development runoff rates.

4.3.1 Modeling Technique

The Soil Conservation Service (SCS) TR-20 methodology was used to determine the flow rates for this hydrologic analysis and HydroCAD (release 10.00) computer modeling software was utilized to perform the computations. This method relies heavily upon detailed watershed characteristics and historical rainfall data to model estimated peak discharges at selected recurrence intervals. Printed results of the HydroCAD modeling and hydrologic computations for the pre-development and post-development conditions for the 2, 10 and 25-year recurrence interval are contained in as an appendix to this section.

Site specific watershed details, including drainage areas, land use cover, and time of concentrations have been calculated and discussed in the following sections.

4.3.2 Study Points

Runoff from the site has been analyzed at Study Points, located at each point where concentrated stormwater flows from the site cross a property line. For this project, a total four (4) points of analysis or Study Points (SP) were evaluated. These study points are indicated on the attached stormwater plans, with Study Point 1 generally at the location of concentrated flows to Campus Avenue, Study Point 2 generally at the location of concentrated flows to Bardwell Street, Study Point 3 generally at the location of concentrated flows to Nichols Street, and Study Point 4 being the catch basin at the southern portion of the facility.

4.3.3 Pre-Development

The pre-development model represents the site in the existing conditions. The study area watershed was broken down into four subcatchments to model total flow condition at the provided study points.

Runoff within Subcatchment 103-E conveys flows to Study Point 1. Subcatchment 12-R conveys flows to Study Point 2. Subcatchment 14-R conveys flows to Study Point 3. Subcatchment 13-R conveys flows to the wetland location at the southern portion of the facility, and then ultimately to an existing catch basin, Study Point 4.

4.3.4 Post-Development

The post-development conditions depict the developed site including the facility improvements and the access improvements. The previously mentioned subcatchments remain in limited forms. An additional subcatchment, 103-E2, was developed to show additional flows conveyed to Campus Avenue through new landscaping. 6 additional subcatchments were developed to indicate surface runoff to the Grassed Underdrained Soil Filter, and several ponds were created to model the piping system to this location. The GUSF was modeled under Pond 1P, which incorporates several the exfiltration to underdrains, the Outlet Control Structure, the emergency spillway, and the storage.

4.3.5 Comparison of Peak Flow Rates

A summary of the Pre-Development and Post-Development peak discharge rates at the study points are shown in Table 10:

Table 10: Summary Table of Pre-Development and Post Development Flow Rates

Study Point	2-Year Storm			10-Year Storm			25-Year Storm		
	Pre (cfs)	Post (cfs)	Diff. (cfs)	Pre (cfs)	Post (cfs)	Diff. (cfs)	Pre (cfs)	Post (cfs)	Diff. (cfs)
SP-1	0.3	0.2	-0.1	0.5	0.4	-0.1	0.6	0.5	-0.1
SP-2	0.1	0	-0.1	0.1	0	-0.1	0.2	0	-0.2
SP-3	0.3	0.3	-	0.6	0.5	-0.1	0.7	0.6	-0.1
SP-4	0.7	0.5	-0.2	1.4	0.8	-0.6	1.7	1.7	-

In general, pre-development and post-development runoff rates are consistent with only minor variations in the peak discharge rates. Peak discharge rates for the existing condition are less than, or equal to, the post-development conditions in the design storms.

4.4 DISCHARGE TO WETLANDS STANDARD

The discharge of runoff to a wetland due to a 2-year storm may not increase the mean storage depth within a wetland more than two inches above pre-development levels for more than 24 hours from the end of the storm event. In the existing condition, Pond PW (wetland location) achieves a maximum elevation of 227.03' in the 2-year rain event. In the proposed condition, Pond PW achieves a maxiumum elevation of 226.82' in the 2-year rain event. The difference is a decrease in peak elevation. Since the peak wetland elevation does not exceed the 2" maximum increase during a comparison of peak events, the discharge to wetland standard is met.

5.1 CONCLUSIONS

By incorporating the proposed BMP presented in this report, runoff from the proposed site will receive treatment/control that meets the applicable Basic, Flooding, and General Standards of Chapter 500, Stormwater Management.

5.2 MAINTENANCE & PROTECTION OF STORMWATER SYSTEM

According to Appendix A – Zoning and Land Use Code, Article XIII. Development Review and Standards, "Sec. 15. Post-construction stormwater management standards", of the City's Code, the applicant shall prepare and receive approval of a Post-Construction Stormwater Management Plan developed in accordance with the applicable standards of the Code.

Long-term responsibilities for maintenance and protection of the project's stormwater drainage system, stormwater treatment systems, paved areas and permanent erosion and sedimentation control measures will be assumed by the applicant. A Maintenance Plan has been developed for the project and the components of the plan are detailed in "Section 14. Basic Standards Submissions" of this application.

CITY OF LEWISTON

Department of Planning & Code Enforcement

TO: Lewiston Planning Board

FROM: Douglas Greene, AICP, RLA, City Planner

DATE: October 22, 2018

RE: New Roots Cooperative Farm, Proposed Greenhouses, Development Review Agenda Item 4 c

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A development review application submitted by the Maine Farmland Trust on behalf of New Roots Cooperative Farm to construct Greenhouses located at 952 College Street.

PROJECT DESCRIPTION

A few years ago, the Maine Farmland Trust acquired the property at 952 College Street. This 38.37 acre tract has been in agriculture for many years and is zoned Rural Agricultural (R). The Maine Farmland Trust has leased the farm to the New Roots Cooperative, a Somali-Bantu farming enterprise. New Roots has been producing crops for the last 2 years and is now wanting to expand their operation by building six (6) "high hoop" greenhouses (30' x 96") that can extend the growing season. The New Roots Cooperative has been working with USDA on project for help with design, funding, materials and technical assistance.

LIST TYPES OF APPROVALS

The proposed greenhouses are a permitted use in the Rural Agricultural (R) zone. This project requires Development Review (for a major development) as it exceeds a total ground area coverage of 5,000 s.f. Therefore, the Planning Board will review the development review application using Article XIII, Development Review and Standards, Section 4, Approval Criteria.

STAFF REVIEW and COMMENTS

This proposal came to the attention of staff through a site inspection at New Roots Cooperative Farm at 952 College Street, which revealed the greenhouses were being constructed without a building permit. The work was stopped and a development review application was prepared by the Maine Farmland Trust, USDA staff and the New Roots Cooperative. The applicant presented a request and was approved to construct one (1) 30' x 96' greenhouse at the October 9th Staff Review Board meeting. During that review the only comments or concerns from staff was from Planning and Code Enforcement. Planning and Code Enforcement wanted to make sure that the greenhouses would be located to meet the 50 foot front and side setbacks and requested a site plan documentation of that in addition to the submission of copies of USDA project checklist that will be completed by the farm for each greenhouse.

STAFF RECOMMENDATION

City staff has no additional comments at this time. Staff recommends APPROVAL of the proposed project, with the following conditions:

1. The applicant shall provide documentation after construction is completed that the greenhouses have been located to meet the front and side setbacks for the Rural Agricultural zone.
2. The applicant shall provide completed copies of the USDA project checklist for each greenhouse after construction has been completed.

ACTION NECESSARY

Make a motion that the application submitted by the Maine Farmland Trust on behalf of New Roots Cooperative to construct five (5) greenhouses (2,880 s.f. each), located at 952 College Street meets all of the necessary criteria contained in the Zoning and Land Use Code, including, but not limited to Article XIII, Section 4 of the Zoning and Land Use Code, and that approval be granted (including, if any, specific conditions raised by the Planning Board or staff).

MAINE FARMLAND TRUST

October 17, 2018

Planning Board
City of Lewiston
27 Pine Street
Lewiston, ME 04240

Re: Development Review Application for Hoop Houses at 952 College Street in Lewiston, New Roots Cooperative Farm

To the City of Lewiston Planning Board:

Maine Farmland Trust (MFT) is seeking approval for the construction of five hoop houses measuring 30'x96' each, and containing no permanent foundations, at property that it owns at 952 College Street in Lewiston, Maine. This property was conveyed to MFT by a deed of sale recorded at the Androscoggin County Registry of Deeds at Book 9296, Page 247 and dated January 22, 2016. This request to construct five hoop houses is in addition to one identical hoop house that was approved at a meeting of the Staff Review Committee on October 9, 2018.

These structures are agricultural in nature and require no permanent foundations or paving. We respectfully point out that while large in size, these structures are different from traditional residential or commercial development and will create a much smaller impact to the site and surrounding areas. In addition, these hoop houses could be easily removed in the future.

If you have questions or require additional information, please do not hesitate to contact April Costa at (207)338-6575 x306 or acosta@mainefarmlandtrust.org. Thank you for considering this application.

Sincerely,

April Costa
Land Steward

Development Review Application

City of Auburn Planning and Permitting Department
City of Lewiston Department of Planning and Code Enforcement

PROJECT NAME: New Roots Cooperative Farm Hoop Houses

PROPOSED DEVELOPMENT ADDRESS: 952 College Street, Lewiston, ME 04240

PARCEL ID#: 112-000-013

REVIEW TYPE: **Site Plan/Special Exception** X **Site Plan Amendment** □
Subdivision □ **Subdivision Amendment** □

PROJECT DESCRIPTION: Construction of five 35'x96' hoop houses on the property. Hoop Houses will be 15' at their tallest and will have no foundation or electricity. Project will be completed in accordance with Natural Resources Conservation Service (NRCS) plans, oversight, and funding.

CONTACT INFORMATION:

Applicant		**Property Owner** SAME AS APPLICANT
Name:	Maine Farmland Trust	**Name:**
Address:	97 Main Street, Belfast, ME	**Address:**
Zip Code	04915	**Zip Code**
Work #:	(207)338-6575 x306	**Work #:**
Cell #:		**Cell #:**
Fax #:	(207)338-6024	**Fax #:**
Home #:		**Home #:**
Email:	acosta@mainefarmlandtrust.org	**Email:**

Project Representative		**Other professional representatives for the project (surveyors, engineers, etc.),**
Name:	Omar Hassan	**Name:**
Address:	PO Box 2142, Lewiston, ME	**Address:**
Zip Code	04240	**Zip Code**
Work #:	(413)665-1271	**Work #:**
Cell #:	(207)319-6261	**Cell #:**
Fax #:	(413)541-8300	**Fax #:**
Home #:		**Home #:**
Email:	ohassan@cdi.coop	**Email:**

PROJECT DATA

The following information is required where applicable, in order to complete the application

IMPERVIOUS SURFACE AREA/RATIO

Existing Total Impervious Area	3,746	sq. ft.
Proposed Total Paved Area	NONE	sq. ft.
Proposed Total Impervious Area	18,146	sq. ft.
Proposed Impervious Net Change	14,400	sq. ft.
Impervious surface ratio existing	0.0086	% of lot area
Impervious surface ratio proposed	0.01	% of lot area

BUILDING AREA/LOT COVERAGE

Existing Building Footprint	3,746	sq. ft.
Proposed Building Footprint	18,146	sq. ft.
Proposed Building Footprint Net change	14,400	sq. ft.
Existing Total Building Floor Area	3,746	sq. ft.
Proposed Total Building Floor Area	18,146	sq. ft.
Proposed Building Floor Area Net Change	14,400	sq. ft
New Building	YES	(yes or no)
Building Area/Lot coverage existing	0.0086	% of lot area
Building Area/Lot coverage proposed	0.01	% of lot area

ZONING

Existing	R/A
Proposed, if applicable	R/A

LAND USE

Existing	Agriculture
Proposed	Agriculture

RESIDENTIAL, IF APPLICABLE

Existing Number of Residential Units	N/A
Proposed Number of Residential Units	N/A
Subdivision, Proposed Number of Lots	N/A

PARKING SPACES

Existing Number of Parking Spaces	N/A
Proposed Number of Parking Spaces	N/A
Required Number of Parking Spaces	N/A
Number of Handicapped Parking Spaces	N/A

ESTIMATED COST OF PROJECT

$60,000

DELEGATED REVIEW AUTHORITY CHECKLIST

SITE LOCATION OF DEVELOPMENT AND STORMWATER MANAGEMENT

Existing Impervious Area	N/A	sq. ft.
Proposed Disturbed Area	N/A	sq. ft.
Proposed Impervious Area	N/A	sq. ft.

1. ***If the proposed disturbance is greater than one acre, then the applicant shall apply for a Maine Construction General Permit (MCGP) with MDEP.***
2. ***If the proposed impervious area is greater than one acre including any impervious area crated since 11/16/05, then the applicant shall apply for a MDEP Stormwater Management Permit, Chapter 500, with the City.***
3. ***If total impervious area (including structures, pavement, etc) is greater than 3 acres since 1971 but less than 7 acres, then the applicant shall apply for a Site Location of Development Permit with the City. If more than 7 acres then the application shall be made to MDEP unless determined otherwise.***
4. ***If the development is a subdivision of more than 20 acres but less than 100 acres then the applicant shall apply for a Site Location of Development Permit with the City. If more than 100 acres then the application shall be made to MDEP unless determined otherwise.***

TRAFFIC ESTIMATE

Total traffic estimated in the peak hour-existing (Since July 1, 1997) N/A passenger car equivalents (PCE)

Total traffic estimated in the peak hour-proposed (Since July 1, 1997) N/A passenger car equivalents (PCE)

If the proposed increase in traffic exceeds 100 one-way trips in the peak hour then a traffic movement permit will be required.

Zoning Summary

1. Property is located in the R/A zoning district.
2. Parcel Area: 38.37 acres / 1,671,397 square feet(sf).

Regulations	Required/Allowed	Provided
Min Lot Area	60,000 sf	/ 1,671,397 sf
Street Frontage	200 sf	/ 2,387 sf
Min Front Yard	50 ft	/ 80 ft
Min Rear Yard	50 ft	/ 400 ft
Min Side Yard	25 ft	/ 75 ft
Max. Building Height	75 ft	/ 15 ft
Use Designation	Agriculture	/ Agriculture
Parking Requirement	1 space/ per N/A square feet of floor area	
Total Parking:	N/A	/
Overlay zoning districts (if any):	NONE	/ /
Urban impaired stream watershed?	YES/NO If yes, watershed name	

DEVELOPMENT REVIEW APPLICATION SUBMISSION

Submission shall include payment of fee and fifteen (15) complete packets containing the following materials:

1. Full size plans containing the information found in the attached sample plan checklist.
2. Application form that is completed and signed.
3. Cover letter stating the nature of the project.
4. All written submittals including evidence of right, title and interest.
5. Copy of the checklist completed for the proposal listing the material contained in the submitted application.

Refer to the application checklist for a detailed list of submittal requirements.

L/A's development review process and requirements have been made similar for convenience and to encourage development. Each Citys ordinances are available online at their prospective websites:
Auburn: www.auburnmaine.org under City Departments/ Planning and Permitting/Land Use Division/Zoning Ordinance
Lewiston: http://www.ci.lewiston.me.us/clerk/ordinances.htm Refer to Appendix A of the Code of Ordinances

I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, I certify that the City's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

This application is for development review only; a Performance Guarantee, Inspection Fee, Building Permit Application and other associated fees and permits will be required prior to construction.

Signature of Applicant:	Date:
Kristin A Varnum	10-18-2018

Development Review Checklist

City of Auburn Planning and Permitting Department
City of Lewiston Department of Planning and Code Enforcement

THE FOLLOWING INFORMATION IS REQUIRED WHERE APPLICABLE TO BE SUBMITTED FOR AN APPLICATION TO BE COMPLETE

PROJECT NAME: New Roots Cooperative Farm Hoop Houses

PROPOSED DEVELOPMENT ADDRESS and PARCEL #: 952 College Street, Lewiston, ME 04240

Parcel #: 112-000-013

Required Information		Check Submitted		Applicable Ordinance	
Site Plan		**Applicant**	**Staff**	**Lewiston**	**Auburn**
	Owner's Names/Address	X			
	Names of Development	X			
	Professionally Prepared Plan	X			
	Tax Map or Street/Parcel Number	X			
	Zoning of Property	X			
	Distance to Property Lines	X			
	Boundaries of Abutting land	X			
	Show Setbacks, Yards and Buffers	X			
	Airport Area of Influence (Auburn only)	N/A			
	Parking Space Calcs	N/A			
	Drive Openings/Locations	X			
	Subdivision Restrictions	N/A			
	Proposed Use	X			
	PB/BOA/Other Restrictions	X			
	Fire Department Review	N/A			
	Open Space/Lot Coverage	X			
	Lot Layout (Lewiston only)	X			
	Existing Building (s)	X			
	Existing Streets, etc.	X			
	Existing Driveways, etc.	X			
	Proposed Building(s)	X			
	Proposed Driveways	X			
Landscape Plan					
	Greenspace Requirements	X			
	Setbacks to Parking	N/A			
	Buffer Requirements	X			
	Street Tree Requirements	N/A			
	Screened Dumpsters	N/A			
	Additional Design Guidelines	X			

	Planting Schedule	N/A			
Stormwater & Erosion Control Plan					
	Compliance w/ chapter 500	X			
	Show Existing Surface Drainage	X			
	Direction of Flow	X			
	Location of Catch Basins, etc.	X			
	Drainage Calculations	X			
	Erosion Control Measures	X			
	Maine Construction General Permit	N/A			
	Bonding and Inspection Fees	N/A			
	Post-Construction Stormwater Plan	X			
	Inspection/monitoring requirements	N/A			
	Third Party Inspections (Lewiston only)	N/A			
Lighting Plan					
	Full cut-off fixtures	N/A			
	Meets Parking Lot Requirements	N/A			
Traffic Information					
	Access Management	N/A			
	Signage	N/A			
	PCE - Trips in Peak Hour	N/A			
	Vehicular Movements	N/A			
	Safety Concerns	N/A			
	Pedestrian Circulation	N/A			
	Police Traffic	N/A			
	Engineering Traffic	N/A			
Utility Plan					
	Water	X			
	Adequacy of Water Supply	X			
	Water main extension agreement	N/A			
	Sewer	N/A			
	Available city capacity	N/A			
	Electric	X			
	Natural Gas	N/A			
	Cable/Phone	N/A			
Natural Resources					
	Shoreland Zone	X			
	Flood Plain	N/A			
	Wetlands or Streams	X			
	Urban Impaired Stream	N/A			
	Phosphorus Check	N/A			
	Aquifer/Groundwater Protection	N/A			
	Applicable State Permits	N/A			
	No Name Pond Watershed (Lewiston only)	N/A			

	Lake Auburn Watershed (Auburn only)	N/A			
	Taylor Pond Watershed (Auburn only)	N/A			
Right Title or Interest					
	Verify	X			
	Document Existing Easements, Covenants, etc.	X			
Technical & Financial Capacity					
	Cost Est./Financial Capacity	X			
	Performance Guarantee	X			
State Subdivision Law					
	Verify/Check	N/A			
	Covenants/Deed Restrictions	N/A			
	Offers of Conveyance to City	N/A			
	Association Documents	N/A			
	Location of Proposed Streets & Sidewalks	N/A			
	Proposed Lot Lines, etc.	N/A			
	Data to Determine Lots, etc.	N/A			
	Subdivision Lots/Blocks	N/A			
	Specified Dedication of Land	N/A			
Additional Subdivision Standards					
	Single-Family Cluster (Lewiston only)	N/A			
	Multi-Unit Residential Development (Lewiston only)	N/A			
	Mobile Home Parks	N/A			
	Private Commercial or Industrial Subdivisions (Lewiston only)	N/A			
	PUD (Auburn only)	N/A			
A jpeg or pdf of the proposed site plan		X			
Final sets of the approved plans shall be submitted digitally to the City, on a CD or DVD, in AutoCAD format R 14 or greater, along with PDF images of the plans for archiving		X			

Article XIII, (Development Review and Standards), Section 4 (Approval Criteria) Narrative

Please answer how your project addresses each of these approval criteria for your Development Review application.

(a) *Utilization of the site.*
The project utilizes an existing farm property. Proposed use of the site will remain consistent with past use of the site.

(b) *Traffic movement into and out of the development area.*
Access into the site has been previously approved and permitted.

(c) *Access into the site.*
Refer to letter B.

(d) *Internal vehicular circulation.*
Parking is informal and minimal over a large area. Parking and driving on the property has not and is not currently causing any erosion, rutting, or mud to form.

(e) *Pedestrian circulation.*
Pedestrian circulation throughout the property is minimal and limited to the farmers and those working with them.

(f) Stormwater management.
The areas between and around the hoop houses will be seeded with grass immediately following their construction. The hoop houses will also be oriented across the slope of the land so that any runoff will be channeled into the existing drainage ditches on the property, which are intended for this use. The Natural Resources Conservation Service (NRCS) will do a watershed analysis to ensure that the hoop houses are oriented correctly.

(g) *Erosion control.*
See letter F.

(h) *Water supply.*
A private well currently provides water to the site.

(i) *Sewage disposal.*
A porta potty is on site.

(j) *Utilities.*
Solar-powered electricity is currently available on site.

(k) *Natural features.*
The existing landscape will be preserved in its current natural state. The site has historically been used as a farm and will continue to be used as such under this proposed development.

(l) *Groundwater protection.*
N/A, site is not located within an aquifer protection area.

(m) Water and air pollution.
N/A

(n) Exterior lighting.
N/A

(o) Waste disposal.
Waste is removed from the site regularly.

(p) *Lot layout.*
Refer to site plan.

(q) *Landscaping.*
N/A

(r) *Shoreland relationship.*
N/A

(s) *Open space.*
N/A

(t) *Technical and financial capacity.*
Project will be funded by the United States Department of Agriculture (USDA).

(u) *Buffering.*
N/A

(v) *Compliance with district regulations.*
The project complies with USDA guidelines and a lease between the landowner and the tenants.

(w) *Design consistent with performance standards.*
The proposed development will comply with the performance standards of Article 7.

Bk 9296 Pg247 #1246
01-22-2016 @ 02:13p

DEED OF SALE
BY PERSONAL REPRESENTATIVE
(TESTATE)

MONIQUE GENDRON, of 90 St. Croix Street, Lewiston, Maine 04240, duly appointed and acting Personal Representatives of the Estate of Arthur C. Gendron, deceased (testate), as shown by the probate records of Androscoggin County, Maine, and having given notice to each person succeeding to an interest in the real property described below at least ten (10) days prior to the sale, by the power conferred by the Probate Code, and every other power, for consideration paid grants to **Maine Farmland Trust, Inc.**, with a mailing address of 97 Main Street, Belfast, Maine, 04915, the real property in Lewiston, Androscoggin County, Maine, described as follows:

MAINE REAL ESTATE
TRANSFER TAX PAID

Beginning at a point on the northerly line of College Road, said point being located two hundred fifty (250) feet north easterly from the intersection of the northerly line of College Road with the easterly line of Merrill Road; thence in a northeasterly direction along the northerly line of College Road to a brook; thence following said book to the line of the Maine Central Railroad; thence in a generally westerly direction along the line of the Maine Central Railroad to the Merrill Road; thence in a southeasterly direction along the easterly line of the Merrill Road to a point located three hundred forty-five (345) feet northwesterly from the intersection of the easterly line of Merrill Road with the northerly line of College Road; thence at right angels and parallel with said College Road a distance of two hundred fifty (250) feet in a northeasterly direction; thence at right angles and parallel with the easterly line of Merrill Road in a southeasterly direction three hundred forty-five (345) feet to the northerly line of College Road and the point of beginning.

Said parcel is subject to the rights of the Central Maine Power Company to maintain pole lines as granted in deeds recorded in Androscoggin County Registry of Deeds in Book 302, Page 1 and Book 302, Page 155.

Mary B. Gendron died on October 30, 1999 and Arthur C. Gendron derived title to the above premises as the surviving joint tenant.

Reference may also be had to a Discharge of Estate Tax Lien regarding the Estate of Marie Blanche Gendron, also known as Mary B. Gendron, date of death October 30, 1999, recorded in Book 4416, Page 121.

Being Parcel Four of the premises conveyed to Arthur C. Gendron and Marie Blanche Gendron by Deed from The Inhabitants of the Municipality of Lewiston dated May 23, 1988 and recorded in the Androscoggin County Registry of Deeds in Book 2251, Page 158.

The premises hereinabove described are conveyed subject to any easements and restrictions of record and together with the benefit of all rights, easements, privileges and appurtenances belonging thereto.

WITNESS my hand and seal this 22th day of January, 2016.

Witness

Monique Gendron, Personal Representative
of the Estate of Arthur C. Gendron

STATE OF MAINE
ANDROSCOGGIN, SS.

January 22, 2016

Then personally appeared the above-named **Monique Gendron** in her said capacity and acknowledged the foregoing instrument to be her free act and deed.

Before me,

Notary Public
Name:
My Commission Expires:

CHRISTINE V. DUBOIS
NOTARY PUBLIC, STATE OF MAINE
MY COMMISSION EXPIRES
APRIL 15, 2019

K:\ALICIA\CLIENTS\ESTATES\Gendron.Arthur\Deed of Sale 952 College.wpd

ANDROSCOGGIN COUNTY
TINA M CHOUINARD
REGISTER OF DEEDS

LEASE WITH OPTION TO PURCHASE

By and Between

MAINE FARMLAND TRUST, INC.

and

NEW ROOTS COOPERATIVE FARM

This Lease With Option to Purchase (the "Agreement") is made on this 14 day of July 2016 by and between Landlord, **Maine Farmland Trust, Inc.**, whose mailing address is 97 Main Street, Belfast, Maine 04915, and Tenant, **New Roots Cooperative Farm**, a Maine cooperative corporation with a mailing address of PO Box 2142, Lewiston, Maine 04241. This is a commercial lease for agricultural purposes.

1. Premises: Landlord hereby rents to Tenant, the following described premises: approximately 30 acres of land located in Lewiston, Androscoggin County, Maine, as more fully described on Schedule A, attached and hereby incorporated into this Agreement by reference.

2. Term: The term of this Agreement shall be for a five year period beginning the date of hereof until December 1, 2021 or upon sale of the Premises to Tenant pursuant to the Option set forth in Section 13, whichever occurs first.

3. Extension of Lease Term: This Agreement may be extended upon written agreement of the parties. The rental rate for any such extension shall be adjusted to reflect Landlord's property tax commitment for the Premises.

4. Termination: This Agreement may be terminated as follows:

    a. By the expiration of the term of the Agreement as set forth in Section 2 (or Section 3, if this Agreement is extended as provided therein);
    b. By Tenant's purchase of the Premises pursuant to the Option set forth in Section 13;
    c. By the mutual agreement of the parties;
    d. If Tenant shall fail to carry out substantially any obligation under this Agreement, including the failure to make a rent payment within thirty (30) days of its due date as specified in Section 5 below, Landlord shall notify Tenant of the alleged breach requiring Tenant to remedy the breach on or before a date at least thirty (30) days after the giving of such notice. If Tenant fails to comply with such notice, Landlord may declare this tenancy terminated and institute action to expel Tenant from the Premises without refund of any rent except payments made pursuant to Section 6 below.

    In the event Tenant elects not to exercise the Option set forth in Section 13 below, then upon termination of this Agreement the Tenant will vacate the premises and remove all personal property and equipment by 12:00 pm (noon) on the date of termination, and Tenant hereby waives any further notice to vacate.

5. Basic Rental Rate: Rent shall be equal to Landlord's property tax commitment for the Premises. The parties agree and acknowledge that Landlord's property tax commitment for 2016 is One Thousand Three Hundred and Eight dollars ($1,308). Rent shall be paid bi-annually with two installments of Six Hundred Fifty-four Dollars ($654) due in the

 SA

first year on the date of execution of this Agreement and on or by December 1, 2016. In subsequent years, bi-annual installments shall be due on or by June 1 and December 1 of each year. Tenant shall, upon demand, pay to the Landlord a late payment penalty of One Hundred Dollars ($100) whenever the rent is fifteen days or more overdue. Tenant shall pay a Twenty-five Dollar ($25) service fee as additional rent for any check returned to the Landlord by the Tenants' bank for insufficient funds or any other reason. Subject to payment by Tenant of the rent specified herein, Landlord shall pay all property taxes assessed against the Premises.

6. Additional Payments: Tenant may make additional payment in excess of Rent payments as set forth in Section 5 above. Said additional payments shall be held in escrow by Landlord and, in the event that Tenant exercises the Option to purchase the Premises as set forth in Section 13 below, shall be applied to the Purchase Price. If Tenant does not exercise the Option, or fails to close on its purchase of the Premises thereunder, all additional payments shall be returned to Tenant at the end of the lease term.

7. Restrictions on Use of Premises:

   a. During the term of this Agreement, Tenant shall use or permit the use of the Premises only for agricultural and/or horticultural purposes, or uses ancillary and secondary to such purposes. No harvesting of timber or extraction of gravel, minerals or hydrocarbons shall be permitted.
   b. Without notice to Landlord, Tenant may erect temporary structures such as, but not limited to: fencing, shelter for animals, tool sheds, mobile wash and pack stations, mobile walk-in coolers, and/or hoophouses for growing of plants. Any such structures shall have no permanent foundation and must be for agricultural management of the property.
   c. Upon prior written approval of Landlord, Tenant may site and construct permanent improvements to the property such as access roads, utilities, and irrigation systems.
   d. Tenant may only construct permanent buildings after exercising the Option to purchase the Premises set forth in Section 13 below and then only upon prior written approval of Landlord.
   e. Tenants shall provide Landlord with all information necessary for Landlord to apply for required permits and approvals from relevant governmental authorities for improvements and buildings constructed on the Premises during the term of this Agreement.
   f. Tenant's use of the Premises shall be in accordance with best management practices identified by the Maine Department of Agriculture, the University of Maine Cooperative Extension, the Natural Resources Conservation Service, or other similar appropriate entity. Tenant shall use its diligent good faith efforts to cultivate and use the Premises in an ecologically sound manner, maintaining the purity of water and air resources, the productivity of the soil, and the integrity of the landscape, and disposing of any wastes in a safe and sanitary manner. Removal or stripping of soil is strictly prohibited.

SA

8. Approvals and Reimbursement:
    a. When seeking Landlord approval pursuant to Section 7 above, Tenant shall submit to Landlord a written request for approval, which approval shall not be unreasonably withheld. Any such request shall include pertinent information including maps, diagrams and plans for potential buildings or other improvements. Notwithstanding the foregoing, Landlord may, in its sole discretion, accept oral request for approval. Within 14 days of receipt of Tenant's request, Landowner shall meet Tenant at the Premises to discuss Tenant's request. Landowner shall have 30 days from the date of said meeting to approve or reject Tenant's request. If Landlord fails to reject or approve the said request within said 30 day time period, then said failure to respond to the request shall be considered a rejection of it.
    b. In the event that Tenant requests the ability to construct permanent improvements pursuant to Section 7.c above, Landlord's approval shall be contingent upon the parties signing a written agreement setting forth the rate and terms of Landlord's reimbursement, if any, to Tenant for Tenant's costs of construction.
    c. In the event that Tenant constructs permanent buildings pursuant to Section 7.d above, but does not close on its purchase of the Premises pursuant to the Option discussed in Section 13 below, then Landlord shall make no reimbursement to Tenant for Tenant's costs of constructing said permanent buildings.
    d. Notwithstanding the prohibition on timber harvesting described in Section 7.a, Landlord may provide approval to clear presently forested land for pasture or crop production upon receiving a written request for approval from Tenant. Any such request shall include a harvest plan, or other similar plan, to be approved by Landlord, and signed by a licensed, professional forester or by another qualified person approved in advance by Landlord. Landlord's approval shall be contingent upon the parties signing a written agreement setting forth the rate and terms of Landlord's compensation requirements, if any, for Tenant's harvest and disposal of timber.

9. Indemnification. The Tenant shall protect the Premises from damage, waste or trespass and shall hold the Landlord harmless from any liability or loss arising out of the activities of Tenant or their guests or invitees, unless such loss or liability was caused by the negligence of the Landlord or its agents.

10. Insurance: Tenant shall maintain liability insurance in an amount of at least One Million Dollars ($1,000,000) on the premises, which insurance shall name Landlord as Additional Insured.

11. No Assignment: Tenant may not assign this Agreement without written approval of Landlord.

12. No Subletting: Tenant may not sublet the premises without written approval of Landlord.

13. Option to Purchase: In consideration of Tenant's agreement to lease the Premises, Landlord hereby grants an Option to Purchase the Premises under the following terms and conditions:

SA

a. Title will be subject to an agricultural conservation easement to be negotiated in good faith by the parties and approved by Landlord's board of directors. The conservation easement will restrict non-agricultural development of the property, include an allowance for at least one, single-family residential dwelling, and may also restrict or prohibit division of the property. Title shall be conveyed by quitclaim deed with covenant and shall be good and marketable, free and clear of any liens, easements, restrictions or other matters affecting title other than the agricultural conservation easement referenced above.

b. The Purchase Price shall be Seventy-Five Thousand Dollars ($75,000);

c. Tenant may exercise this option by written notice delivered to Landlord at least 30 days prior to the termination of this Agreement. Closing shall take place on the date specified in the notice, which date shall be not more sixty (60 days after the date of the notice, unless the parties agree otherwise. Within two (2) business days after giving the notice to purchase, Tenant shall pay to Landlord an earnest money deposit in the amount of $750. Notwithstanding the provisions of Paragraph 4 hereof, this Agreement shall stay in effect until the Closing, provided that Tenant continues to pay rent as provided herein.

14. Miscellaneous:

a. This Agreement shall be construed under the laws of the State of Maine.
b. If any provision of this Agreement or portion of such provision or the application thereof to any person or circumstance is held invalid, the remainder of the Agreement (or the remainder of such provision) and the application thereof to other persons or circumstances will not be affected thereby.
c. It is understood and agreed that all understandings and agreements between the parties hereto are merged into this contract, which alone fully and completely expresses their agreement, and that the same is entered into after full investigation, neither party relying upon any statements or representations not embodied in this contract, made by the other. This agreement may not be changed or terminated orally.
d. All the rights, obligations and liabilities, given to or imposed upon the parties hereto, shall extend to and bind the respective personal representatives, heirs, successors and assigns of such parties. No rights, however, shall inure to the benefit of any assignee of the Tenant unless the assignment has been approved by the Landlord in writing as set forth in Section 11, above.
e. Upon request of either party, the parties shall execute a Memorandum of Lease, consistent with Maine statutes, to evidence this Lease.

SA *[Signatures appear on following page]*

Witnesseth:

Landlord Maine Farmland Trust, Inc.,

Kimberly Sawtown
Witness

By Kristin Varnum
Its Vice President, Duly Authorized

Tenant New Roots Cooperative Farm

x JABRIL ABDI
Witness

x Seynab Ali
By: Seynab Ali
Its: President

x Batula Ismail

x Mohamed Abukar

Attachments:
Exhibit A (legal description)
Exhibit B (map)

EXHIBIT A

to Lease with Option to Purchase

Legal Description

Beginning at a point on the northerly line of College Road, said point being located two hundred fifty (250) feet northeasterly from the intersection of the northerly line of College Road with the easterly line of Merrill Road; thence in a northeasterly direction along the northerly line of College Road to a brook; thence following said brook to the line of the Maine Central Railroad; thence in a generally westerly direction along the line of the Maine Central Railroad to the Merrill Road; thence in a southeasterly direction along the easterly line of the Merrill Road to a point located three hundred forty-five (345) feet northwesterly from the intersection of the easterly line of Merrill Road with the northerly line of College Road; thence at right angles and parallel with said College Road a distance of two hundred fifty (250) feet in a northeasterly direction; thence at right angles and parallel with the easterly line of Merrill Road in a southeasterly direction three hundred forty-five (345) feet to the northerly line of College Road and the point of beginning.

Said parcel is subject to the rights of the Central Maine Power Company to maintain pole lines as granted in deeds recorded in Androscoggin County Registry of Deeds in Book 302, Page 1 and Book 302, Page 155.

Being the same premises conveyed to Maine Farmland Trust, Inc., by Deed of the Estate of Arthur C. Gendron, dated January 22, 2016, and recorded in the Androscoggin County Registry of Deeds in Book 9296, Page 247.

The premises hereinabove described are subject to any easements and restrictions or record and together with the benefit of all rights, easements, privileges and appurtenances belonging thereto.

SA

Gendron Property, College St. Parcel (~30 Acres)

Lewiston, Androscoggin County, Maine

Exhibit B to Lease with Option to Purchase

Gendron Property

SA

MAINE FARMLAND TRUST

Note:Information on this map is provided for purposes of discussion and visualization only; mapped boundaries and acreages are approximate.

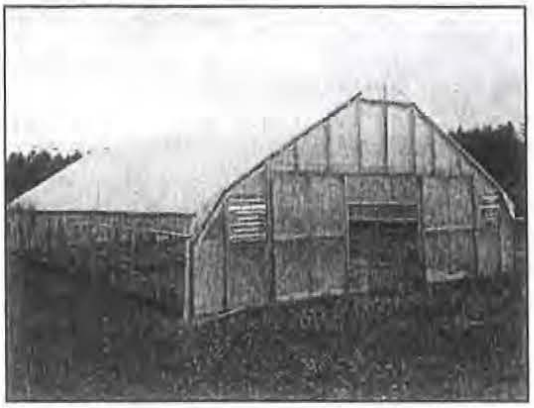
N

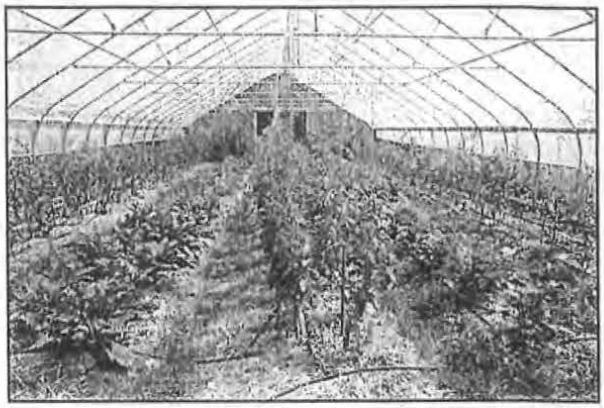
0 250 500 Feet

Created by Pippa Stanley, 7/16/2015
Base Data Source: Maine Office of GIS, NAIP 2013, NRCS Soils.

High Tunnel System

Job Sheet and Specifications — ME - 325





Definition

An enclosed polyethylene, polycarbonate, plastic, or fabric covered structure that is used to cover and protect crops from sun, wind, excessive rainfall, or cold, to extend the growing season. Vegetable or other specialty crops are grown in the natural soil or in raised beds (*not* in pots or on benches or tables).

Models that do not meet Maine's Criteria are not eligible for NRCS program payments. Vendor claims that models are "NRCS approved" may not be accurate for Maine: minimum criteria and specifications for this practice are not the same in all states.

Producer Certification:

I have received a copy of this document, and understand that my structure must meet the listed criteria AND be installed to NRCS and manufacturer specifications in order to receive program payments related to this Seasonal High Tunnel practice.

I am responsible for ensuring that the model is ordered and installed with all required components, as listed below, to meet Maine requirements. In some cases, additional components (at additional cost) are needed for the structure to meet Criteria. (Examples include corner wind bracing, cross-ties, or purlins that are not standard in a particular kit.)

I understand that I am responsible to maintain this structure for the 5 year lifespan. Operation and Maintenance items are listed in this document, and include ice and snow load management to protect the structure against failure. I am responsible to repair or replace all materials of the high tunnel at my own cost if any damage is sustained by ice/snow loads, wind, or other events or accidents.

Producer Signature: Seyndb Ali Date: 3/22/17

Producer	New Roots Cooperative	Field/Tract	F3 / T760
Planner:	Rebecca Lay	Date:	3/22/17
Approved By:	Rebecca Lay	Date:	3/22/17

NRCS will review all designs to ensure that the chosen model and any additional components meet NRCS Maine criteria.

High tunnels that do not appear on the list of models meeting current Maine Criteria must be reviewed and approved by State Resource Conservationist or appointed staff.

Model Chosen

Manufacturer: Ledgewood

Model: Gothic

Width: 30' **Length:** 96'

Additional components needed to meet Criteria:

Supporting Practices Needed for Stabilization and Functioning of This Site:
(check all that apply)

- ☐ Critical Area Planting
- ☐ Diversion
- ☐ Other: _____

See attached map showing specific approved site location and orientation of 1) the high tunnel, 2) water source, 3) any needed supporting practices.

This location has been inspected and approved. A change to the planned location must undergo the NRCS site approval review process prior to installation, which will cause delays.

Construction Specifications:

- Prepare site according to manufacturer's instructions. Sites should be level, well-drained, and clear of large stones and other debris. Use a level or transit.
- Lay out building location according to site plan.
- Install supporting practices as required, according to construction plans provided by NRCS.

- Assemble high tunnel structure according to manufacturer's instructions.
- Do not pound ground posts directly with a sledge hammer or other device. Use a protective cap, large bolt or other material to protect the post from damage. Damage to ground post will prevent insertion of bows.

Site-Specific Construction Notes:

Operation and Maintenance Requirements

- Follow manufacturer's instructions for operation and maintenance of the high tunnel structure.
- Periodically inspect structure and cover for damage. Reinstall or repair plastic promptly.
- Close high tunnel completely during high wind events.
- Inspect runoff control measures frequently. Repair promptly.
- **WINTER:**
  - Keep sides rolled down prior to seasonal freezing to prevent them from freezing open.
  - **Remove plastic for winter <u>OR</u> be diligent to remove ice/snow on and around the structure during and after storms as needed. Ensure that snow sheds off roof and does not pile up against sides.**
  - **Note:** If structure is in danger of collapse from wind, snow, or ice, cutting the plastic (from outside the structure) may save the metal framework.
- Operate the high tunnel to manage temperature and moisture according to the tolerances of crops grown. Excess heat and humidity can lead to crop failure.
- Test soils periodically for nutrient content and salt concentration. Plastic may be removed for a season to allow flushing of soil sodium as needed, or tunnel may be flooded to provide flushing effect.
- Do not use the high tunnel for storage of equipment or supplies during the extended growing season.
- The High tunnel is not to be used for livestock housing.
- Crops in high tunnel must be grown in natural soil profile or raised beds. It is not to be used for crops grown on benches or in pots.
- Excluding paths, no more than 10% of the square footage of the high tunnel may be used for non-crop growing space (washing and crop prep area, storage, pumps, heaters, etc.).

Practice Checkout for NRCS Certification

☐ Frame is gothic style (peaked, not rounded). Minimum height is 6 feet.

☐ Maximum tunnel width is 30 ft. Maximum total length is 96 feet. If structure exceeds 96 feet, provide manufacturer approval statement for planned length, including list of any additional required brace components.

☐ Bows and ground posts are at least:

(i) 1.90" round 14 gauge galvanized steel or stronger for tunnels ≥ 26 ft. wide

(ii) 1.66" round 14 gauge galvanized steel or stronger for tunnels < 26 ft. wide

(iii) 2.00" square 16 gauge galvanized for all tunnel widths

(iv) 1.625" x 2.750" oval 16 gauge for all tunnel widths

☐ Bows are spaced 4 ft. apart. Exception: Bows may be spaced 6 ft. apart for tunnels constructed with galvanized steel bows and ground posts that are at least:

(i) 2.375" round 14 gauge or

(ii) 2.0" x 3.56" oval 16 gauge

☐ 3 purlins for tunnels < 26 ft. wide, 5 purlins for tunnels ≥ 26 ft. wide. This includes one central "ridgepole" purlin. A ridgepole purlin is always required.

☐ For tunnels ≥ 26 ft. wide, cross-ties with trusses/braces at least every other bow (recommended for all widths).

☐ Wind bracing diagonals on each end, placed in accordance with manufacturer's directions.

☐ Frame is covered with at least 6-mil, 4-year UV resistant polyethylene film, or polycarbonate.

☐ Roll-up or drop-down sides are installed on both sides.

☐ Rope (or equivalent material) is attached from hip-board to baseboard the entire length to protect sides from billowing.

☐ End walls are framed with wood or metal and covered with UV resistant polyethylene film (at least 6-mil, 4-year), polycarbonate, or wood.

☐ Baseboards are installed as instructed.

☐ At least one end wall contains a door for access. (At least one 6' x 6' door is recommended. End wall vents are also recommended.)

☐ Bows/posts shall consist of no more than 5 individual segments, including ground posts. Typically this includes 2 ground posts, 2 half bows, and a bow connector. (Splices/sleeves that are used to join posts/bows and are not considered segments.)

☐ All segments of the bow must be through-bolted (carriage bolt and nut) at the connection point.

I have Job Approval Authority and certify that this practice, as applied, meets NRCS Standards and Specs.

Approved By: _____ **Date** _____

Notes (including as-built info if implementation deviated from design):

Natural Resources Conservation Service
Maine Specification Guide

High Tunnel System 325

See Maine's High Tunnel System 325 conservation practice standard for more information.

This Specification Guide serves as a guide for the selection of and planning for the installation of a high tunnel. This document contains a list of considerations for the applicant, and includes a *Producer Certification* form on the last page to document that they have received, and understand, the NRCS requirements and constraints of this practice. This document will be given to all producers who apply for NRCS financial assistance to install a high tunnel.

High Tunnel Location

- High tunnels shall not be located on active floodplains.
- The site location must have access to a water source that can supply enough clean irrigation water to meet crop needs. Estimate roughly 125 gallons per day per 1,000 square feet of high tunnel.
- High tunnels should be located on suitable soils and sites where drainage and runoff are manageable.
- If a double-layered plastic option is chosen, electricity must be on site to run the blower fan between the layers.
- Construct high tunnel structures on level grade or the naturally occurring slope if the slope does not exceed five percent, or manufacturer guidelines, whichever is less. The long axis must be oriented with the slope direction.
- Spacing:
    - **The location shall allow a minimum of 15 feet around the structure for snow removal via plowing or snow blowing.**
    - Provide enough space around the structure to allow for maintenance and farming operations without damage to the structure or covering.
    - Avoid shade from other structures by locating the tunnel a minimum of 15 feet away from other tunnels (on any side) or structures on the north side. The distance from the tunnel to another tunnel or other structure on the south, east, or west side should generally be at least twice the height of the shading structure (*e.g.* locate the tunnel approximately 40 ft. away from a 20 ft. high barn on the south side).
- Other Orientation Considerations:
    - If late and early season production is a primary goal, orient the long axis of the tunnel East-West.
    - Increased width or length will impede ventilation. Natural ventilation is improved when the long axis of the tunnel is oriented perpendicular to the direction of the prevailing winds. However, note that more damage may occur to tunnels that are oriented this way.

- In unprotected windy areas, consider orienting the structure such that an endwall will take the brunt of prevailing winds. Consider adding more purlins, cross-ties, and/or wind bracing kits.
    - Movable tunnels may have fewer ground posts, and therefore may be more susceptible to wind.
- Consider orientation of the structure and its interaction with the shading effect of endwall construction and materials.

Design Approval Procedure

Prior to purchase:

- The producer (program participant) is required to supply NRCS with the manufacturer's design and installation instructions for the specific model and size for review and approval. The *Required High Tunnel Materials and Design Criteria* (below) provides a checklist of required elements. The chosen high tunnel kit must meet each of these elements. Some kits may need additional elements in order to meet.
- NRCS will review all designs. An estimate sheet from the distributor may be needed to ensure that the selected model and any additional needed components meet the criteria.
- High tunnels that do not appear on the list of models meeting current Maine Criteria (below) must be reviewed and approved by the State Technology Program Leader or designated staff.
- If structure will exceed 96 feet, the producer must provide manufacturer approval statement for planned length, including list of any additional required brace components.

Required High Tunnel Materials and Design Criteria:

☐ Frame is gothic style (peaked, not rounded). Minimum height is 6 feet.

☐ Maximum tunnel width is 30 ft. Maximum total length is 96 feet. *If structure will exceed 96 feet, participant must provide manufacturer approval statement for planned length, including list of any additional required brace components. (A 96 foot long high tunnel can be covered by one 100 foot roll of plastic, which is the largest available size.)*

☐ Bows and ground posts are at least:

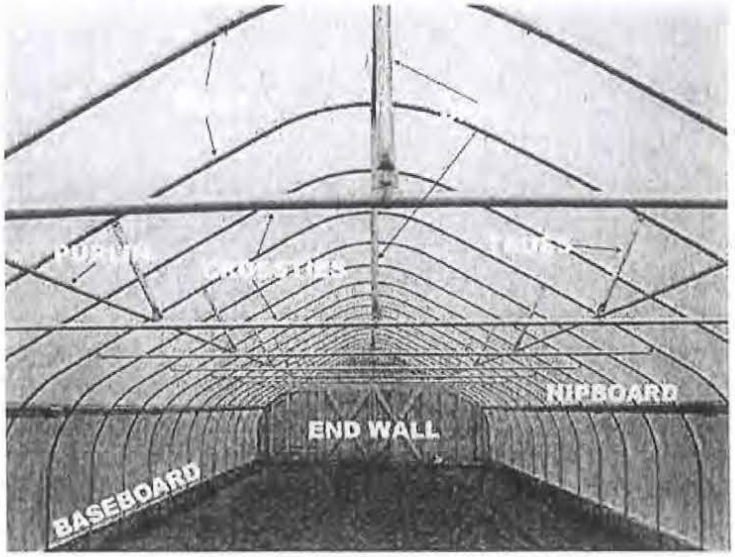
(i) 1.90" round 14 gauge galvanized steel or stronger for tunnels ≥ 26 ft. wide
(ii) 1.66" round 14 gauge galvanized steel or stronger for tunnels < 26 ft. wide
(iii) 2.00" square 16 gauge galvanized for all tunnel widths
(iv) 1.625" x 2.750" oval 16 gauge for all tunnel widths

☐ Bows are spaced 4 ft. apart. Exception: Bows may be spaced 6 ft. apart for tunnels constructed with galvanized steel bows and ground posts that are at least:

(i) 2.375" round 14 gauge or
(ii) 2.0" x 3.56" oval 16 gauge

- ☐ 3 purlins for tunnels < 26 ft. wide, 5 purlins for tunnels ≥ 26 ft. wide. This includes one central "ridgepole" purlin. A ridgepole purlin is always required.
- ☐ For tunnels ≥ 26 ft. wide, cross-ties with trusses/braces at least every other bow (recommended for all widths).
- ☐ Wind bracing diagonals on each end, placed in accordance with manufacturer's directions.
- ☐ Frame is covered with at least 6-mil, 4-year UV resistant polyethylene film, or polycarbonate.
- ☐ Roll-up or drop-down sides are installed on both sides.
- ☐ Rope (or equivalent material) is attached from hip-board to baseboard the entire length to protect sides from billowing.
- ☐ End walls are framed with wood or metal and covered with UV resistant polyethylene film (at least 6-mil, 4-year), polycarbonate, or wood.
- ☐ Baseboards are installed as instructed.
- ☐ At least one end wall contains a door for access. (At least one 6' x 6' door is recomnended. End wall vents are also recommended.)
- ☐ Bows/posts shall consist of no more than 5 individual segments, including ground posts. Typically this includes 2 ground posts, 2 half bows, and a bow connector. (Splices/sleeves that are used to join posts/bows and are not considered segments.)
- ☐ All segments of the bow must be through-bolted (carriage bolt and nut) at the connection point.

Anatomy of a High Tunnel



The following structures meet Maine's Criteria:

This list includes models with design and materials that have been found to meet the minimum criteria for Maine NRCS High Tunnel financial assistance, as delivered.

Vendors' or manufacturers' statements that their models are "NRCS approved" are not official and may not be accurate. (Minimum criteria/specifications vary by state, and must be verified.) ***High Tunnels that do not meet Maine's High Tunnel Materials and Design Criteria are not eligible for Maine NRCS program payments, regardless of vendors' claims.***

Note: Program participant is responsible for ensuring that the model is ordered and constructed with all required components to meet Maine's Criteria list (above). For example, if wind braces or cross-ties are not included in a "kit", they must be ordered separately and at additional cost.

Source	Model
Ledgewood Farms Moultonborough, NH (603-476-8829) www.ledgewoodfarm.com	Ledgewood Farm Gothic
Rimol Greenhouse Systems, Inc. Hooksett, NH (603-494-9426) www.rimol.com	Nor'Easter Eastpoint Rolling Thunder Northpoint (except 26 ft model)
Harnois Industries St. Thomas, Quebec (888-427-6647) www.harnois.com	Ovaltech I Ovaltech III
Four Season Tools Kansas City, MO (816-444-7330) www.SmallFarmTools.com	Four Season Moveable Gothic

This list is subject to update. Any list with a later date will supersede this list. This product list is not all inclusive and does not imply NRCS endorsement of any product, company, or position.

Operation and Maintenance

- Follow manufacturer's instructions for operation and maintenance of the high tunnel structure.
- Close high tunnel completely during high wind events.
- Inspect structure, cover, and surrounding area for damage periodically and after weather events. Repair and/or replace damaged components promptly. Small injuries to plastic may be repaired with greenhouse tape.
- Inspect runoff control measures frequently. Repair promptly.
- **WINTER:**
    - Close side curtains prior to seasonal freezing to prevent them from freezing open.
    - **Remove plastic for winter OR be diligent to remove ice/snow on and around the structure during and after storms as needed. Ensure that snow sheds off roof and does not pile up against sides.**
    - **Note:** If structure is in danger of collapse from wind, snow, or ice, cutting the plastic (from outside the structure) may save the metal framework.
- **Crops and Soil**:
    - Monitor and operate the high tunnel ventilation to manage temperature and moisture according to the tolerances of crops grown. Excess heat can kill the crop, and excess humidity can promote disease.
    - Monitor soil moisture and irrigate as needed. Use of drip irrigation for most crops will reduce the incidence of disease, limit weeds, and conserve water.
    - Test soils at least every other year for nutrient content, organic matter, and salt concentration. Plastic may be removed for a season to allow flushing of soil sodium as needed, or tunnel may be flooded to provide flushing effect.
- **Prohibited Uses**:
    - Storage of equipment or materials.
    - Livestock housing.
    - Growing on benches or in pots. (Plant in the soil or on raised beds.)
    - Excluding paths, no more than 10% of the square footage of the high tunnel may be used for non-crop growing space (washing and crop prep area, storage, pumps, heaters, etc).

Before You Sign a Contract:

Considerations for Producers Interested in Purchasing a High Tunnel with NRCS Program Assistance

Additional Labor:
Do you have extra labor help to manage a high tunnel?

- Pruning, trellising, weeding
- Rolling sides up and down (often daily: for weather events, *humidity and temperature control*), etc. Adds significant hours of labor during the regular growing season.
- An extended growing season means a longer labor season (less time off).

Location

- Should be convenient for daily management - opening and closing daily as needed for humidity and temperature and for gusty storms, harvesting, and ice and snow management and monitoring.
- **Water source** - Do you have a pressurized, viable water source within reach? Irrigation is required.
  - During the summer months, expect to use an average of 125 gallons per day per 1,000 square feet (a 30 x 70 structure is 2,100 square feet).
  - Drip irrigation is best for most crops (reduces fungal diseases by keeping leaves dry), but overhead sprinklers may be appropriate for small crops such as greens.
- Electricity (if needed). Do you need electricity to run inflation fan (if 2 layers of plastic), ventilation fans, or other desired utilities?

Winter management to prevent collapse. Ice and snow can bring a structure down quickly.

- Owner is responsible to maintain the structure regardless of weather. Terms of the contract are that, in the event of a collapse, owner must replace structure (without NRCS funding) during the 4-year lifespan.
- Snow slides off structure and piles up. Do you have adequate room to plow snow away from sides and an adequate space to pile it or push it off site? A minimum of 15 feet is needed around and between high tunnels.
- Sometimes snow may NOT slide off structure, and will need to be carefully removed during certain storms.
- Ice storms can add significant weight. Ice removal will be needed, and may involve the use of a heat source inside the structure during the storm to prevent ice buildup on the roof.

Soil/nutrient management:

- What method will you use to supply nutrients to your crop(s)?
  - Crops under black plastic with drip irrigation may require a fertigation system.
- Soils will need organic matter additions periodically, usually in the form of compost.
- Due to the "desert" nature of the high tunnel, salt will build up in the soil and will need periodic flushing via flooding OR removal of the plastic to allow precipitation to flush salts. Plastic removal for a significant period of time may entail sacrifice of a crop or an extended season. The University of Maine soils lab provides testing for high tunnel nutrients and salt.

Will you be growing summer or winter crops?

- Heat-loving plants are not compatible in the same tunnel as those that need cooler temps or less direct sun.
- Winter crops (greens) are planted in early September when tomatoes are still producing. This may present a space conflict.
- Growing the same crops (i.e., tomatoes) in the high tunnel year after year may lead to disease issues. What will be your strategy to avoid this?

Mulching:

- Will prevent weeds, warm the soil (black plastic), and prevent evaporation of irrigation water.
- Weeds can quickly take over the high tunnel. Start with a weed-free area and apply mulching and weed control right from the beginning. Control weeds around the exterior walls as well to prevent spread into the structure.

Irrigation management – how will you monitor soil moisture to prevent damage to crops (either under- or over-watering)?

Design and Kit: Critical!

- You are responsible to purchase a structure with all of the components as listed in Maine NRCS Selection Criteria.
    - Do not accept manufacturer claims that a product meets NRCS criteria. Verify with NRCS prior to purchase. Each state has different criteria.
    - ****You may need to purchase additional components in order to meet criteria. It is possible you may need additional components even for models listed as meeting Maine's Criteria.****
    - If you purchase a structure that does not meet NRCS Maine Criteria and/or is not built to manufacturer recommendations, you will not receive payment.

Installation:

- High Tunnels are challenging to construct. Who will you hire to install your structure? Or, if you plan to install it yourself, who will assist you?
- Generally speaking, after site prep is done, *construction of the structure may take an average of two weeks or longer*.
- Posts must be pounded into the ground at perfect 4-foot intervals, to the correct depth, AND be vertically plumb. Rocky soil will complicate this.
- You may need a lift to work on the roof components.
- Plastic must be applied on a wind-free day, with at least several laborers and a means to bring the plastic to the peak.
- End walls must have a solid frame, door(s), and optional vents and be covered with 6 mil plastic, polycarbonate, or lumber materials in accordance with specifications.
- Plastic life expectancy is 4 years. You will need to budget for new plastic every four years, and will need sufficient labor assistance to apply the new cover (on a windless day).

Consider costs in addition to your high tunnel "kit" and any extra needed components:

- delivery fees
- site preparation
- material costs for end walls, baseboards, doors and ventilation
- installation labor costs

- 100 feet of plastic is needed to cover a 96 foot long structure (plastic comes in a maximum of 100 feet)

Producer/Participant Certification:

☒ I have received a copy of the attached *Maine NRCS High Tunnel 325 Specification Guide*.

☒ I understand that I must meet the listed criteria and install the structure to NRCS and manufacturer specifications in order to receive program payments related to this High Tunnel System practice.

☒ I understand that I am responsible for ensuring that the chosen and approved model is ordered with all required components, as listed in this document. This may require me to order extra components, such as corner wind bracing or cross-ties, with the kit, which will increase the cost.

☒ I am aware that, regardless of vendor claims, I must ensure that my chosen kit meets Maine NRCS Criteria.

☒ I will be responsible to maintain this structure for the 5 year lifespan.

☒ I will be responsible to perform Operation and Maintenance items as listed in this document. This includes timely ice and snow removal to prevent damage or destruction.

☒ I will be responsible to repair or replace all materials of the high tunnel *at my own expense* if any damage is sustained by ice/snow loads, wind, or other events. I may choose to obtain an insurance rider to cover structural failure.

☒ **I certify that I understand these statements, and that I am aware of my obligation to meet the requirements of this document if I choose to sign a contract with NRCS for a program payment for a High Tunnel System. *Furthermore*, I understand that if I purchase and erect a structure that does not meet, I will forfeit funding and may be responsible for payment for *liquidated damages* associated with the planning and design associated with the contract.**

☒ **I self-certify that I have an adequate water source within a reasonable distance of the planned/approved site with which to provide the necessary irrigation for the crops I intend to grow inside the structure.**

Signature: Seynab Ali Date: 3/22/17

Print Name: Seynab Ali

Ledgewood Greenhouse Assembly Instruction
30 Foot- Wide

1. Begin construction. Select the orientation for the greenhouse and establish the grades. The site should be nearly level across the width of the house and level or slightly inclined the length of the house. Stretch a high quality builder's twine the length of one side plus two feet on each end. The string should be seven inches above the ground. The posts for one side will follow along the string to maintain a straight line. See Figure 1.

2. Driving posts. The first post will be driven within two feet of one end of the string. Use the large bolt that is included and a hammer to set the post so the middle drill hole is seven inches above the ground. The hole will line up with the string. Use the wooden spacing template to locate the next post. One notch in the template with fit around the first post and the second notch is where the second post will be located. Continue using the template to locate all of the posts in the first line. See figure 2.

3. Locating the other line of posts. Locate the other line of posts. See page 4. The posts must be 30 feet apart from the outside of one side to the outside of the other line of posts. Make sure that the two sides are square to each other. Locate the two ends of the house and stretch the string the length of the house plus the two feet on each end. The string should be seven inches above the ground and level with the other side. Drive the first post where the corner was determined and use the template to space the remaining posts.

4. Bow assembly. The long bow halves and the cap pieces are interchangeable. The short leg is the sidewall, the long end is the rafter. Assemble one bow by connecting two bow halves together with a cap piece in the middle. The 2" bow pieces slide over the cap to make the connection. The 2-½" long bolts are used to connect the three pieces together. Tighten the nuts only finger tight at this time. See figure 3. An insert between the post and bow is used to connect the post to the bow. The best way to attach the inserts is to bolt them to the bow before it is erected and slide the entire bow and insert into the post. The inserts are placed into the bow halves so that one of the holes is aligned with the hole in the bow. Use a 5/16 by 2-½-inch bolt and nut to secure the insert to the bow. Two people can stand the completed bow up into position. Insert one side of the bow into the post. The other side must be compressed inward to insert it into the post. Continuing installing bows for the rest of the house. After the purlins and corner braces are installed a 5/16 by 2-1/2 inch bolt secures the bow to the post. Two ¼ by 4-inch bolts are used to connect the baseboard to the post. See Figure #7.

5. Attaching purlin. The purlins attach in the straight rafter section and the hip board attaches at the curve. The purlins and ridgepole are connected to the underneath of the bows. The best way to attach the purlins is to start with the lowest location on each side and work upward toward the ridgepole. The 4-inch bolts are used to attach the purlins to the bows. See figure 4. Each purlin is taped together in a bundle and

numbered in sequence (1,2,3,etc.) The purlin must not be mixed with other bundles. The number 1 piece is at one end of the house and the highest number is at the other end. Attach the first piece to the bows and then add the number 2 piece into the first and continue for all the pieces to make the full length. See figure 5. The drill holes every four feet will line up with each bow and all of the joints will fall in between bows and the pieces are connected using 2-inch bolts and nuts. The bolts should be only finger tight at this point.

6. Corner brace installation. See page 5 for detailed installation instructions. The corner braces should all be attached in the same orientation. For example low to high from the end of the greenhouse toward the center. After the corner braces are attached all of the bolts in the frame should be tightened. The best way to do this is to strike the head of the bolt with a hammer to set it down into the bow. Be careful not to over tighten the nuts as the bolts might break or the threads could strip out.

7. Crosstie installation (optional). See page 6 for detailed installation instructions. The crossties are an optional feature on all of the houses.

8. Baseboard. The baseboard is attached to the outside of the greenhouse posts. Make sure that the joints in the lumber you use do not join at the posts. It is difficult to attach the baseboard to the post in that situation. Most installations use one 2 by 10-inch plank. The board is bolted to the ground posts using the holes that are pre-drilled and the 4-inch bolts. Place the drill through the holes in the ground posts, drill through the board, insert the bolts and attach the nuts. See figure 6.
9. End walls. See page 7 for an example of end wall construction. There are many choices for this step. The illustrated method is durable and fairly simple to complete.The metal strap and 3"decking screws are included in the kit. Toenail the studs with 4 screws and use two screws to attach the strap. Use 2-1/2" to attach plywood.
10. Polyethylene film installation. The most common glazing is either single or double layer poly film. The first step is to roll out the film either on the ground or down the ridge of the house. You must be willing to walk down the purlins to roll the poly down the ridge but it is the simplest approach. Make sure that the poly is square and even on both sides and ends. Using an extruded metal system or using wood strips and decking or roofing screws completes the attachment. Make sure that any system is very secure. If you are using wood strips the screws should be no further than 8 inches apart and pre-drill the holes for the screws. "Star Drive" decking screws that are #10 by 2-1/2-inch are included in the kit.

1. A 2"x4" hip board must be attached to the greenhouse frame. There is a black line about 2" below the drill hole in the curve. The board will attach with the lower edge of the board touching the black line. Use the 4" carriage bolts and nuts to secure the board. You will also attach a strip of wood strapping to the upper edge of the hip board to act as a shelf to help shed snow.
2. The best strapping is 5/4"x6" pressure treated decking that is ripped into 1-3/4" strips. Pre-drill 5/32" holes 8 inches apart for the #10x 2-1/2" star drive decking screws and start all of the screws into the board before you roll out the poly. If you don't pre-drill the strapping it won't grip the poly tight and the poly will rip in the wind.
3. When you have completely finished construction of the entire frame including the end walls and doors it is time to put on the poly. You will have either one or two layers of poly. Make sure the IR poly is the inside layer in a two layer installation. Poly has an inside and an outside so make sure the poly is correct side out. It is important if you have roll up sides that the poly be centered and square on the frame, and the edges of both layers line up.
4. The easiest way to install the poly on our frames is to roll it down the ridgepole and then unfold it. Select the IR roll of poly and align it so the poly will roll off the bottom of the roll. Take one of the long roll up pipes and slide the pipe through the cardboard core of the poly. Lift the roll up onto one end of the tunnel and place it so the center of the roll is on the ridgepole. Unroll about 18" of poly and pull it over the gable end. Attach the poly to the gable end with a short piece of wood strapping and a couple of decking screws. Now two people will climb out onto the tunnel with your feet on the purlin and one hand on the pipe that is through the poly roll and the other holding on to the bow. Now walk along the purlin and roll the poly the length of the tunnel, stopping a couple of times to make sure it is snug and straight. When you reach the other end, bring the poly over the gable end and attach it to the tunnel with another piece of strapping. If you have two layers you will repeat the steps and roll the second layer on top of the first. DO NOT UNFURL the first layer until both layers are installed. Now you can unfurl both layers, make sure they are square and comfortably taut and install the wood strapping. We attach one side first, check to make sure the poly is still aligned properly, install the second side and then attach the gable ends.
5. <u>Inflation Fan</u>. If you have two layers of poly you need to install the blower bracket before you finish securing the end where the fan is going to be located. See the instruction sheet in the bag with the bracket.
6. <u>Roll up side</u>. Attach the Tee handle to the #1 piece of roll up pipe with the ¼"x2" bolt and nut. The #2 pipe will slide onto the reduced end of #1 and connect the pieces together with one of the #12x3/4" Tek screws. Continue connecting pieces until the entire side is together. You will have a piece of pipe left over that is about 7' long. This pipe slides through the Tee to lever the roll up side.
7. <u>Attaching poly to the roll up pipe.</u> The Tee handle should extend beyond the gable end of the tunnel about 18". You will trim the poly so it ends just before the Tee handle or about 12"beyond the gable end. Lay the entire roll up pipe

on top of the poly and use the black clips to attach the poly every 4'. You want to maintain an even edge so only wrap about three quarters of a wrap of poly onto the pipe before you attach the clips. The only way the roll up will work properly is if the poly is attached to the pipe evenly. The first and last clips must be at the respective ends of the poly.

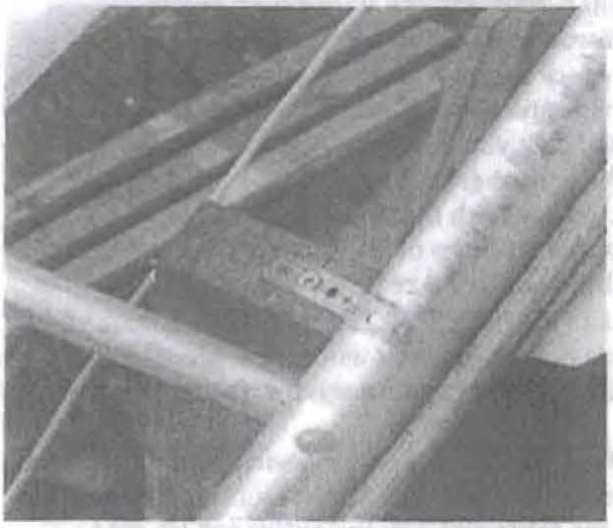
8. Ropes. The last step is to attach ¼" UV protected polypropylene rope from the hip board to the baseboard every 8 feet along each side. Use the 5"eye bolts through the hip board and the 4" eye bolts through the base board. The eye bolts will be located 12 inches away from the bow. Make sure there is an eye bolt at each end of your tunnel. The rope will run vertically from the hip board to the baseboard. The bolt in the baseboard should be 3" from the top of the baseboard so the roll up can rest against the side of the baseboard to help seal out cold air.

9.

10. This instruction booklet is a guide for proper installation, but it is not the only system that may be used. Pipe frame greenhouses are vulnerable to weather extremes and you must take all precautions to insure the integrity of the greenhouse including closing them against high winds, adequately clearing snow from the sides and roof, and protecting the ground post foundation from being compromised. Please contact us if you have any questions about proper maintenance.

End Wall Construction

A base plate or sill should be installed at ground level on each end. A two- layer sill works very well. The end wall may be constructed in any manner. The following photograph is one example. The 2"x6" studs should be on two-foot centers. Find the middle of the end wall and measure two-foot centers toward each side. Stand an uncut stud in place, plumb the stud and mark its intersection with the bow. Cut the stud to length at the proper bevel. Toenail the stud in place at the bottom and then band it to the bow as shown in the diagram. Make sure the stud is flush to the outside of the bow. The banding should be screwed to the outside of the stud and then wrapped up over the bow and attached to the top of the stud on the inside. After all of the studs and plywood are in place, block in between the studs with pieces of two-inch wood as shown in the photograph. This provides a surface to screw the plywood to, as well as, a straight surface to attach the poly cover.

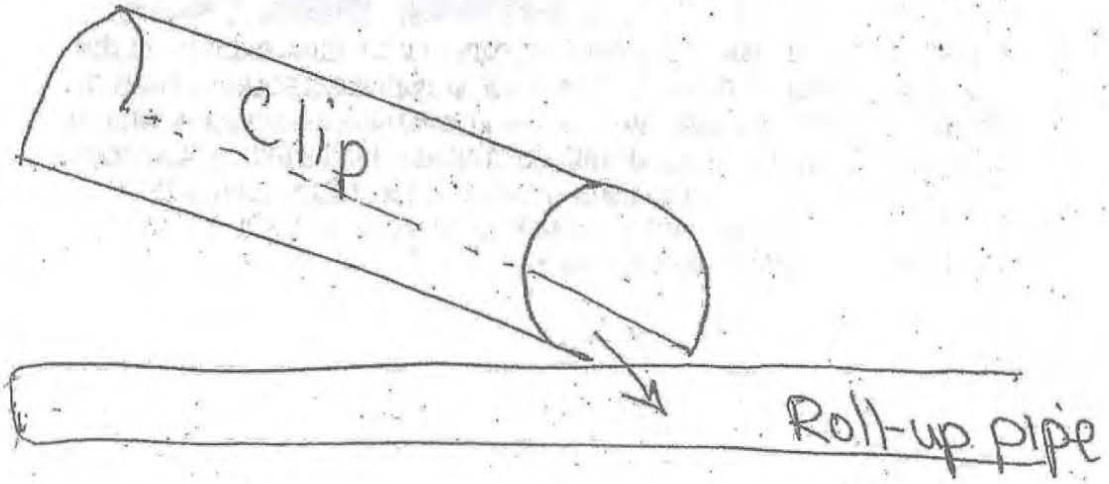


PHONE MOULTONBORO 603-476-8829 ED PERSON

Ledgewood Farm Greenhouse Frames

132 Old Mountain Road • Route 171 • Moultonboro, NH 03254

These plastic clips are used to attach the poly to the Roll-up pipe. They are very firm so you need to tilt them so one end starts to clip onto the pipe and then press the rest of the Clip onto the pipe. To remove slide a flat blade screwdriver into the slot and pry outwards.



30X96 BOLT-NUT CHART/PACK LIST

NAME	ISMAIL						
HOUSE SIZE	30X96						
# OF BOWS	25		50	BOW HALF			
1/4X4	225		25	CAPS			
1/4X3-1/2	-		50	POSTS			
1/4x2-1/2	-		50	COUPLERS			
1/4X2	20		5	PURLINS			
5/16X2-1/2	150		2	ROLLUPS			
5/16X1-1/2	96		4	CORNER BRACES			
¼ NUTS	245		12	CROSSTIES			
5/16 NUTS	246		12	DROPS			
NAILS	-		24	TRUSSES			
DRIVE BOLT	LARGE		1	TEMPLATE			
CORNER BRACES	12 - 2"- TB 4-1-3/8 BB 12- 5/16X1 1/2B&N		48X100 48X100	IR POLY CL POLY			
2" BB	48		1	WARRANTY			
1-5/8 BB	-		3	HARDWARE			
1-3/8 BB	48						
RPS HANDLE	2						
1/4X4	50						
1/4X2	2						
TEK #12X3/4	8						
¼ NUTS	52						
POLY CLIPS	52						
DIRECTIONS	30						
FAN/BRACKET	LARGE						
ROPE	250						
¾"X10' STRAP	3						
4" EYE BOLT/NUT	28						
5" EYE BOLT/NUT	28						
1#-2-1/2" SCREW	-						
5#-2-1/2" SCREW	4						
1#-3" SCREWS	-						
5#-3" SCREWS	2						

Warranty

Ledgewood Farm Greenhouse Frames warrants our greenhouse frames and component parts from defects in materials and workmanship for one year from the date of purchase. We will replace any defect free of charge. The warranty does not include any cost or labor to remove/replace the defective part. Incidental or consequential damage is not covered.

Douglas Greene

From: Alex Redfield <alex@cultivatingcommunity.org>
Sent: Thursday, October 11, 2018 2:26 PM
To: Douglas Greene
Cc: acosta@mainefarmlandtrust.org; Teller, Terri - NRCS, Lewiston, ME; Johnson, Jim - NRCS, Lewiston, ME; Omar Hassan; New Roots
Subject: Re: FW: Reference 952 College Street

Hi all,

Thanks for including me on these emails - sorry to have been out of the loop. Doug, I thought I might add a few points regarding the agricultural reasoning behind placing these high tunnels on the farm (and in that location, specifically) in lieu of New Roots farmers having the literacy skills to do so themselves.

1) Small, diversified, organic vegetable farmers in Maine rely on high tunnels broadly as both a risk management, soil improvement, and season extension strategy. The common rule we teach farmers in our program is that small growers operating on less than 5 acres of vegetables shoot for approximately $0.50 to $1.25 in revenue per square foot of unprotected/field growing space; in a high tunnel, that revenue target is much closer to $15-$25 per sq ft. The combination of warmth, protection from the elements, ability to trellis crops to use vertical space, the perfect growing conditions for high value crops like tomatoes and peppers, and the extra two months or so of growing season means high tunnels are hugely profitable investments for small farmers. These pieces of infrastructure are essential to farm profitability on such small, intensively managed acreage.

2) High tunnels are often used (and would be used by New Roots farmers) for four-season growing. Like we discussed in your office, fall and winter plantings of spinach, carrots, and other hardy crops can make the difference between being first to market in the spring and being late to market - again, hugely important in the development of a viable marketing strategy. In order to manage winter plantings of crops, it only makes sense to have those tunnel in close proximity to the fields' entrance. Snow removal is key to maintain the structures (in fact it's required as part of the NRCS contract), and having those tunnels in a place where tractors, plows, and humans can access them is required.

3) Proximity to other farm infrastructure is equally important. To have high tunnels on one side of the farm, and your wash/pack facility or cold storage on the other adds significant cost to the equation for farmers. Adding 5 minutes of loading and hauling produce between sites, over ten or twenty times per day, over an extended growing season - these costs are real and can tilt the balance in a business intrinsically dependent on efficiency and razor thin margins.

4) Orientation, sun exposure, and wind patterns are all hugely significant in placing the tunnels. I don't have the research to back it up, but the rule I was taught is that a 1% decrease in light availability for crops growing under plastic is equivalent to a 10% yield reduction. Not all sites on that property have ideal conditions, the proposed location is a good compromise between shelter, sunlight, and access.

5) This is a working farm - working farms in New England necessarily look and sound a certain way in order to survive. The New Roots' small 35 hp tractor is operated during daylight hours because farming is an incredibly challenging occupation that requires long hours during the growing season. The high tunnels make sense for the property because farming is a very risky livelihood for any grower to enter in to. The vehicles pulling in and out of that farm need to be pulling in and out in order to bring produce to Lewiston and surrounding community for

market. These are all factors that can make or break a fledgling food based business. I agree that relationship building should be at the heart of how the farm emerges in the neighborhood, but that investment in relationship building isn't necessarily required of the farmers and the farmers alone. Hopefully some of the other community benefits that the development of this project bring to the table are weighed as well.

Understanding the complexity of balancing different needs for different stakeholders - I hope some of these points are valuable in consideration of the high tunnel permits.

Thanks, appreciate your time and consideration of the project thus far and patience with working through a lot of different voices and faces!

Alex Redfield

Douglas Greene

From: Baillargeon, Ellen K <Elke.Baillargeon@td.com>
Sent: Thursday, October 11, 2018 1:22 PM
To: Douglas Greene
Cc: David Hediger
Subject: RE: Reference 952 College Street

Thank you very much for your response and explanation below

Ellen Baillargeon / [redacted]on
[redacted]
[redacted]
[redacted]
[redacted]

[redacted]

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From: Douglas Greene [mailto:DGreene@lewistonmaine.gov]
Sent: Thursday, October 11, 2018 1:18 PM
To: Baillargeon, Ellen K
Cc: David Hediger
Subject: RE: Reference 952 College Street

Hi Ellen,
I wanted to respond to your email from last week regarding the proposed greenhouses at 952 College St. A quick background on this is our office received a call about the greenhouses being under construction. A code enforcement officer did a site visit and found no building permit had been applied for and had the work stopped.. Our opinion was that the greenhouses are considered structures and would require a building permit given the total area of the 6 proposed greenhouses was 17,280 s.f. We also looked at the greenhouses from the standpoint of their locations needing to meet the 50 foot setbacks for both the front and side yards, which they do. The property is zoned Rural Agricultural and greenhouses are a permitted use in that zoning district. The end result of this evaluation is the New Roots Cooperative farmers and the Maine Farmland Trust (the owner) were instructed to prepare and submit a development review application to the city. That application was reviewed at a Staff Review Committee meeting last Thursday and the committee approved one greenhouse to be permitted and completed. The farmers will now have to go to the Planning Board on October 22nd at 5:30 pm to seek approval of the remaining greenhouses. You will be getting a notification letter in the near future regarding this meeting.

I'd like address your email as much as possible. Some of your comments and concerns are related to possible encroachments into the property at 942 College Street. I've communicated your concerns to the New Roots Farm, the Maine Farmland Trust and the USDA, who are coordinating the construction of the greenhouses with

the farmers and encouraged them to contact you to get to understand your concerns and work out/stop the possible encroachments.

As I mentioned earlier, the area north of Merrill and East Merrill Road, is zoned Rural Agricultural and agricultural uses are permitted by right. As long as a property owner complies with our land use regulations the City and/or Planning Board doesn't have the power to deny permitted uses. You certainly can come to the Planning Board meeting on October 22nd and voice your concerns and I will be adding your email to the staff comments as part of their application "package". I also will be happy to talk to more if you have questions.
Best Regards,
Doug

Douglas M. Greene; AICP, RLA
City Planner
Deputy Director Planning
and Code Enforcment
City Of Lewiston
27 Pine Street
Lewiston, ME 04240
dgreene@lewistonmaine.gov
207-513-3125 ext. 3223
Fax: 207-795-5071

From: Baillargeon, Ellen K <Elke.Baillargeon@td.com>
Sent: Monday, October 8, 2018 4:46 PM
To: Douglas Greene <DGreene@lewistonmaine.gov>
Subject: RE: Reference 952 College Street

Thank you very much

[redacted]n
[redacted]
[redacted]
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[redacted]).

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From: Douglas Greene [mailto:DGreene@lewistonmaine.gov]
Sent: Monday, October 08, 2018 4:42 PM
To: Baillargeon, Ellen K
Subject: Re: Reference 952 College Street

Yes I've received your emails .

Doug

Sent from my T-Mobile 4G LTE device

------ Original message------
From: Baillargeon, Ellen K
Date: Mon, Oct 8, 2018 12:40 PM
To: Douglas Greene;
Cc:
Subject:RE: Reference 952 College Street

Please confirm you have received this

Thank you

~~Ellen Baillargeon / Loan Underwriter III / Retail Credit and Loan Origination~~
~~Mailstop: ME2-001-023/ 140 Mill Street, Lewiston, Me 04240~~
~~T.207-755-6458 / M. 207-754-8131~~
~~NMLS ID # 1487874~~
~~TD Bank, America's Most Convenient Bank~~

~~If at any time you are not receiving legendary service, please feel free to contact my manager Heather Quillette at 207-755-6451 or (Heather.Quillette@TD.com~~).

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From: Baillargeon, Ellen K
Sent: Monday, October 08, 2018 11:02 AM
To: dgreene@lewistonmaine.gov
Cc: Baillargeon, Ellen K
Subject: Reference 952 College Street

Good morning,

I live at 949 College across the street from the Maine Farmland Trust,, I understand they are looking to put 2 Green houses on the property.

These Greenhouses would be directly across the street from us,,

I am hoping either they could place them somewhere else further down College as the Maine Farmland Trust owns all that land further down the road.

We really do not want to see these across the street from our house, this will take away the view that we have,, we will be looking at these structures instead of being able to look out at the field without having anything blocking the view.

My husband grew up at 942 College,, my daughter and her husband will be buying the home and moving their.. if we were to sell this house or our house we might have a hard time due to having the Co Op and other structures on the property

It feels like it's becoming more commercial then agricultural

Right behind the house at 942 at our property line,, they have been planting on their side however they are driving on our land with their vehicles... I am not sure if there is a 10 feet requirement from the property line.

They have moved big boulders on our side of our property line and just left them there.. We have had to have help moving these.

Maybe these structures can go up on the hill or below..

I feel this has taken over our neighborhood.. we go out front to sit in our yard and this is what we will be looking at these Green houses,, out back of 942 College you go out in the yard and we feel it will hinder our clientele when we decide to sell either property.

We are very opposed to have these structures so close to our homes and to take away our view.

I am hoping that we can come to a decision where everyone will be happy.. We love living out here and both my husband and I grew up here,, we enjoyed the quietness, not having anyone directly across the street from us or on the side of 942 College or out back.

I am hoping you will take this into consideration when a decision is made.

We love living here as its almost in Greene but still in Lewiston and we are close to everything

Thank you very much

[redacted]
[redacted]
T[redacted]1
[redacted]4
[redacted]

[redacted]
755-6451 or (Heather.Quellette@[redacted]).

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CITY OF LEWISTON

Department of Planning & Code Enforcement

TO: **Lewiston Planning Board**

FROM: **Douglas Greene, AICP, RLA; Deputy Director/City Planner**

DATE: **October 22, 2018**

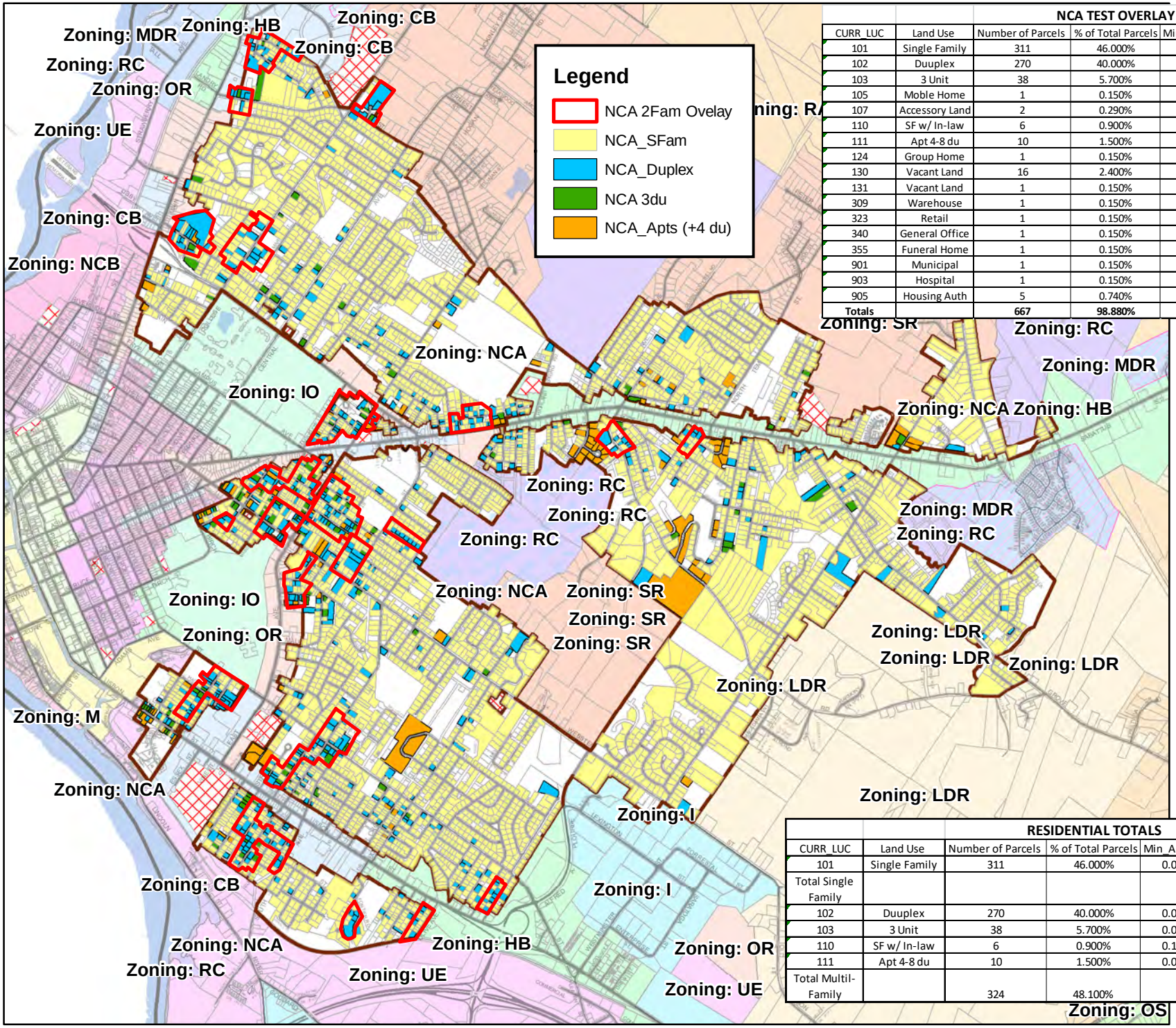
RE: **Discussion of NCA District**

A proposal to consider a text amendment regarding the conversion of single family dwellings into two family dwellings in the Neighborhood Conservation "A" District (NCA) has been discussed by the City Council on June 12th, July 27th, September18th and most recently on October 9th. The Planning Board has discussed this issue on September 10th and September 24th. Through the course of these discussions, the staff came up with 4 options on how to address the issue. At their October 9th meeting, the City Council made it clear to the Staff they wanted to separate the discussion into 2 parts; 1.) Making changes to the zoning ordinance that currently allows the conversion of single family dwellings into duplexes and 2.) Making changes to in-law apartments or to allow accessory dwelling units. Just as with the Planning Board, the City Council spent quite a bit of time discussing in-law apartments and accessory dwelling units. In the end, their conclusion was to ask the Planning Board to make a recommendation **only** on the first part, seen below as options 1, 2 and 3 and discuss in-law apartments and accessory dwelling units at a later date.

Possible options to address single family conversions into duplexes in the NCA zone:

1. Create an Overlay in the NCA District where single-family dwellings could be converted into two-family dwellings using the current criteria. Areas outside of the Overlay would no longer allow two-family dwelling conversions or development. An attached draft map shows Overlay districts based on concentrations (close to 50%) of two-family and multi-family dwellings.
   Staff recommendation: Not recommended. Establishing criteria for an overlay will be difficult and makes our zoning more complicated not more simple. The current criteria for duplex conversions are difficult to administrate.
2. Do nothing. There have been only 3 conversions of single-family dwellings into two-family dwellings in the NCA over the last 5 years.
   Staff recommendation: Not recommended. This approach does not acknowledge that "duplex creep" may occur in the future and doesn't address the current duplex conversion criteria.
3. Prohibit the conversion of single-family dwellings into a two-family dwellings or the development of vacant lots into two-family dwellings in the NCA District
   Staff recommendation: ***Staff recommends Option 3****. This option will be a proactive approach, end duplex conversions and do the most to protect NCA neighborhoods.*

The Staff looks forward to discussing options 1, 2 and 3 at your October 22nd meeting and then possibly discussing in-law apartments and accessory dwelling units in the future.



NCA TEST OVERLAY

CURR_LUC	Land Use	Number of Parcels	% of Total Parcels	Min_ACRES	Max_ACRES	Ave_ACRES	Total Ac
101	Single Family	311	46.000%	0.06	0.98	0.20	62.61
102	Duuplex	270	40.000%	0.04	4.88	0.27	72.36
103	3 Unit	38	5.700%	0.09	0.55	0.22	8.44
105	Moble Home	1	0.150%	0.13	0.13	0.13	0.13
107	Accessory Land	2	0.290%	0.10	0.47	0.29	0.57
110	SF w/ In-law	6	0.900%	0.10	0.50	0.25	1.53
111	Apt 4-8 du	10	1.500%	0.06	0.42	0.21	2.10
124	Group Home	1	0.150%	0.11	0.11	0.11	0.11
130	Vacant Land	16	2.400%	0.07	0.53	0.24	3.91
131	Vacant Land	1	0.150%	0.20	0.20	0.20	0.20
309	Warehouse	1	0.150%	0.12	0.12	0.12	0.12
323	Retail	1	0.150%	1.59	1.59	1.59	1.59
340	General Office	1	0.150%	0.35	0.35	0.35	0.35
355	Funeral Home	1	0.150%	0.42	0.42	0.42	0.42
901	Municipal	1	0.150%	0.16	0.16	0.16	0.16
903	Hospital	1	0.150%	0.23	0.23	0.23	0.23
905	Housing Auth	5	0.740%	0.31	0.79	0.48	2.40
Totals		**667**	**98.880%**				**157.22**

RESIDENTIAL TOTALS

CURR_LUC	Land Use	Number of Parcels	% of Total Parcels	Min_ACRES	Max_ACRES	Ave_ACRES	Total Ac
101	Single Family	311	46.000%	0.06	0.98	0.20	62.61
Total Single Family							
102	Duuplex	270	40.000%	0.04	4.88	0.27	72.36
103	3 Unit	38	5.700%	0.09	0.55	0.22	8.44
110	SF w/ In-law	6	0.900%	0.10	0.50	0.25	1.53
111	Apt 4-8 du	10	1.500%	0.06	0.42	0.21	2.10
Total Multil-Family		324	48.100%				84.43

NCA District- Duplex Conversion Overlay Test

DMG 7-27-18