

# Stormwater Discharge Narrative

## Science, Technology, Engineering and Mathematics Project

September 4, 2014

### Proposed Stormwater Treatment

The project is located in the University of Vermont designated North Campus Watershed. Stormwater in the watershed is collected and piped to the North Campus Stormwater Treatment Facility located behind Centennial Field. Stormwater is detained and treated in the facility prior to discharging to the Centennial Brook Watershed which is impaired for stormwater as classified by the State of Vermont.

The Water Quality Treatment Standard, Channel Protection Treatment Standard, and Overbank Flood Protection Standard for the project will be obtained through the North Campus Treatment Facility. The following is a brief summary of the measures taken to comply with the Stormwater Treatment Standards outlined in the Vermont Stormwater Management Manual. Calculations and hydrologic model runs can be provided on request as supporting documentation.

### Water Quality Treatment Standard:

The North Campus Stormwater Facility is considered a P-1 Micropool Extended Detention Pond. The Water Quality Treatment Standard has been met by providing extended detention, using the modified curve number, for the 0.9" Water Quality storm. The Water Quality Volume has been provided, not just for this project, but for all portions of the University of Vermont and Fletcher Allen that are included in the North Campus Watershed. The forebay is at least 4 feet deep has adequate capacity to handle the minimum required 10% Water Quality Volume. The micropool is 8 feet deep and has both an aquatic and safety bench around the perimeter.

### Groundwater Recharge Treatment Standard:

Because all the soils on the site are classified as hydrologic soil group D, the Groundwater Recharge Treatment Standard is waived for this site.

### Channel Protection Treatment Standard (Cpv):

A Reg-U-Flo Vortex Valve is currently used to control both the Water Quality and Channel Protection storms. This structure has proven to be an effective and relatively maintenance free outlet device. The vortex valve control device was designed to provide the required cold water 12 hour centroid to centroid detention for the 1-year 24 hour storm event.

**STEM - Stormwater Narrative**



Overbank Flood Protection Treatment Standard (Qp10):

A pre-development hydrologic model was created to ensure runoff from the post-development 10 year, 24 hour storm event does not exceed the existing pre-development flows for the same storm event. The pre-development model was created considering the site under natural conditions. All pervious surfaces were modeled as a wood-grass combination. The pond outlet structure has been designed to control the post-development runoff from the 10 year, 24 hour storm to a level less than that of the pre-development 10 year, 24 hour storm. The calculations have been provided in the Overbank Flood Protection Appendix.

Pre-development 10 year, 24 hour storm = 59.32 c.f.s.  
Post-development 10 year, 24 hour storm = 49.95 c.f.s.

Extreme Flood Protection Standard:

The Extreme Flood Protection Standard is waived because the total impervious area proposed for the development is less than 10 acres. The waiver for this standard is included in the Extreme Flood Protection Appendix.

Sediment Offset:

Because the project is located in an impaired water way, the sediment release from the project cannot exceed the current sediment release from the existing conditions. We have calculated the sediment release from the project as 82 lbs/year.

As part of the UVM campus wide stormwater master plan, the University just completed a project that removed a significant amount of sediment from Centennial Brook. The University collected previously "untreated and un-detained" stormwater from the entire parking lot for Marsh Austin and Tupper (MAT) residential buildings and directed the runoff to the East Campus Stormwater Facility. In the facility the runoff is full treated in accordance with current state stormwater regulation and removes 80% of the sediment. The sediment removal from this parking lot treatment project is 739 lbs/year.

13210:STEM – City permit stormwater narrative 9-4-14

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**Erosion Prevention & Sediment Control Narrative**  
**Science, Technology, Engineering, and Mathematics Project**

September 5, 2014

**Project Disturbance**

The STEM project limits are approximately 2.95 acres. Two small utility connections will extend outside the project limits. One is for the stormwater connection to the "North Campus Stormwater System" piping and the other is to connect to the existing PBX vault located between Billings and Williams Hall.

**Existing Conditions**

The site generally slopes from west to east. The westerly portion of the site is moderately sloping and the easterly portion of the site is generally flat. The site contains the existing Cook Building, Angell Hall and associated walks.

The soils are generally glacial till on most of the University Campus and are represented as a hydrologic D soil. Typically these soils have a slight erosion potential.

**Erosion Prevention and Sediment Control Strategies**

We have prepared an overall erosion control plan (Sheet C-002). This plan requires the contractor to establish stabilized construction entrances at each construction entrance, establish silt fence at down slope limits of disturbed soil, provide rolled erosion fabric over newly topsoiled and seeded areas, provide protection for existing and new stormwater catch basins, require foundation pump outs to be directed to silt bags, grass treatment, or other methods acceptable to the Engineer, implement check dams in drainage swales, and minimize the time of exposed soils to 14 days, with the only exceptions provided by the State permit. The staging areas and all phases of construction will follow the same erosion control standards as the site.

In addition to the best management practices listed above a critical component to stormwater management will be the temporary diversion of upslope runoff away from the site. This strategy will be implemented early in the construction process.

The project will require daily review to ensure sediment does not leave the site either through stormwater or dust. In order to minimize soil disturbance existing paths or walks will remain and be used as long as possible. These paved areas will need to be swept regularly and water will be applied as necessary to control dust during sweeping and as the site requires.

In addition to the daily review the site contractor will be required to formally inspect the installed Best Management Practices at least once a week, and after any rain event that produces a discharge. Any observed deficiencies will be addressed and immediately repaired. As part of the storm inspections the contractor will be required to take turbidity samples of runoff leaving the site as required by the State regulations. At a minimum, Krebs and Lansing will be on site bi-weekly, during active construction, to specifically review erosion and sediment control measures. Additionally, we expect to be on site two or three times a week for utility, road, and sidewalk construction. Erosion and sediment control will be reviewed during each site visit.

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Burlington Department of Public Works  
Stormwater Program

645 Pine Street

Burlington, VT 05401

PH: 802-540-1748 Email: [mmoir@ci.burlington.vt.us](mailto:mmoir@ci.burlington.vt.us)

Attachment 6

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DEPARTMENT OF PLANNING & ZONING

**Small Project Erosion Prevention & Sediment Control Plan**

This questionnaire, at a minimum, is required to accompany all zoning or building permit applications which involve 400 sq. ft. or more of land disturbance. Please also provide a site plan indicating the locations of all erosion prevention and sediment control measures (silt fence, hay bales etc).

Properties with greater than 2500 sq. ft. of total impervious surfaces, that are adding more impervious, will also be required to comply with additional long term stormwater management requirements.

1. Project Location 82 University Place  
2. Brief Project Description (i.e. house foundation, swimming pool)  
The University is demolishing Cook and Angel Halls and constructing a new STEM laboratory and office building with associated drives, walks, landscaping, and utilities.

3. Owner Name: University of Vermont  
4. Owner Mailing Address: 109 South Prospect Street  
5. Owner Phone: 802-656-3208 6. Owner email: Linda.Seavey@uvm.edu  
7. Contractor Name: Not known at this time  
8. Contractor Phone: \_\_\_\_\_ 9. Contractor Email: \_\_\_\_\_

10. Estimated Project Start Date May 19, 2015 Estimated End Date August 22, 2018  
11. Area of Land Disturbance 128,400 +/- sq. ft.  
12. Total proposed (existing + new) amount of impervious: 13,500 +/- sq. ft. Net New Impervious  
13. Estimated distance in feet from disturbance to nearest:

- a. City Sidewalk or Street 50 ft
- b. Drainage Ditch 0 ft
- c. Catch Basin (storm drain) 0 ft
- d. Lake/River/Stream >500 ft

14. Site plan/sketch MUST BE ATTACHED showing the following:  
 Limits of disturbance  Direction of stormwater flow on site  
 Location of stockpiles (if any)  Location of sediment control BMP's (silt fence etc.)

**EPSC QUESTIONNAIRE (See last page for typical solutions to these questions)**

A) Nature of all site disturbances (check all that apply):  
 Underground utility trench(es)  curb cut/driveway  foundation  cut/fill/regrading  landscaping  
 other \_\_\_\_\_  
B) Do you anticipate the need for any dewatering of excavations during the construction?  Yes  No  
• If yes, how will the pumped water be managed or filtered to prevent the discharge of dirty water?  
Dewatering may be necessary during utility installation and foundation excavation. Pumped water will be discharged to vegetated areas away from disturbed areas. If vegetative filtering is not sufficient, sediment filter bags will be used for dewatering.

C) Will excavated soil be stockpiled on the site?  Yes  No

- If yes, how long will the stockpile be on site? (i.e. 1 day, 1 week) Approx. 9 months at a time.

How do you propose to control erosion of the stockpile? Silt fence will be installed and properly keyed-in along the downslope limits of soil stockpiles. Stockpiles present longer than 14 days need to be temporarily mulched.

- If no, where is the ultimate disposal of excess soil? \_\_\_\_\_

D) How do you propose to prevent sediment from leaving the site and entering nearby city sidewalks/streets and storm drains and/or lakes, rivers and streams? (see page 4 for examples)

Inlet protection will be installed around catch basins within construction sites and downslope of disturbed areas. Silt fence will be disturbed at downslope limits of disturbance. Paved areas will be swept if sediment is tracked from the sites.

E) Do you plan to park construction vehicles on or disturb City owned property like the greenbelt area?  Yes  No

- If yes, tell us how you agree to repair all disturbances or damage to City owned property and provide a written approval from the City allowing construction vehicles to park on City owned property.

- If no, then please monitor all construction and visitor vehicles and advise all not to park on City owned property.

F) How do you propose to either prevent or clean sediment generated from construction vehicles and activities that becomes deposited on City streets, sidewalks, or bikepaths and how frequently this will be done.

Construction vehicles will be accessing sites from existing pavement which will make tracking of sediment onto city streets and sidewalk unlikely. Sediment tracked onto City streets or sidewalks will be removed within 24 hours.

G) Will stockpiles or disturbed soils be present and/or exposed after Nov. 1<sup>st</sup> of any construction year?  Yes  No

- If yes, tell us how you plan to stabilize any stockpile and/or disturbed soils.

**Do you agree to abide by the following conditions?**

- Y  N Applicant will call 540-1748 or email [mmoir@burlingtonvt.us](mailto:mmoir@burlingtonvt.us) at least 24 hours prior to initiating earth disturbance and submit the name and contact (cell phone and email) of the erosion control coordinator for the project
- Y  N Applicant will post the notice in a visible location
- Y  N I acknowledge that it is the responsibility of the owner and his/her representatives to ensure that:
  - sediment does not enter surface water bodies (streams, ditches, ponds, lakes, wetlands etc.)
  - sediment does not enter City conveyance infrastructure (catch basins, sewers etc.) and
  - All sediment must be removed from the city ROW (sidewalks and roadways) by the end of each work day.
- Y  N Sediment control measures will be installed prior to the initiation of earth disturbance.
- Y  N During the non-winter construction season (April 15 – November 1): After an initial 14 day period of initial disturbance, temporary or permanent stabilization (mulching, erosion control matting or tarps for stockpiles, or other approved method) of exposed areas and stockpiles will occur at the end of each work day unless:
  - Earthwork is to continue in the area within the next 24 hours and there is NO liquid precipitation forecast for the next 24 hours; or
  - If work is occurring in a self contained excavation (no outlet) with a depth of 2 feet or greater (e.g. house foundation excavation or utility trenches).

- Y  N During the winter construction period from November 1 to April 15, any **new disturbance** must be temporarily or permanently stabilized (mulching, erosion control matting or tarps for stockpiles, or other approved method) will occur at the end of each work day unless:
  - Earthwork is to continue in the area within the next 24 hours and there is NO liquid precipitation forecast for the next 24 hours; or
  - If work is occurring in a self-contained excavation (no outlet) with a depth of 2 feet or greater (e.g. house foundation excavation or utility trenches)
- Y  N The perimeter of the site and all BMPs will be inspected at the **end of each workday** to ensure that sediment will not leave the site. If sediment has travelled beyond the site boundary, it shall be swept up or otherwise removed and deposited on-site in an upgradient area at the **end of each work day**.
- Y  N The owner and his/her representatives shall abide by the best management practices (BMPs) indicated in this plan and conditions and in the Vermont DEC Low Risk Site Handbook for Erosion Prevention and Sediment Control (2006). Contact 802-540-1748 for a hard copy or go to the web:  
[http://vtwaterquality.org/stormwater/docs/construction/sw\\_low\\_risk\\_site\\_handbook.pdf](http://vtwaterquality.org/stormwater/docs/construction/sw_low_risk_site_handbook.pdf)
- Y  N **If soils will be exposed after November 1st and winter construction has not been permitted the project will notify DPW prior to October 15th.** If the project is completed during the winter months, an additional inspection will be required to ensure that the site is buttoned up for the winter.
- Y  N Within 48 hours of reaching final grading, the exposed soil will be seeded and mulched or covered with erosion control matting (for slopes steeper than 3:1 or high wind prone areas). Erosion control matting is preferred.
- Y  N The owner will contact DPW to schedule a stabilization inspection when site work is finished and stabilization measures (seeding and mulching or matting) have been installed.

**AGREEMENT**

By filling out and signing this plan, I agree to abide by the terms and conditions outlined above. Failure to follow this plan can result in a stop work order by the City of Burlington, fines, or both.

By:  Owner     Contractor     Architect/Engineer

Linda Seavey, Director, Campus Planning Services, for the University of Vermont

Name

*Linda Seavey*

Signature

*Linda Seavey*

9/8/14

Date

Additional Conditions of Approval:

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Required Compliance Items:

- Notification of start/identification of EPSC responsible party
- Winter Stabilization Inspection (if applicable)
- Final Stabilization

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# AN EROSION PREVENTION AND SEDIMENT CONTROL PLAN

FOR THE PROJECT AT:

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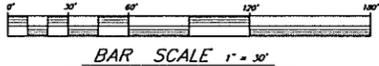
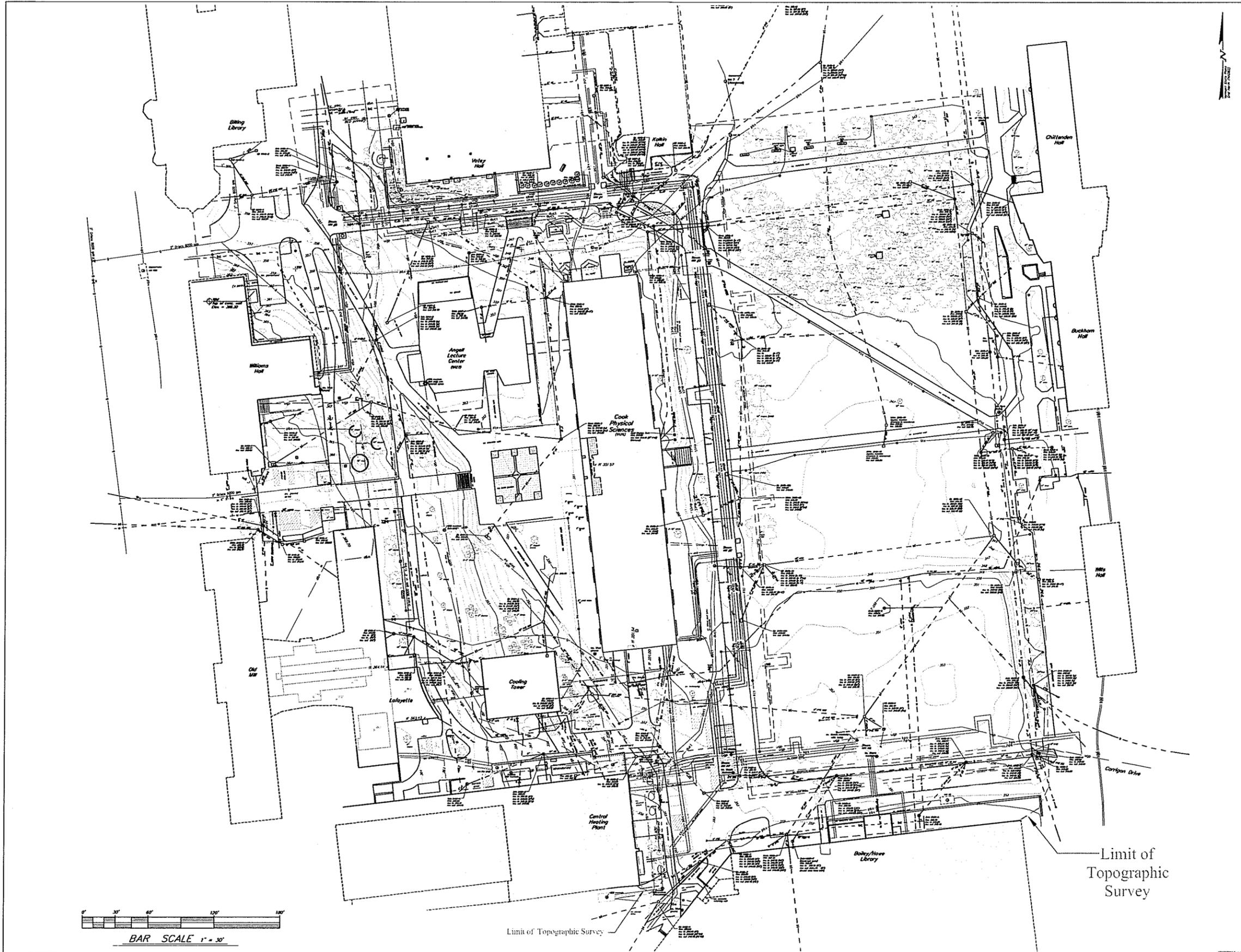
HAS BEEN FILED WITH THE CITY OF BURLINGTON  
STORMWATER MANAGEMENT PROGRAM IN ACCORDANCE  
WITH CHAPTER 26 OF THE BURLINGTON CODE OF ORDINANCES

THIS REQUIRES THAT MEASURES BE INSTALLED OR TAKEN TO  
PREVENT SEDIMENT FROM LEAVING THE SITE AND ENTERING  
WATERWAYS AND IMPACTING CITY INFRASTRUCTURE  
(RIGHT OF WAY AND STORMDRAINS)

FOR QUESTIONS OR TO REPORT SEDIMENT LEAVING THE SITE  
CALL 802-540-1748

This notice to be posted in full view at all times during earth  
disturbance. Additional conditions on attached.

Plan Approved by: \_\_\_\_\_ Date: \_\_\_\_\_  
Megan J. Moir, CPESC, CPSWQ



BAR SCALE 1" = 30'



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82 University Place  
 Burlington, VT

A1335

9/05/14 1" = 30'

TJB WHN

EXISTING  
 CONDITIONS  
 SITE PLAN

EX-1.0

Limit of  
 Topographic  
 Survey

Limit of Topographic Survey

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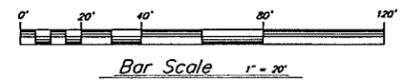
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**Notes:**

- The underground utilities shown on this plan are based on limited dig safe markings and utility mapping provided by UVM. Utility locations are approximate and not warranted to be exact or complete. The Contractor shall contact Dig Safe prior to any site excavation.
- There are existing FIBT conduits located in the vicinity of this project. The Contractor shall contact UVM Telecommunications and Network Services (836-3339) prior to any work in the vicinity of the FIBT conduit. The Contractor shall carefully excavate around the FIBT conduit to prevent damage to the FIBT infrastructure. Contractor shall be responsible for placing Owner supplied locator bolts over exposed conduits prior to backfilling.
- Deviations are based on the NAVD 83 vertical datum.
- The Contractor shall be responsible for repairing all disturbed areas back to original condition, including but not limited to curbing, sidewalks, road, parking areas, landscaping, site lighting, electrical, and etc. All asphalt shall be sawcut prior to paving.
- All stumps, roots, and other non-approved trench backfill material discovered during construction is the exclusive property of the Contractor and shall be removed from UVM property and disposed of in a State approved disposal location.
- All passing sieve, proctor, and compaction testing expenses shall be paid by Owner. Testing coordination, all other required testing, and expenses for failed tests shall be the Contractor's responsibility.
- The Contractor shall contact the Burlington Electric Department prior to any work in the vicinity of the existing electric conduits.
- The Contractor shall comply with the City of Burlington Small Project Erosion & Sediment Control Plan and the erosion prevention and sediment control permit requirements and the procedures outlined in the Low Risk Site Handbook for Erosion Prevention and Sediment Control. The Contractor shall be responsible for installing, maintaining and removing all erosion and sediment control devices shown on the plans or details and, to the maximum extent practical, to minimize potential contamination of stormwater runoff from the construction activities.
- Contractor shall be responsible for all "As-built" measurement and drafting requirements as outlined on the Detail Sheets. All trench excavations shall remain open until all as-built survey shots have been taken. Progress Record Drawings shall be submitted to the Engineer as indicated in the Record Drawing Specifications.
- Contractor shall coordinate location of staging areas with Owner prior to bid.
- The Contractor shall be responsible for all construction barrier/safety fencing required for the project.
- Definition of "Preconstruction Excavation" for these contract documents shall be: The site contractor shall expose utilities and obtain all necessary information, including but not limited to, invert elevation, size, depth, pipe type, joint location, etc. Contractor shall transit survey the location and elevations of the utility. Contractor shall provide the engineer with sketches indicating horizontal and vertical information of pipe or conduit type and size, cross-section information, concrete encasement information (top and bottom elevations, width, etc.), joint location, etc. of each required existing underground utility. Accuracy of horizontal location is within 1 foot, and accuracy of vertical elevation is within 0.02 ft. (1/4"). Coordinate all excavation with City, Owner, and Engineer. Preconstruction excavations shall occur prior to ordering structures and prior to utility construction to facilitate redesign and/or design confirmation. The location of the preconstruction excavation symbols does not necessarily indicate the location of the buried utility. It is the responsibility of the Contractor to find and expose the utility.
- Contractor shall be responsible for importing topsoil as required to complete the project. Contractor shall test topsoil for approval by the Owner and Engineer.
- The Contractor shall be responsible for all signage and fencing necessary to providing safe vehicular and pedestrian access through or around the site during construction.
- All storm pipes shall be PVC SDR 35 unless otherwise noted.
- All waterline pipe shall be Class 52 ductile iron. All bends and fittings shall have cast in place thrust blocks.

**Legend**

- Power pole
- Survey Control Point
- New hydrant
- Ex. blue phone
- Proposed blue phone
- Ex. light post
- Sign
- Inlet protection around catch basin
- Preconstruction Excavation (See Note 13)
- New Drainage Flow Direction
- Existing FIBT/manhole
- Existing Water Line/Water valve
- New Water Line/Water valve
- Existing Gas Line/Gas valve
- New Gas Line/Gas valve
- Existing Sewer Line/manhole
- Existing Storm Line/Catch Basin/manhole
- New Storm Line/Catch Basin
- Existing Underground Power Line
- Existing concrete encased underground power line
- Existing Secondary Underground Power Line
- Existing Overhead Power Line
- Existing Building Control Line
- Existing Light Line
- Existing Blue Light Conduit
- Approximate property line
- Existing Tree/Vegetation Line
- Existing Contours
- New Contours
- New Concrete Curb
- New pavement
- New Structural concrete
- New Concrete walls
- Temporary Silt Fence



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**THE UNIVERSITY OF VERMONT**  
 STEM

82 University Place  
 Burlington, VT

PROJECT NO. A1335

DATE 9/08/14 SCALE 1" = 20'

DESIGNED TJB WHN

CHECKED

OVERALL CIVIL GRADING PLAN

NO. C-001

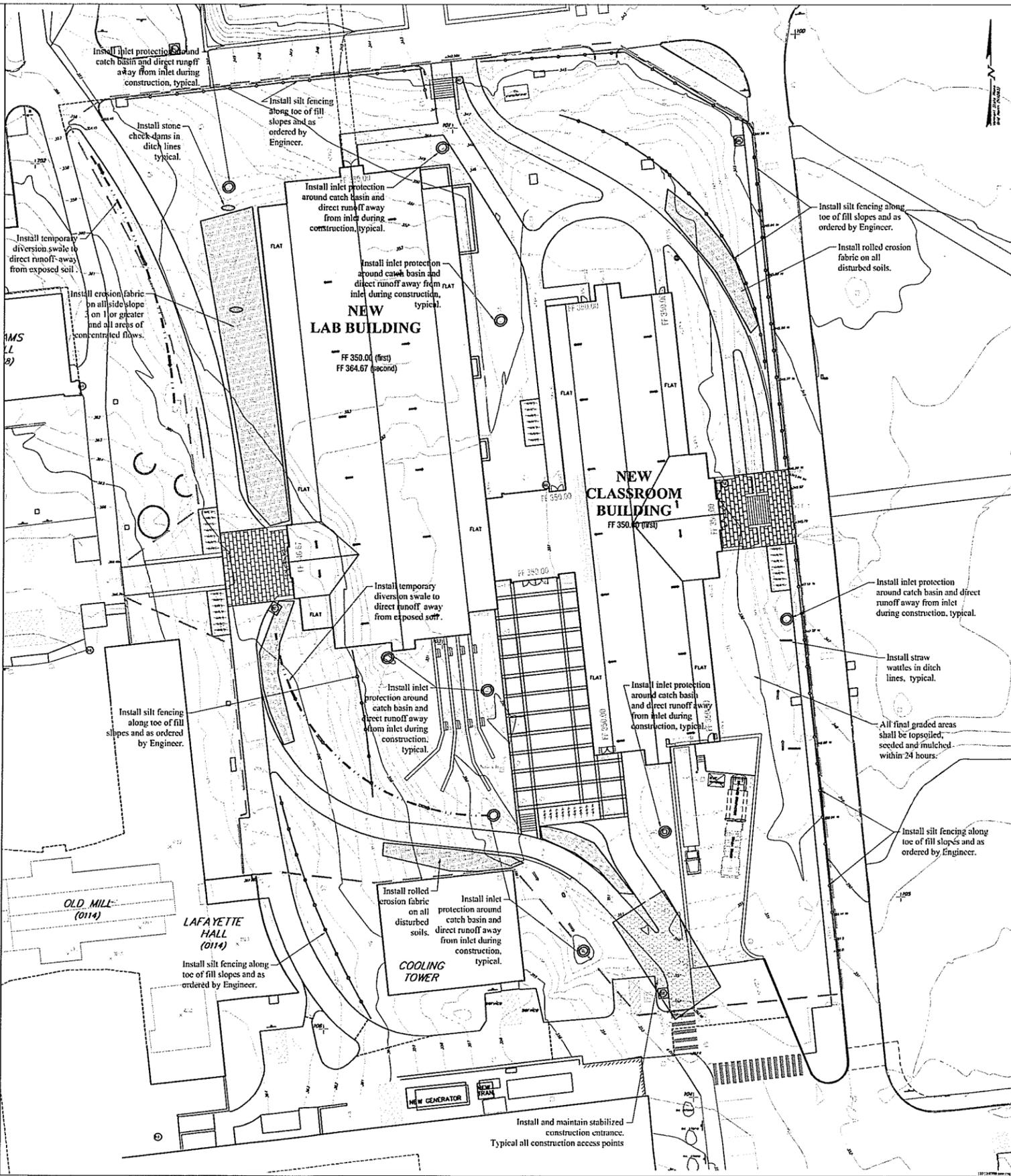
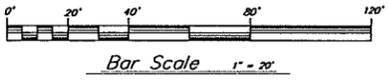
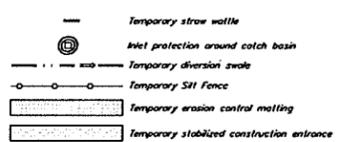
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**Erosion Prevention and Sediment Control Notes**

1. Contractor shall be responsible for complying with all State and Local erosion prevention and sediment control standards and permit requirements during construction.
2. The limit of disturbance shall be clearly defined by Contractor's surveyor prior to clearing. Erosion and sediment control devices shall be established to trap sediment on site.
3. Trees, woods, and phased disturbance areas shall be cleared and grubbed after disturbance limits and sediment controls are in place. All roots, stumps and debris must be removed from the site. The Contractor shall minimize the amount of disturbed land at any given time.
4. All erosion control shall be placed as shown on the drawings or as ordered by the Engineer. The Contractor shall maintain the erosion control measures until the Engineer is satisfied that permanent ground cover is established and that further measures are not required. It shall be the responsibility of the Contractor to employ appropriate erosion control as shown on these drawings and any other measures as necessary to trap sediment on site. Refer to permit maintenance and inspection requirements.
5. All areas of disturbance shall be permanently or temporarily stabilized as soon as possible and within 48 hours of final grading. All areas of disturbance shall be at least temporarily stabilized within 14 days of initial disturbance. Any disturbance after 14 consecutive days of exposed soil shall be stabilized only unless the following exceptions apply:
  - a. Stabilization is not required if earthwork is to continue in the area in the next 24 hours and there is no precipitation forecast in the next 24 hours.
  - b. Stabilization is not required if the work is occurring in a self-contained excavation (i.e. no outlet) with a depth of 2 ft. or greater (e.g. house foundation excavation, utility trenches). Stabilization measures shall include mulch and netting, erosion control matting, crushed stone, gravel, or pavement.
6. Unless specifically indicated on the plans acceptable methods of stabilization shall include:
  - Mulching - 2 tons per acre. Approximately 1" uniform thickness. Only applied on relatively flat areas with minimum upslope watershed. Mulch must be properly anchored to prevent material from being blown away by wind (windrows).
  - Hydroseeding - Applied at the manufacturer's recommended application rate. Contractor shall provide evidence of proper application rate. Hydroseeding is not allowed in areas of concentrated flow.
  - Erosion control matting - 375 matting must be applied to all slopes 1:1 (or steeper) unless otherwise indicated.
  - Crushed stone or crushed gravel - Typically used for temporary access roads and construction staging areas.
  - Paved surfaces (Concrete, asphalt, etc.)
  - Weighted impermeable barriers and other materials as approved by the Engineer.
7. The Contractor shall use water for dust control.
8. The Contractor shall provide inlet protection around catch basins (existing or new) that collect construction site stormwater runoff.
9. A stabilized construction entrance shall be installed and maintained at all construction access locations.
10. Any paved roads used by construction vehicles shall be swept daily or at a greater frequency if dirt or gravel is tracked from the site. The swept debris shall be immediately removed from face of curb if applicable.
11. During construction of underground utility lines the following standards must be met:
  - No more than 300 linear feet of trench may be open at one time.
  - Excavated material must be placed on the uphill side of the trench or immediately hauled to an approved and protected soil storage area.
12. All temporary erosion and sediment control measures shall be removed within 30 days after final stabilization or after the measures are no longer needed, unless otherwise authorized.
13. All sediment removed from sediment control practices shall be placed in an approved soil disposal area. Contractor shall be responsible for providing off-site soil disposal for the project.
14. All areas that do not have established vegetation by October 15th must be stabilized in accordance with the Water Stabilization requirements outlined in the Low Risk Site Handbook.
15. After permanent seeding the Contractor shall be responsible for watering, if necessary, to ensure adequate vegetative growth.
16. To ensure disturbance is limited to a maximum of 3 acres of exposed soil, the Contractor shall complete each phase before commencing the following phase.

**Erosion Control Legend**



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**THE UNIVERSITY OF VERMONT**  
STEM

82 University Place  
Burlington, VT

PROJECT NO.	A1335
ISSUE DATE	9/08/14
SCALE	1" = 20'
DESIGNER	TJB
CHECKER	WHN

OVERALL CIVIL EROSION CONTROL PLAN

C-002

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