

# **Stormwater Discharge Permit Narrative**

## **University of Vermont**

### **Freshman Housing Project**

April 24, 2015

#### **Project Description**

The University of Vermont is leasing a portion of land on the Central Campus to American Campus Communities and Redstone to develop a first year student housing project. The project aligns with the University's Housing Master Plan goal of consolidating freshman housing close to the Central Campus. The project will include a new building with two wings that are linked by an elevated connector, a second elevated bridge that will connect the new building to the Bailey Howe Library, a green roof, a new access drive to an existing parking lot, a loading dock, sidewalks, bike storage areas, and gathering spaces. In addition, this project will incorporate and slightly modify the alignment of the Green Mountain Walkway.

This application will be an amendment to the University of Vermont's Individual Stormwater Operational Discharge Permit 3627-INDS.ARA. Currently 22.59 acres of existing impervious is permitted under this permit. The project will result in 1.60 acres of new impervious. All runoff from the new project will be collected and piped to the North Campus Stormwater Treatment Facility, located south of the Centennial Baseball Field.

#### **Existing Conditions**

The site is located just north of the Bailey-Howe Library. It will be located east of the recently permitted STEM project, west of the Converse Hall parking lot, and integrated with the Green Mountain Walkway project.

The western portion of the site contains a lawn area that is divided by east to west crossing sidewalks. The site of the new western building includes a slightly elevated flat lawn that drops off to the north. The eastern portion of the site is on a moderate slope that grades east to west. Overall the site slopes in a south to north direction. The existing conditions, with contours, are shown on the attached plans

The site contains soils that are classified or have soil properties consistent with the Covington and Vergennes clays that are mapped adjacent to the east. These soils have a hydrologic soil group D classification. Over the years we have observed excavations for a number of construction projects within the Central Campus. The dense soils that have been observed are consistent across this portion of campus. Therefore, a hydrologic soil group D classification has been used in the stormwater analysis for the project site.

#### **Existing Stormwater System**

There is a large stormwater network that currently collects runoff from the North Campus Watershed. This collection system extends south to Main Street, north nearly to Colchester Avenue, and east, across East Avenue, and ultimately to the North Campus Stormwater Treatment Facility located south of the Centennial Baseball Field. The facility was constructed as part of the Fletcher Allen Renaissance project. It has since been modified, and permitted through multiple UVM projects, in accordance with the 2002 Vermont Stormwater Management Manual.

### **Proposed Stormwater Treatment**

Runoff from the new impervious surfaces created by the project will be collected and piped to the North Campus Stormwater Treatment Facility. Stormwater will be detained and treated in the facility prior to discharging to Centennial Brook. Centennial Brook is a cold water fish habitat which is impaired for stormwater as classified by the State of Vermont.

The Water Quality Treatment Standard, Channel Protection Treatment Standard, Overbank Flood Protection Standard, and Extreme Flood Protection Standard for the project will be obtained through the North Campus Treatment Facility. Because of the hydrologic soil group D classification, the Groundwater Recharge Treatment Standard is not required for this project. The following is a brief summary of the measures taken to comply with the Stormwater Treatment Standards outlined in the Vermont Stormwater Management Manual. The calculations have been provided as supporting material.

### **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 Medical Center (formerly Fletcher Allen) and the University of Vermont that are included in the North Campus Watershed. Water Quality Volume calculation sheets are included in the Water Quality Appendix to breakdown the various UVM Medical Center and UVM property specific impervious areas. The forebay is at least 4 feet deep and will contain more than the minimum required 10% Water Quality Volume. The micropool is 8 feet deep and has an aquatic bench for nutrient uptake. The appropriate calculations have been provided in the Water Quality Volume Appendix 2.

### **Groundwater Recharge Treatment Standard:**

The project contains soils that are classified or have soil properties consistent with hydrologic soil group D. Therefore, the Groundwater Recharge Treatment Standard is waived for this project. However, when possible, the design includes non-rooftop disconnections as a means of improving water quality treatment and increasing runoff travel times.

### **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. The calculations for this standard have been provided in the Channel Protection Volume Appendix 4.

### **Overbank Flood Protection Treatment Standard (Op10):**

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 for all UVM and UVM Medical Center areas. All pervious surfaces were modeled as a wood-grass combination. Offsite areas are modeled in their present condition. 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 5.

Pre-development (Natural Conditions) 10 year, 24 hour storm = XX.XX c.f.s.  
Post-development 10 year, 24 hour storm = XX.XX c.f.s.

**Extreme Flood Protection Standard:**

The new impervious area from this project brings the post 2002 cumulative amount of new UVM impervious area, within the Centennial Brook Watershed, above 10 acres. The project is therefore subject to the Extreme Flood Protection Standard.

A pre-development hydrologic model, using the 2002 existing conditions, was created to ensure runoff from the post-development 100 year, 24 hour storm event does not exceed the existing pre-development (2002) flows for the same storm event. The PondPack hydrologic model indicates that the pond outlet structure will control the post-development runoff from the 100 year, 24 hour storm to a level less than that of the 2002 pre-development 100 year, 24 hour storm. The calculations have been provided in the Extreme Flood Protection Appendix 6.

Pre-development (2002 Existing Conditions) 100 year, 24 hour storm = XX.XX c.f.s.  
Post-development 100 year, 24 hour storm = XX.XX c.f.s.

**Proposed Stormwater Conveyance**

Runoff from the new impervious rooftops, roads, and walks will be conveyed by overland flow and a stormwater collection system to the P-1 Micropool Extended Detention North Campus Stormwater Facility for detention and treatment prior to discharging to an unnamed tributary of the Centennial Brook.