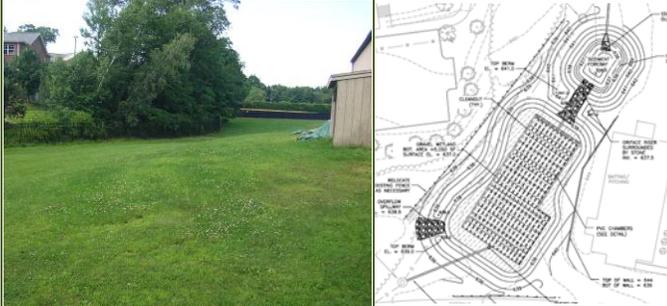


Site B3: Christian Field/Batting Cages

Gravel-based Wetland Systems

Project Summary



Parameter	B3
Impervious Cover Treated (acres)	15.1 acres
Runoff Reduction Volume (cu ft per 1" rain event)	0
TN Removal (lb/yr)	49.19
TP Removal (lb/yr)	13.28
TSS Removal (lb/yr)	2,262.73
Estimated Cost	\$250,100

Site Description

The proposed retrofit concept is located by the baseball fields and batting cages in the southeastern portion of the UConn Campus.

Existing Conditions

Existing drainage pipe system collects runoff from pervious and impervious surfaces for 55 acre drainage area and discharges into Red Brook (Figure 1). Existing 24 inch pipe runs along open field areas with inlets, likely under baseball field and across Stadium Road. Some of this area is currently managed by upgradient stormwater BMPs. Because a portion of this conveyance appears to have been a former stream, there is likely a shallow depth to groundwater. The location of inlets or manholes in the vicinity of the site were not found. The pipe invert at the outfall is less than 5 feet.

Proposed Concept

Proposed installation of a gravel based wetland system with forebay, designed offline with approximately 5,050 sq ft of available surface area (Figure 2). Use a diversion manhole to divert flows from existing drain line into pretreatment forebay with outlet structure that discharges into bottom of chambered, gravel wetland system. Flows are

forced up through gravel filters to a vegetated wetland surface where additional pollutants can be removed via plant uptake. Overflow from the wetland is discharged back into existing stormdrain. An emergency spillway drains into existing low area/wetland to the southwest.

This project is feasible and very attractive, as few locations on campus offer the ability to manage significant volumes of runoff and impervious surfaces. Available surface area limits available treatment capability; however additional retrofit projects in the drainage area (i.e, B5a/b) may help reduce sizing requirements.



Figure 1. Drainage areas to proposed gravel wetland system include additional proposed retrofits.

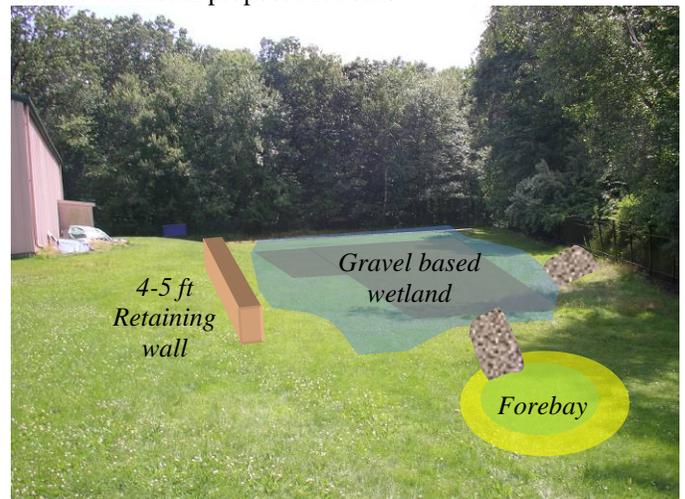


Figure 2. Gravel based wetland system with underground chambers, pretreatment sediment forebay, and retaining wall.

Preliminary Concept Designs

A 25% concept design for the proposed retrofit can be found in attachment B, which includes preliminary plan views, cross sections, and project details (Figure 3). These initial plans will require field survey and more information on drainage pipes, utilities, and soils (among other things) before going to construction plans.

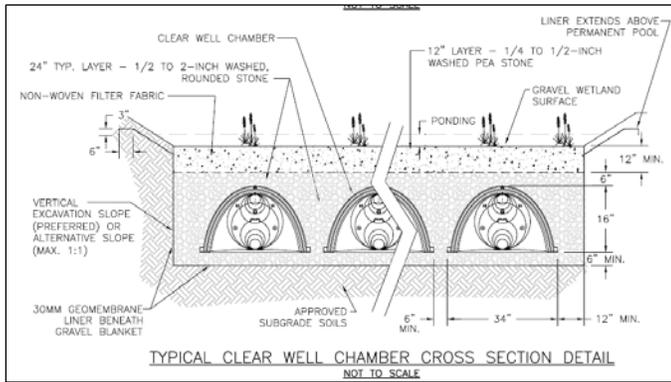


Figure 3. Typical cross section of gravel wetland showing underground storage chambers and vegetated surface where water pushed up from below is designed to pond.

Preliminary Hydrologic Calculations

Preliminary sizing of the gravel based wetland system was completed based on guidance provided in the 2009 Rhode Island Stormwater Manual (public review draft) and are summarized in the table below.

Sizing calculations for Site B3	
Parameter	Value
Drainage Area, A (acres)	55.0
Imperviousness, I (%)	27
Volumetric Runoff Coefficient, Rv	0.30
Rainfall Depth, P (in)	
Water Quality Volume, WQv (cf)	59,345
Surface Area Required, Af (sq. ft)	8,386
Surface Area Provided (sq ft)	5,050
Treatment Provided (% of 1")	60

Design Considerations

- Sizing of facility is constrained by space and grade. Note the height of retaining wall, depth of forebay, and available head driving upflow filter. Sizing of facility can potentially be reduced if additional retrofits are installed within the drainage area upgradient.

- Must verify location of all existing storm drain infrastructure. Double check potential utility conflicts (i.e., sewerline).
- Final design to include cleanouts for gravel wetland and maintenance access for forebay.
- May need to relocate existing fence and install guardrail along road.

Maintenance

Maintenance will generally be related to landscaping practices and sediment removal from pretreatment forebay to prevent clogging. Inspect semi-annually for the first year of operation and annually after the first year as well as after major storm events. The routine maintenance activities typically associated with gravel-based wetlands are summarized in the table below.

Maintenance Activities	
Activity	Schedule
<ul style="list-style-type: none"> • Replant vegetation to original design standards if less than 50% of the original vegetation is established 	After two years
<ul style="list-style-type: none"> • Remove and replace ill-established, dead, or severely diseased plants 	Annual
<ul style="list-style-type: none"> • Inlets, outlets, and overflow spillway will be checked for blockage, structural integrity, and evidence of erosion • Sediment build up at the cleanout pipe will be removed 	Routinely and after major storm events
<ul style="list-style-type: none"> • Clean and remove debris at cleanout pipe • Sub-surface storage chambers shall be flushed and/or snaked 	As needed (if standing water is observed 48 hours after storm event)

Cost Considerations

\$30/sf, not including utility/ main drainage pipe relocation.