



FOR FOR WEBSTER STREET MILL RESIDENTIAL CONVERSION ASSESSOR REF. MBL 27-032-02+2A 70 WEBSTER STREET WORCESTER, MA



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LDG Project No.: 1999.0



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# **SECTION 1.00 - HYDROLOGIC SUMMARY**

#### METHODOLOGY

The HydroCAD computer program (HydroCAD) was used to model the existing and proposed hydrology of the site and design a stormwater management system. HydroCAD generates flood hydrographs dependent upon the type of land use, vegetation, soil types, land slope, watershed areas and rainfall data. HydroCAD also takes into account the antecedent moisture condition of the soil. The peak rate of runoff and volume of runoff are projected for the input storm frequency events (design storms).

Rainfall data was obtained from the precipitation data for Worcester for storm frequencies of 2-, 10-, 25- and 100year storm return from Extreme Precipitation Tables Northeast Regional Climate Center; these were then input into HydroCAD. Rainfall data is attached herein. A 24-hour type III rainfall distribution was used in the HydroCAD analysis as prescribed for New England by the USDA Soil Conservation Service (SCS).

#### **PRE-DEVELOPMENT CONDITIONS**

The development site is identified as Assessor Ref. MBL 27-032-02+2A and consists of a  $1.0\pm$  Ac. The site is bound by Webster Street to the east, an existing commercial parcel / mill building to the south, a National Grid parcel containing a transformer station to the north, and Curtis Pond to the west. The parcel is fully developed and contains an existing 17,250±sf. footprint historic mill building with associated parking, loading, and utilities. There is no established on-site stormwater management system as all surface and rooftop runoff from 90% of the site draining west towards Curtis Pond with the remining area draining towards Webster Street

The parcel is located in an MG-2.0 Zoning District and is also within an Adaptive Reuse Overlay District. The onsite wetland and resource area boundary which consists of the bank of Curtis Pond was flagged by has been flagged by Goddard Consulting, LLC in February of 2022. An Order of Conditions (OOC) for MADEP File # 349-1354 was issued by the demolition of approximately 5,000±sf. of the existing structure by City of Worcester Conservation Commission in March of 2023.

The on-site soils within the area of the limits of the development are classified by the Worcester County Soil Survey, Northern Part:

- 1 Water
- 602 Urban Land

See the SCS soils documentation included herein for additional on-site soil details.

Based on current MAGIS Mapping the development site is NOT located in any of the following environmentally sensitive areas:

- Natural Heritage and Endangered Species Program Priority Habitats of Rare Species
- Natural Heritage and Endangered Species Program Estimated Habitats of Rare Wildlife
- Natural Heritage and Endangered Species Program Natural Communities
- Natural Heritage and Endangered Species Program Certified Vernal Pools
- MADEP Wellhead Protection Areas Zone 1 & Zone 2
- Surface Water Supply Protection Areas Zone A, Zone B, & Zone C
- MADEP Surface Water Supply Watersheds



- MA DFW Coldwater Fisheries Resource Area
- Outstanding Resource Waters
- Subsurface Aquifer
- Mass Historic Commission Inventory Area or Point

A FEMA Flood Zone AE is identified on Flood Map Panel Number 205170802E For Worcester County with an effective dated of July 4, 2011 along the bank of Curtis Pond with a Flood Elevation of 475 – NAVD88.

The development site is located within a mapped Mass Historic Commission Inventory Area identified as WOR.BS and contains two identified historic points which are the two existing structures. The main mill building is identified as point WOR.3168 and is the former Wickwire – Spencer Steel Company Building. The second point is identified as WOR.3170 and is the former Wickwire – Spencer Steel Company Garage Building No.17. The City of Worcester Historic Commission and MassHistoric have been notified regarding the proposed redevelopment and adaptive reuse of the site.

#### **POST-DEVELOPMENT CONDITIONS**

The Applicant to redevelop the  $17,250\pm$ sf. mill building as residential apartments. As detailed above, a  $5,000\pm$ sf. single story section of the building will be demolished. The remaining existing three story  $9,640\pm$ sf. footprint will be redeveloped and an additional two story addition is proposed to be built on-top of the remaining  $2,524\pm$ sf single story footprint. The residential conversion will contain 8 two-bedroom units and 25 one-bedroom units. The building slab area of the demolished  $5,000\pm$ sf. single story structure will be converted into a parking area and the remaining existing paved parking and loading area will be converted into a new residential parking lot. The residential parking lot will contain newly cutout directional island and landscaping.

Impervious coverage (building and pared parking) from the site will increase slight from 35,896±sf to 34,642±sf, a net increase of 1,254±sf. This minor increase in pavement is mitigated by conversion of 6,782±sf. of hard packed gravel currently used as additional parking area adjacent to Curtis Brook to cleaned and resorted landscaped area. New curbing is proposed within the parking area to collect and treat stormwater runoff. Two new proposed catch basins are proposed within the parking area which connect to a CDS Stormwater Treatment Unit for additional TSS removal prior to discharge. A new on-site discharge from the treatment system is proposed along the bank of Curtis Pond in an area which will be regraded to provide a level discharge area new faired end section and rip-rap pad.

Compliance with the10 MADEP Stormwater Standards for the proposed site development and stormwater management system is detailed below.



# **SECTION 2.00 - MADEP STORMWATER MANAGEMENT STANDARS**

#### **STANDARD 1: Untreated Discharges**

Stormwater Management Standard 1 requires that, "No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth".

This standard is met by the proposed redevelopment not creating any new non-treated stormwater discharges. All surface runoff from redeveloped impervious areas draining to Curtis Pond is collected and treated for suspended solids removal prior to discharge.

#### **STANDARD 2: Peak Rate Control and Flood Prevention**

Stormwater Management Standard 2 requires that, "Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for land subject to coastal storm flowage."

This standard is met by the proposed development mitigating the post-development peak discharge rates at the designated control points for all design storm events. This is accomplished by the conversion of hard pack gravel areas into restored landscape area and with the installation of new landscaped parking island. The proposed redevelopment will reduce the peak rate of runoff at all the design control points and provide ample groundwater recharge.

#### SUMMARY OF PEAK STORMWATER RUNOFF (CFS)

A single control point was utilized to analyze the existing conditions runoff characteristics of the site. Control Point R1 was established at Curtis Pond which is the westerly property boundary and Control Point R2 is Webster Street where runoff from the front of the site drains to in the current existing condition.

	Control Point	– R1
Storm	Pre-Dev. Flow	Post-Dev. Flow
2-yr	2.79 cfs	2.64 cfs
10-yr	4.40 cfs	4.26 cfs
25-yr	5.65 cfs	5.52 cfs
100-yr	8.18 cfs	8.08 cfs
	Control Point	– R2
Storm	Pre-Dev. Flow	Post-Dev. Flow
2-yr	0.30 cfs	0.28 cfs
10-yr	0.45 cfs	0.44 cfs
25-yr	0.57 cfs	0.56 cfs
100-yr	0.81 cfs.	0.81 cfs.

The net peak discharge is controlled and does not increase at the control points for any of the evaluated design storms



#### **STANDARD 3: Recharge to Groundwater**

Stormwater Management Standard 3 requires that, "Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures, including environmentally sensitive site design, low impact development techniques, best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from the pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook."

This standard is met to the maximum extent practicable as the existing site current does not provide any ground water recharge. Improvements to the site which include the installation of new pervious islands withing the existing paved parking area and conversion of existing hard pack gravel parking areas to restored landscaped area will improve the current on-site recharge characteristic of the site as a redevelopment project.

#### STANDARD 4: 80% TSS Removal

Stormwater Management Standard 4 requires that, "Stormwater management systems must be designed to remove 80% of the average annual post-construction of Total Suspended Solids (TSS). This standard is met when:

- a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan and thereafter are implemented and maintained;
- b. Stormwater BMPs are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook and;
- c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook"

This standard is me to the maximum extent practicable by collecting all surface runoff draining to the west of the site in deep-sump and hooded catch basins. Flow from the two new proposed basins the receives additional treatment from CDS Stormwater Treatment Unit prior to discharge.

The volume of stormwater runoff to be treated for water quality is calculated as one-half inch times the total postdevelopment impervious area of the site based on current MADEP Stormwater Management Standards for a development not producing higher potential pollutant loads as defined by MADEP Standard 5 and not located in a critical area as defined by MADEP Standard 6. The proposed site improvements provide 80% TSS removal Below is a summary of the proposed water quality treatment practices to be utilized at the development site. MADEP TSS Removal Calculation Sheets area provided in Section 4.0.

Summary of Proposed	d Water Quality Treatment Practices
Best Management Practices	TSS Removal Efficiency
Deep Sump and Hooded Catch Basins	25%
CDS Stormwater Treatment Unit	74%

\*TSS & TP removal efficiency taken from Massachusetts Stormwater Handbook - Structural BMPs - Volume 2 | Chapter 2

Water Quality Volume Compliance Calculation:

Total Site Impervious Area (not including existing roof)=  $21,410\pm$  s.f. 0.5 inch x 1 foot/12 inches= 0.042 feet 0.042 feet  $21,440\pm$  s.f.=  $899\pm$  cu.ft.



Total Volume to be treated for Water Quality= 899± cu.ft.

Required Water Quality Volume for each Treatment Train. CDS Stormwater Treatment units are sized using the Massachusetts Department of Environmental Protection Wetlands Program – Standard Method to Convert Required Water Quality Volume to a Discharge Rate for Sizing Flow Based Manufactured Proprietary Stormwater Treatment Practices.

Flow to Prop. CB 1 & 2 Treated by CDS Unit (CDS Model 2015-4)

Imperious Area =18,990 $\pm$  s.f. 0.5 inch x 1 inch/foot = 0. 04219 feet 0.042 feet x 18,990 s.f. = 798 cu. ft. Total Volume to be treated for Water Quality draining to CDS Unit= 798 cu.ft.

Q0.5=(qu)(A)(WQV)

qu=752 csm/in for a Tc of 0.1 hours (taken from Figure 2 of the Massachusetts Department of Environmental Protection Wetlands program - Standard Method to Convert Required Water Quality Volume to a Discharge Rate

A=18,990 $\pm$  s.f. (impervious area flowing to CBs 1-3) = 0.436 acres

WQV=0.5 inches

Q<sub>0.5</sub>=(752 csm/in) (0.436acres) (0.0015625 sq. mi / acre) (0.5 inch)

 $Q_{0.5}$  = 0.256 cfs < CDS Model 2015 Inlet Unit with a Treatment Capacity = 0.70 cfs

The calculation above details that the required flow rate to provide the required treatment is required to be at a minimum of 0.256 cfs. The proposed CDS Unit, as sized, is capable of providing maximum treatment for flows less than 0.70 cfs which complies with the reequipments of Standard 4.

#### **STANDARD 5: Higher Potential Pollutant Loads**

Stormwater Management Standard 5 requires that, "For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention, all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt and stormwater runoff, the proponent shall use the specific stormwater BMPs determined by the Department to be suitable for such use as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 2,§26-53, and the regulations promulgated thereunder at 314 CMF 3.00, 314 CMR 4.00 and 314 CMR 5.00."

The proposed redevelopment of the parcel is not classified as a use which will create a Higher Potential Pollutant Load.



#### **STANDARD 6: Critical Areas**

Stormwater Management Standard 6 requires that Stormwater discharge to a Zone II Interim Wellhead Protection Area of a public water supply and stormwater discharges near any other critical area require the use of specific source control and pollution prevention measures and the specific stormwater best management practices determined by the Department to be suitable for managing discharges to such area, as provided in the Massachusetts Stormwater Handbook. A discharge near a critical area, if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters or Special Resource Waters shall be set back from the receiving water and receive the highest and best practical method of treatment. A "stormwater discharge," as defined in 314 CMR 3.04(2)(a)1. or (b), to an Outstanding Resource Waters or Special Resource Waters shall comply with 314 CMF 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A area prohibited unless essential to the operation of the public water supply."

The development site is not located within a Critical Area as defined by the Massachusetts Stormwater Handbook.

# STANDARD 7: Redevelopment and Other Projects Subject to the Standards only to the Maximum Extent Practicable

The definition of a Redevelopment Project under the definition provided in the MADEP Stormwater Handbook for Standard 7 is listed below:

"Development rehabilitation, expansion and phased projected on previously developed sites, provided that redevelopment results in no next increase in impervious area."

The proposed development is classified as Redevelopment Project and fully complies with the requirements of the MADEP Stormwater Management Standards to the maximum extent partible.

#### **STANDARD 8: Erosion and Sediment Control**

Stormwater Management Standard 8 requires that, "A plan to control construction-related impacts, including erosion sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan), must be developed and implemented."

This standard is met by including erosion and sediment controls within the design plans. Access to the site will be from an existing paved driveway and will be monitored for tracking of construction debris onto Webster Street. Siltation control fence with straw wattle is proposed at the limits of all site related construction activities. Silt sacks are also proposed to be installed at all of the existing catch basins within the area of the proposed site disturbance. A Construction Period Pollution and Erosion & Sedimentation Control Plan has also been prepared for and is included as part of the Stormwater Report as the site disturbance of less than 1 acres does not require the implementation of a Stormwater Pollution Plan.

#### **STANDARD 9: Operation and Maintenance**

Stormwater Management Standard 9 requires that, "A long-term operation and maintenance plan must be developed and implemented to ensure that stormwater management systems function as designed".

This standard is fully met with development and implementation of a new Site Operation and Maintenance Plan for the redeveloped site.



#### **STANDARD 10: Illicit Discharges**

Stormwater Management Standard 10 requires that, "All illicit discharges to the stormwater management system are prohibited".

This standard is fully met with development and implementation of a new Long-Term Pollution Prevention for the redeveloped site. An Illicit Discharge statement has been prepared and is included herein.



# Massachusetts Department of Environmental Protection Bureau of Resource Protection - Wetlands Program

# **Checklist for Stormwater Report**

# **B. Stormwater Checklist and Certification**

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

*Note:* Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

# **Registered Professional Engineer's Certification**

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Longterm Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



Signature and Date

Checklist

**Project Type:** Is the application for new development, redevelopment, or a mix of new and redevelopment?

New development



Mix of New Development and Redevelopment



## Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

	No disturbance to any Wetland Resource Areas
	Site Design Practices (e.g. clustered development, reduced frontage setbacks)
	Reduced Impervious Area (Redevelopment Only)
$\square$	Minimizing disturbance to existing trees and shrubs
	LID Site Design Credit Requested:
	Credit 1
	Credit 2
	Credit 3
	Use of "country drainage" versus curb and gutter conveyance and pipe
	Bioretention Cells (includes Rain Gardens)
	Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
	Treebox Filter
	Water Quality Swale
	Grass Channel
	Green Roof
	Other (describe):

#### **Standard 1: No New Untreated Discharges**

No new untreated discharges

- Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



## Checklist (continued)

#### Standard 2: Peak Rate Attenuation

- Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

Calculations provided to show that post-development peak discharge rates do not exceed predevelopment rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24hour storm.

#### Standard 3: Recharge

Soil Analysis provided. Limited testing area, additional test pits to be provided prior to start of construction

Required Recharge Volume calculation provided.

Required	Recharge	volume	reduced	through	use of th	e LID	site I	Desian	Credits.

Sizing the infiltration, BMPs is based on the following method: Check the method used.

Static Static	Simple Dynamic
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Dynamic Field<sup>1</sup>

Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

$\mathbf{\Lambda}$	Recharge BMPs have been sized to infiltrate the Required Recharge Volume only to the maximum
	extent practicable for the following reason:

Site is comprised solely of C and D soils and/or bedrock at the land surface

M.G.L. c. 21E sites pursuant to	310 CMR 40.0000
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- Solid Waste Landfill pursuant to 310 CMR 19.000
- Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

<sup>&</sup>lt;sup>1</sup> 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



## Checklist (continued)

#### Standard 3: Recharge (continued)

The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

#### **Standard 4: Water Quality**

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
- Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
  - is within the Zone II or Interim Wellhead Protection Area
  - is near or to other critical areas
  - is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
  - involves runoff from land uses with higher potential pollutant loads.
- The Required Water Quality Volume is reduced through use of the LID site Design Credits.
- Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



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#### Standard 4: Water Quality (continued)

- The BMP is sized (and calculations provided) based on:
  - ☑ The ½" or 1" Water Quality Volume or
  - The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- ☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

#### Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior to** the discharge of stormwater to the post-construction stormwater BMPs.
- The NPDES Multi-Sector General Permit does *not* cover the land use.
- LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- All exposure has been eliminated.
- All exposure has *not* been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

#### **Standard 6: Critical Areas**

- The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- Critical areas and BMPs are identified in the Stormwater Report.



#### Checklist (continued)

# Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

- The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
  - Limited Project
  - Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
  - Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
  - Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
  - Bike Path and/or Foot Path
  - Redevelopment Project
  - Redevelopment portion of mix of new and redevelopment.
- Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- ✓ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

#### Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



### Checklist (continued)

# **Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control** (continued)

- ☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has *not* been included in the Stormwater Report but will be submitted *before* land disturbance begins.
- The project is *not* covered by a NPDES Construction General Permit.
- The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

#### **Standard 9: Operation and Maintenance Plan**

- The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
  - Name of the stormwater management system owners;
  - Party responsible for operation and maintenance;
  - Schedule for implementation of routine and non-routine maintenance tasks;
  - $\square$  Plan showing the location of all stormwater BMPs maintenance access areas;
  - Description and delineation of public safety features;
  - Estimated operation and maintenance budget; and
  - ✓ Operation and Maintenance Log Form.
- The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
  - A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
  - A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

#### Standard 10: Prohibition of Illicit Discharges

- The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- An Illicit Discharge Compliance Statement is attached;
- NO Illicit Discharge Compliance Statement is attached but will be submitted *prior to* the discharge of any stormwater to post-construction BMPs.



# **SECTION 3.00 – GIS AND REFERNCE MAPPING**

- 4.10 MAGIS Mapping
- 4.20 On-Site Soils Mapping & Information
- 4.30 FEMA Flood Insurance Map

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Areas of Critical Environmental Concern ACECs	Sole Source Aquifers	Outstanding Resource Waters	<ul> <li>Cape Cod National Seashore</li> <li>Protected Shoreline</li> </ul>	<ul> <li>Public Water Supply Watershed</li> <li>Retired Public Water Supply</li> </ul>	<ul> <li>Scenic/Pratected River</li> <li>Wildlife Refuge</li> </ul>	DFW Coldwater Fisheries Resources	NHESP Certified Vernal Pools	Potential Vernal Pools	NHESP Priority Habitats of Rare Species	NHESP Estimated Habitats of Rare Wildlife	Zone IIs	Zone Is	IWPAs	Zone C	Zone B	Zone A	Property Tax Parcels
						Webster Court		Dee Et	91 WEBSTER ST	o webstrek st	And A A A A A A A A A A A A A A A A A A	CTREET SUCCOUSS I Leaflet   Massels					
	curris sT					To WEBSTER ST	2	70 WEBSTER ST	WEBDS MERCILLE MERCIN	iter Street							
										~	N 11.128 20 m	50 H					

70 Webster Street



National Cooperative Soil Survey

**Conservation Service** 

Soil Map—Worcester County, Massachusetts, Northeastern Part (70 Webster Street Worcester MA) ſ

MAP INFORMATION	The soil surveys that comprise your AOI were mapped at 1:20,000.	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	aistance and area. A projection that preserves area, sucn 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: - Morrester County Massachusetts	Northeastern Part	Survey Area Data: Version 17, Sep 9, 2022	Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.	Date(s) aerial images were photographed: May 22. 2022—Jun	5, 2022	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.	
	Spoil Area Stony Spot	Very Stony Spot	Wet Spot	Other	Special Line Features	tures	Streams and Canals	ation Rails	Interstate Highways	US Routes	Major Roads	Local Roads	pu	Aerial Photography										
EGEND	₩ <	8	43	$\triangleleft$	Ĭ,	Water Fea	ξ	Transport	1	5	8	8	Backgrou	4										
MAPL	<b>terest (AOI)</b> Area of Interest (AOI)		soil Map Unit Polygons Soil Map Unit Lines	Soil Map Unit Points	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
	Area of Int	Soils			Special	9		1 36	$\diamond$	冷	* <mark>*</mark>	0	~	-\$	«	0	0	>	÷	°.°	Ŵ	\$	A	Ø



# Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Water	0.2	11.7%
602	Urban land	1.6	88.3%
Totals for Area of Interest		1.8	100.0%

# National Flood Hazard Layer FIRMette

°50'20"W 42°14'47









regulatory purposes.



# **SECTION 4.00 – SUPPORTING INFORMATION AND CALCULATIONS**

- 4.10 MADEP TSS Removal Calculation Sheets
- 4.20 Illicit Discharge Statement

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INSTRUCTIONS:

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table

- 2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
- 3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
- 4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
- 5. Total TSS Removal = Sum All Values in Column D





# Hydrodynamic Separation Product Calculator

Webster Street Mill Conversion

Parking Area

CDS 2015-4

		Project Informati	on		
Project Name	Webster Street Mill Conversi	on		Option #	A
Country	UNITED_STATES	State	Massachusetts	City	Worcester

	Contact Inform	nation	
First Name	Nick	Last Name	Facendola
Company	Level Design Group, LLC	Phone #	508-695-2221
Email	nfacendola@leveldg.com		

		Design Crit	teria		
Site Designation	Parking Area			Sizing Method	Net Annual
Screening Required?	Yes	Drainage Area (ac)	0.48	Peak Flow (cfs)	2.80
Groundwater Depth (ft)	0 - 5	Pipe Invert Depth (ft)	0 - 5	Bedrock Depth (ft)	10 - 15
Multiple Inlets?	Yes	Grate Inlet Required?	No	Pipe Size (in)	12.00
Required Particle Size Distribution?	No	90° between two inlets?	No	180° between inlet and outlet?	No
Runoff Coefficient	0.96	Rainfall Station	71 - Birch Hill Dam, MA	TC (Min)	6

		Treatment Se	election		
Treatment Unit	CDS	System Model	2015-4		
Target Removal	80%	Particle Size Distribution (PSD)	125	Predicted Net Annual Removal	96.30%



# Hydrodynamic Separation Product Calculator

Webster Street Mill Conversion

Parking Area

CDS 2015-4

CD	S ESTIMATEI	D NET ANNUAL	SOLIDS LOAD	<b>REDUCTION E</b>	BASED ON THE	RATIONAL RAI	NFALL METHO	D
Rainfall Intensity <sup>1</sup> (in/hr)	% Rainfall Volume <sup>1</sup>	Cumulative Rainfall Volume	Rainfall Volume Treated	Total Flowrate (cfs)	Treated Flowrate (cfs)	Operating Rate (%)	Removal Efficiency (%)	Incremental Removal (%)
0.0800	37.59%	37.59%	37.59%	0.0369	0.0369	5.27%	100.00%	37.59%
0.1600	22.64%	60.23%	22.64%	0.0737	0.0737	10.53%	99.30%	22.48%
0.2400	11.89%	72.12%	11.89%	0.1106	0.1106	15.80%	98.25%	11.68%
0.3200	7.58%	79.70%	7.58%	0.1475	0.1475	21.07%	97.19%	7.37%
0.4000	4.35%	84.05%	4.35%	0.1843	0.1843	26.33%	96.14%	4.18%
0.4800	2.35%	86.40%	2.35%	0.2212	0.2212	31.60%	95.09%	2.23%
0.5600	1.79%	88.19%	1.79%	0.2580	0.2580	36.86%	94.03%	1.68%
0.6400	1.37%	89.56%	1.37%	0.2949	0.2949	42.13%	92.98%	1.27%
0.7200	0.87%	90.43%	0.87%	0.3318	0.3318	47.40%	91.93%	0.80%
0.8000	1.16%	91.59%	1.16%	0.3686	0.3686	52.66%	90.87%	1.05%
0.8800	1.49%	93.08%	1.49%	0.4055	0.4055	57.93%	89.82%	1.34%
0.9600	0.93%	94.01%	0.93%	0.4424	0.4424	63.20%	88.76%	0.83%
1.0400	0.38%	94.39%	0.38%	0.4792	0.4792	68.46%	87.71%	0.33%
1.1200	0.41%	94.80%	0.41%	0.5161	0.5161	73.73%	86.66%	0.36%
1.2000	0.58%	95.38%	0.58%	0.5530	0.5530	79.00%	85.60%	0.50%
1.2800	0.31%	95.69%	0.31%	0.5898	0.5898	84.26%	84.55%	0.26%
1.3600	0.17%	95.86%	0.17%	0.6267	0.6267	89.53%	83.50%	0.14%
1.4400	0.88%	96.74%	0.88%	0.6636	0.6636	94.80%	82.44%	0.73%
1.5200	0.55%	97.29%	0.55%	0.7004	0.7000	100.00%	81.35%	0.45%
1.6000	0.40%	97.69%	0.38%	0.7373	0.7000	100.00%	77.28%	0.31%
1.8000	0.20%	97.89%	0.17%	0.8294	0.7000	100.00%	68.70%	0.14%
2.0000	0.94%	98.83%	0.71%	0.9216	0.7000	100.00%	61.83%	0.58%
					•			96.30%
						Removal Efficier	ncy Adjustment <sup>2</sup> =	
					Pre	edicted % Annual I	Rainfall Treated =	98.55%
					Predicted Ne	t Annual Load Rer	noval Efficiency =	96.30%
1 - Based on 13 ye	ars of 15 minute	e precipitation data	for Station 0666,	Birch Hill Dam, W	orcester County, M	A		
2 - Reduction due t	o use of 60-min	ute data for a site t	hat has a time of	concentration less	s than 30-minutes.			

#### SECTION (\_\_\_\_\_) STORM WATER TREATMENT DEVICE

#### 1.0 GENERAL

- 1.1 This item shall govern the furnishing and installation of the CDS<sup>®</sup> by Contech Engineered Solutions LLC, complete and operable as shown and as specified herein, in accordance with the requirements of the plans and contract documents.
- 1.2 The Contractor shall furnish all labor, equipment and materials necessary to install the storm water treatment device(s) (SWTD) and appurtenances specified in the Drawings and these specifications.
- 1.3 The manufacturer of the SWTD shall be one that is regularly engaged in the engineering design and production of systems deployed for the treatment of storm water runoff for at least five (5) years and which have a history of successful production, acceptable to the Engineer. In accordance with the Drawings, the SWTD(s) shall be a CDS<sup>®</sup> device manufactured by:

Contech Engineered Solutions LLC 9025 Centre Pointe Drive West Chester, OH, 45069 Tel: 1 800 338 1122

- 1.4 Related Sections
  - 1.4.1 Section 02240: Dewatering
  - 1.4.2 Section 02260: Excavation Support and Protection
  - 1.4.3 Section 02315: Excavation and Fill
  - 1.4.4 Section 02340: Soil Stabilization
- 1.5 All components shall be subject to inspection by the engineer at the place of manufacture and/or installation. All components are subject to being rejected or identified for repair if the quality of materials and manufacturing do not comply with the requirements of this specification. Components which have been identified as defective may be subject for repair where final acceptance of the component is contingent on the discretion of the Engineer.
- 1.6 The manufacturer shall guarantee the SWTD components against all manufacturer originated defects in materials or workmanship for a period of twelve (12) months from the date the components are delivered to the owner for installation. The manufacturer shall upon its determination repair, correct or replace any manufacturer originated defects advised in writing to the manufacturer within the referenced warranty period. The use of SWTD components shall be limited to the application for which it was specifically designed.
- 1.7 The SWTD manufacturer shall submit to the Engineer of Record a "Manufacturer's Performance Certification" certifying that each SWTD is capable of achieving the specified removal efficiencies listed in these specifications. The certification shall be supported by independent third-party research

1.8 No product substitutions shall be accepted unless submitted 10 days prior to project bid date, or as directed by the Engineer of Record. Submissions for substitutions require review and approval by the Engineer of Record, for hydraulic performance, impact to project designs, equivalent treatment performance, and any required project plan and report (hydrology/hydraulic, water quality, stormwater pollution) modifications that would be required by the approving jurisdictions/agencies. Contractor to coordinate with the Engineer of Record any applicable modifications to the project estimates of cost, bonding amount determinations, plan check fees for changes to approved documents, and/or any other regulatory requirements resulting from the product substitution.

#### 2.0 MATERIALS

- 2.1 Housing unit of stormwater treatment device shall be constructed of pre-cast or cast-in-place concrete, no exceptions. Precast concrete components shall conform to applicable sections of ASTM C 478, ASTM C 857 and ASTM C 858 and the following:
  - 2.1.1 Concrete shall achieve a minimum 28-day compressive strength of 4,000 pounds per square-inch (psi);
  - 2.1.2 Unless otherwise noted, the precast concrete sections shall be designed to withstand lateral earth and AASHTO H-20 traffic loads;
  - 2.1.3 Cement shall be Type III Portland Cement conforming to ASTM C 150;
  - 2.1.4 Aggregates shall conform to ASTM C 33;
  - 2.1.5 Reinforcing steel shall be deformed billet-steel bars, welded steel wire or deformed welded steel wire conforming to ASTM A 615, A 185, or A 497.
  - 2.1.6 Joints shall be sealed with preformed joint sealing compound conforming to ASTM C 990.
  - 2.1.7 Shipping of components shall not be initiated until a minimum compressive strength of 4,000 psi is attained or five (5) calendar days after fabrication has expired, whichever occurs first.
- 2.2 Internal Components and appurtenances shall conform to the following:
  - 2.2.1 Screen and support structure shall be manufactured of Type 316 and 316L stainless steel conforming to ASTM F 1267-01;
  - 2.2.2 Hardware shall be manufactured of Type 316 stainless steel conforming to ASTM A 320;
  - 2.2.3 Fiberglass components shall conform to applicable sections of ASTM D-4097
  - 2.2.4 Access system(s) conform to the following:
  - 2.2.5 Manhole castings shall be designed to withstand AASHTO H-20 loadings and manufactured of cast-iron conforming to ASTM A 48 Class 30.

#### 3.0 PERFORMANCE

- 3.1 The SWTD shall be sized to either achieve an 80 percent average annual reduction in the total suspended solid load with a particle size distribution having a mean particle size (d<sub>50</sub>) of 125 microns unless otherwise stated.
- 3.2 The SWTD shall be capable of capturing and retaining 100 percent of pollutants greater than or equal to 2.4 millimeters (mm) regardless of the pollutant's specific gravity (i.e.: floatable and neutrally buoyant materials) for flows up to the device's rated-treatment capacity. The SWTD shall be designed to retain all previously captured pollutants addressed by this

subsection under all flow conditions. The SWTD shall be capable of capturing and retaining total petroleum hydrocarbons. The SWTD shall be capable of achieving a removal efficiency of 92 and 78 percent when the device is operating at 25 and 50 percent of its rated-treatment capacity. These removal efficiencies shall be based on independent third-party research for influent oil concentrations representative of storm water runoff ( $20 \pm 5 \text{ mg/L}$ ). The SWTD shall be greater than 99 percent effective in controlling dry-weather accidental oil spills.

- 3.3 The SWTD shall be designed with a sump chamber for the storage of captured sediments and other negatively buoyant pollutants in between maintenance cycles. The minimum storage capacity provided by the sump chamber shall be in accordance with the volume listed in Table 1. The boundaries of the sump chamber shall be limited to that which do not degrade the SWTD's treatment efficiency as captured pollutants accumulate. The sump chamber shall be separate from the treatment processing portion(s) of the SWTD to minimize the probability of fine particle re-suspension. In order to not restrict the Owner's ability to maintain the SWTD, the minimum dimension providing access from the ground surface to the sump chamber shall be 16 inches in diameter.
- 3.4 The SWTD shall be designed to capture and retain Total Petroleum Hydrocarbons generated by wet-weather flow and dry-weather gross spills and have a capacity listed in Table 1 of the required unit.
- 3.5 The SWTD shall convey the flow from the peak storm event of the drainage network, in accordance with required hydraulic upstream conditions as defined by the Engineer. If a substitute SWTD is proposed, supporting documentation shall be submitted that demonstrates equal or better upstream hydraulic conditions compared to that specified herein. This documentation shall be signed and sealed by a Professional Engineer registered in the State of the work. All costs associated with preparing and certifying this documentation shall be born solely by the Contractor.
- 3.6 The SWTD shall have completed field tested following TARP Tier II protocol requirements

#### 4.0 EXECUTION

- 4.1 The contractor shall exercise care in the storage and handling of the SWTD components prior to and during installation. Any repair or replacement costs associated with events occurring after delivery is accepted and unloading has commenced shall be borne by the contractor.
- 4.2 The SWTD shall be installed in accordance with the manufacturer's recommendations and related sections of the contract documents. The manufacturer shall provide the contractor installation instructions and offer on-site guidance during the important stages of the installation as identified by the manufacturer at no additional expense. A minimum of 72 hours notice shall be provided to the manufacturer prior to their performance of the services included under this subsection.
- 4.3 The contractor shall fill all voids associated with lifting provisions provided by the manufacturer. These voids shall be filled with non-shrinking grout providing a finished surface consistent with adjacent surfaces. The contractor shall trim all protruding lifting provisions flush with the adjacent concrete surface in a manner, which leaves no sharp points or edges.

4.4 The contractor shall removal all loose material and pooling water from the SWTD prior to the transfer of operational responsibility to the Owner.

	•	
CDS Model	Minimum Sump Storage Capacity	Minimum Oil Storage
	(yd <sup>3</sup> )/(m <sup>3</sup> )	Capacity (gai)/(L)
CDS2015-4	0.9(0.7)	61(232)
CDS2015-5	1.5(1.1)	83(313)
CDS2020-5	1.5(1.1)	99(376)
CDS2025-5	1.5(1.1)	116(439)
CDS3020-6	2.1 (1.6)	184(696)
CDS3025-6	2.1(1.6)	210(795)
CDS3030-6	2.1 (1.6)	236(895)
CDS3035-6	2.1 (1.6)	263(994)
CDS3535-7	2.9(2.2)	377(1426)
CDS4030-8	5.6(4.3)	426(1612)
CDS4040-8	5.6 (4.3)	520(1970)
CDS4045-8	5.6 (4.3)	568(2149)
CDS5640-10	8.7(6.7)	758(2869)
CDS5653-10	8.7(6.7)	965(3652)
CDS5668-10	8.7(6.7)	1172(4435)
CDS5678-10	8.7(6.7)	1309(4956)
CDS7070-DV	3.6(2.8)	914 (3459)
CDS10060-DV	5.0 (3.8)	792 (2997)
CDS10080-DV	5.0 (3.8)	1057 (4000)
CDS100100-DV	5.0 (3.8)	1320 (4996)

TABLE 1 Storm Water Treatment Device Storage Capacities

**END OF SECTION** 

# **Illicit Discharge Statement**

FOR: WEBSTER STREET MILL RESIDENTIAL CONVERSION 70 WEBSTER STREET, WORCESTER, MA **DEVELOPED BY:** GOLD STAR BUILDERS, INC. WORCESTER, MASSACHUSETTS

All illicit discharges to the Stormwater Management System are prohibited. The Stormwater Management System is the system for conveying, treating, and infiltrating stormwater. Illicit discharges to Stormwater Management Systems are discharges that are not entirely comprised of stormwater, but do not include discharges from the following activities or facilities:

- Firefighting .
- Water Line Flushing .
- Potable Water Sources
- Landscape Irrigation
- Potable Water Sources
- Uncontaminated Groundwater .
- Air-conditioning Condensation

- Dechlorinated Water from Swimming Pools
- Water used for street washing
- Water used for clean residential buildings without detergents
- Foundation Drains

The site will be operated and maintained in accordance with the Operation and Maintenance Plan dated March 29, 2023 prepared by Level Design Group, LLC.

I, Tony Nguyen (Applicant) do hereby agree to comply with requirements set forth within the Illicit Discharge Statement and will not knowingly discharge illicit materials to the stormwater management system once it is brought online upon completion of construction.

Signature

<u>3/28/23</u> Date



## SECTION 5.00 - HydroCAD ANALYSIS

- 5.10 Existing Conditions Subcatchments Map
- 5.20 Existing Conditions Analysis for 2-, 10-, 25- & 100- Year Storm Events
- 5.30 Proposed Conditions Subcatchments Map
- 5.40 Proposed Conditions Analysis for 2-, 10-, 25- & 100- Year Storm Events

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#### 1999 - Existing

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Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
46,650	HSG C	E1, E2
0	HSG D	
0	Other	
46,650		TOTAL AREA

1999 - Existing	
Prepared by {enter your company name here}	

0

46,650

0

Existing Conditions - 2,10,25,100-Year Storms

Page 4

Printed 3/29/2023 HydroCAD® 10.00-20 s/n 04015 © 2017 HydroCAD Software Solutions LLC Ground Covers (all nodes) HSG-A HSG-B HSG-C HSG-D Other Ground Subcatchment Total (sq-ft) (sq-ft) (sq-ft) (sq-ft) (sq-ft) Cover Numbers (sq-ft) 6,782 0 0 6,782 0 0 Gravel surface E1 0 0 15,010 0 0 15,010 Paved parking E1, E2 0 17,232 0 17,232 Roof (Main Bldg) E1 0 0 Roof (Small Bldg) E1, E2 0 0 2,400 0 0 2,400 0 0 5,226 0 0 5,226 Woods, Good E1

0

46,650 TOTAL AREA

0

Soil Listing (all nodes)

**1999 - Existing** Prepared by {enter your company name here} HydroCAD® 10.00-20, s/n 04015, © 2017 HydroCAD Software Solutions LLC.

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A	Area (sf) 12.043	<u>CN</u> 98	Descript Paved p	ion arkin	a. HSG	С											
7 k	1,200	98 98	Roof (Sr Roof (M	nall E ain B	Bldg), H	SGC											
	6,782	96 70	Gravel s	urfac	e, HSG	C											
	42,483	94	Weighte	d Ave	erage	<u> </u>											
	30,475		71.73%	Impe	rvious A	Area											
Tc (min)	Length	Slop (ft/f	e Veloc	ity (	Capacit	y Des	scription										
6.0	(1001)	(101	.) (1030	.0)	(013	Dir	ect Entry	, Tc. M	lin								
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999 - I Prepare łydroCAI	Existing ed by {en D® 10.00-	l ter you 20 s/n	r compa 04015 © 2	ny n: 2017	ame he HydroC/ Subca	ere} AD Soft	ware Solu ent E1:	tions LL Over	<u>.c</u> land Flo	w to Cu	rtis Pc	Existing	Conditic Type III .	ns - 2,1 24-hr 2	10,25,1 2-Year Pri	00-Yea Rainfa inted 3	ar Storms all=3.27" j/29/2023 Page 6
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Time (hours)



1999 - Existing

#### Summary for Subcatchment E1: Overland Flow to Curtis Pond BVW Runoff = 4.40 cfs @ 12.09 hrs, Volume= 14,126 cf, Depth> 3.99" Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=4.92" CN Area (sf) Description Paved parking, HSG C Roof (Small Bldg), HSG C Roof (Main Bldg), HSG C Gravel surface, HSG C 12,043 98 1,200 17,232 98 98 6,782 96 Woods, Good, HSG C 5,226 70 Weighted Average 42,483 94 12,008 28.27% Pervious Area 30,475 71.73% Impervious Area Slope Velocity Capacity Description Tc Length (min) (feet) (ft/ft) (ft/sec) (cfs) Direct Entry, Tc. Min 6.0 Existing Conditions - 2,10,25,100-Year Storms 1999 - Existing Type III 24-hr 10-Year Rainfall=4.92" Prepared by {enter your company name here} HydroCAD® 10.00-20 s/n 04015 © 2017 HydroCAD Software Solutions LLC Printed 3/29/2023 Page 12 Subcatchment E1: Overland Flow to Curtis Pond BVW Hydrograph 4.40 cfs - Runoff Type III 24-hr 10-Year Rainfall=4.92" Runoff Area=42,483 sf Runoff Volume=14,126 cf 3 Flow (cfs) Runoff Depth>3.99" Tc=6.0 min 2 CN=94 0 6 ż ġ 10 5 8 11 12 13 14 15 16 17 18 19 20 Time (hours)

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Time (hours)

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1999 - Existing

#### Summary for Subcatchment E1: Overland Flow to Curtis Pond BVW Runoff = 5.65 cfs @ 12.09 hrs, Volume= 18,374 cf, Depth> 5.19" Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=6.22" CN Area (sf) Description Paved parking, HSG C Roof (Small Bldg), HSG C Roof (Main Bldg), HSG C Gravel surface, HSG C 12,043 98 1,200 17,232 98 98 6,782 96 Woods, Good, HSG C 5,226 70 Weighted Average 42,483 94 12,008 28.27% Pervious Area 30,475 71.73% Impervious Area Slope Velocity Capacity Description Tc Length (min) (feet) (ft/ft) (ft/sec) (cfs) Direct Entry, Tc. Min 6.0 Existing Conditions - 2,10,25,100-Year Storms 1999 - Existing Type III 24-hr 25-Year Rainfall=6.22" Prepared by {enter your company name here} HydroCAD® 10.00-20 s/n 04015 © 2017 HydroCAD Software Solutions LLC Printed 3/29/2023 Page 18 Subcatchment E1: Overland Flow to Curtis Pond BVW Hydrograph 6 5.65 cfs - Runoff Type III 24-hr 5 25-Year Rainfall=6.22" Runoff Area=42,483 sf 4 Runoff Volume=18,374 cf Flow (cfs) Runoff Depth>5.19" 3 Tc=6.0 min CN=94 2 0 6 ż ġ 10 5 8 11 12 13 14 15 16 17 18 19 20 Time (hours)

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Time (hours)

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1999 - Existing

#### Summary for Subcatchment E1: Overland Flow to Curtis Pond BVW Runoff = 8.18 cfs @ 12.09 hrs, Volume= 27,044 cf, Depth> 7.64" Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=8.88" CN Area (sf) Description Paved parking, HSG C Roof (Small Bldg), HSG C Roof (Main Bldg), HSG C Gravel surface, HSG C 12,043 98 1,200 17,232 98 98 6,782 96 Woods, Good, HSG C 5,226 70 Weighted Average 42,483 94 12,008 28.27% Pervious Area 30,475 71.73% Impervious Area Slope Velocity Capacity Description Tc Length (min) (feet) (ft/ft) (ft/sec) (cfs) Direct Entry, Tc. Min 6.0 Existing Conditions - 2,10,25,100-Year Storms 1999 - Existing Type III 24-hr 100-Year Rainfall=8.88" Prepared by {enter your company name here} HydroCAD® 10.00-20 s/n 04015 © 2017 HydroCAD Software Solutions LLC Printed 3/29/2023 Page 24 Subcatchment E1: Overland Flow to Curtis Pond BVW Hydrograph 9 - Runoff 8.18 cfs 8 Type III 24-hr 100-Year Rainfall=8.88" 7 Runoff Area=42,483 sf 6 Runoff Volume=27,044 cf (cfs) 5-Runoff Depth>7.64" Flow Tc=6.0 min 4-CN=94 3-2 1 0 10 ż ġ 5 6 8 11 12 13 14 15 16 17 18 19 20 Time (hours)

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Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

#### Reach R1: Curtis Pond BVW



#### **1999 - Existing** Prepared by {enter your company name here} <u>HydroCAD® 10.00-20 s/n 04015 © 2017 HydroCAD Software Solutions LLC</u>

Existing Conditions - 2,10,25,100-Year Storms *Type III 24-hr 100-Year Rainfall=8.88"* Printed 3/29/2023 Page 28

Summary for Reach R2: Webster Street Stormwater System

 Inflow Area =
 4,167 sf,100.00% Impervious, Inflow Depth > 7.94" for 100-Year event

 Inflow =
 0.81 cfs @ 12.09 hrs, Volume=
 2,758 cf

 Outflow =
 0.81 cfs @ 12.09 hrs, Volume=
 2,758 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

#### Reach R2: Webster Street Stormwater System







Prepared by {enter your company name here} HydroCAD® 10.00-20 s/n 04015 © 2017 HydroCAD Software Solutions LLC

Printed 3/29/2023 Page 3

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
46,650	HSG C	P1, P2
0	HSG D	
0	Other	
46,650		TOTAL AREA

	Proposed Conditions - 2,10,25,100-Year Storms
1999 - Proposed	
Prepared by {enter your company name here}	Printed 3/29/2023
HydroCAD® 10.00-20 s/n 04015 © 2017 HydroCAD Software Solutions LLC	Page 4

Soil Listing (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	Subcatchment Numbers
0	0	5,447	0	0	5,447	>75% Grass cover, Good	P1, P2
0	0	21,410	0	0	21,410	Paved parking	P1, P2
0	0	12,167	0	0	12,167	Roof (Main Bldg)	P1
0	0	2,400	0	0	2,400	Roof (Small Bldg)	P1, P2
0	0	5,226	0	0	5,226	Woods, Good	P1
0	0	46,650	0	0	46,650	TOTAL AREA	

				Sum	nary to	u Subc	accim			verian		w 10 (	urus	rund	D V VV			
unoff	=	2.64	cfs @	12.0	9 hrs, Vo	olume=		8,07	5 cf, D	)epth>	2.28"	0.05						
unoff I ype III	by SCS TF 24-hr 2-Y	k-20 me ′ear Ra	ethod, l infall=3	UH=S 3.27"	CS, Wei	ghted-C	N, Time	Span	= 5.00	-20.00	nrs, dt=	= 0.05 l	nrs					
ļ	Area (sf)	CN	Descri	iption														
	18,990 1,200	98 98	Paved Roof (	l park Small	ng, HSG Bldg), H	i C ISG C												
	12,167	98 70	Roof (	Main	Bldg), H	SGC												
	3,143	74	>75%	Gras	s cover, 0	Good, H	SG C											
	1,757	<u>74</u> 92	<u>&gt;75%</u> Weiah	Grase Inted A	s cover, ( verade	Good, H	SGC											
	10,126 32,357		23.849 76.169	% Per % Imp	vious Are ervious	ea Area												
Tc (min)	Length (feet)	Slope (ft/ft	e Velo ) (ft/	ocity /sec)	Capacit (cfs	ty Deso s)	cription											
6.0						Dire	ct Entry	, Tc.	Min									
													Propos	sed Co	nditions	- 2,10,25	5,100-Year	- Storms
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Flow (cfs) From (cfs)	Propose ed by {en AD® 10.00-	ed ter you 20 s/n (	r comp )4015 (	pany © 201	name hı 7 HydroC Subc	ere} AD Softw atchme	/are Solu ent P1: Hyo 	tions L Ove Irogra	rland aph	Flow 2 RI RU	-Ye Ino off Ru	urtis P ar I ff A Vol nof	Propos Fond B Rair rea Jum f De	sed Coo <i>Typ</i> vw pe I nfal =42 e=8 epth c=(	ll 24 = 3.2 ,483 ,075 >2.2 5.0 m	-hr 27" 5 cf 28" nin 92	5,100-Year ar Rainfa Printed 3/	Storms II=3.27" 29/2023 Page 6
Flow (cfs) Flow (cfs)	Proposi ed by {en AD® 10.00-	ed ter you 20 s/n (	r comp 14015 (	pany © 201	name ho 7 HydroC Subc	ere} AD Softw atchme	/are Solu ent P1: Hyc 	tions L Ove Irogra	LC rland aph	Flow 2 RL Run	-Ye Ino off Ru	urtis P ar I ff A Vol nof	Propos Fond B Rair Rair Ium f De T	sed Coo <i>Typ</i> vw pe I nfal =42 e=8 epth c=(	ll 24 = 3.2 ,483 ,075 >2.2 5.0 n CN=	-hr 27" 5 cf 28" nin 92	5,100-Year ar Rainfa Printed 3/	Storms II=3.27" 29/2023 Page 6
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Flow (cfs)	Propose ed by {en AD® 10.00-	ed ter you 20 s/n (	r comp 04015	pany © 201	name ho 7 HydroC Subc	ere} AD Softw atchme	vare Solu ent P1: Hyd	tions L Ove Irogra	rland aph	Flow 2 Ru Run	-Ye ino off Ru	urtis P ar I ff A Vol nof	Propos Fond B Rair rea um f De	sed Coo Typ vw pe I nfal =42 e=8 epth c=(	nditions = /// 24-  =3.2 ,483 ,075  >2.2 5.0 m CN=	-hr 27" 5 cf 28" nin =92	5,100-Year ar Rainfa Printed 3/	Storms II=3.27" 29/2023 Page 6

Runoff	=	0.28	cfs @ 12	.09 hr	s, Volu	ime=		890 cf.	Depth> 2.56'							
Runoff by		2-20 m	athod UH	-909	Weigh	ted_CN	Time S	nan= 5.00	0-20.00 brs. d	H- 0 05 H	are					
Type III 2	24-hr 2-Y	ear Ra	infall=3.2	/"	, weign	leu-on,	Time O	pan- 5.00	0-20.00 m3, u	it= 0.00 i	115					
Ar	rea (sf)	CN	Descripti	on												
ł	2,420 1.200	98 98	Paved pa Roof (Sm	rking, all Blo	HSG C la). HS(	; G C										
	547	74	>75% Gr	ass co	over, Go	od, HSC	GC									
	4,167 547	95	13.13% F	Pervio	age us Area											
	3,620		86.87% I	nperv	ious Are	ea										
Tc (min)	Length	Slop	e Veloci	y Ca	apacity (cfs)	Descri	ption									
6.0	(1001)	(101)	) (1000	<u>,                                     </u>	(010)	Direct	Entry,	Tc. Min								
											Proposed	d Condi	tions - 2	2,10,25,	100-Yea	ar Storms
1999 - F	Proposo	ed ter vou	r compar		ne here	<del></del>					Proposed	l Condi Type II	tions - 2 11 24-hr	2,10,25, - 2-Yea P	100-Yea ar Rainfa Printed 3	ar Storms all=3.27" 3/29/2023
<b>1999 - F</b> <sup>&gt;</sup> repared <u>HydroCAL</u>	Propose d by {en D® 10.00-	ed ter you 20 s/n (	r compar 14015 © 2	iy nar	ne here	e} ) Softwar	e Solutio	ons LLC			Proposec	d Condii Type II	tions - 2 11 24-hr	2,10,25, • 2-Yea P	100-Yea ar Rainfa Printed 3	ar Storms all=3.27" 3/29/2023 Page 8
<b>1999 - F</b> Prepared HydroCAE	<b>Propos</b> d by {en D® 10.00-	ed ter you 20 s/n (	r compar 14015 © 2	ny nar 017 Hy	ne hera /droCAE	e} ) Softwar	e Solutio	ons LLC	nd Flow to	Webstr	Proposed	l Condit Type II	tions - 2 1 24-hr	2,10,25, - 2-Yea P	100-Yea ar Rainfa Printed 3	ar Storms all=3.27" 3/29/2023 Page 8
<b>1999 - F</b> Prepareu <u>lydroCAL</u>	Propose d by {en D® 10.00-	ed ter you 20 s/n (	r compar 14015 © 2	ny nar 017 Hy	ne here /droCAD	e} 9 Softwar 9 <b>ttchme</b>	e Solution ent P2:	ons LLC Overlai	nd Flow to	Webste	Proposec pr Street	l Condit Type II	tions - 2 11 24-hr	2,10,25, - 2-Yea P	100-Yea ar Rainfa rinted 3	ar Storms all=3.27" 3/29/2023 Page 8
<b>1999 - F</b> Prepared JydroCAL	Proposi d by {en D® 10.00-	ed ter you 20 s/n (	r compar 14015 © 2	ny nar 017 Hy	ne here /droCAE <b>Subca</b>	e} 9 Softwar 1tchme	e Solutio ent P2: Hydro	ons LLC Overlar ograph	nd Flow to	Websto	Proposed Pr Street	d Condi Type II	tions - 2 11 24-hr	2,10,25, • 2-Yea P	100-Yea ar Rainfa Printed 3	ar Storms all=3.27" 3/29/2023 Page 8
<b>1999 - F</b> Prepareu <u>-lydroCAL</u>	Propos( d by {en D® 10.00-	ed ter you 20 s/n (	r compar 94015 © 2	iy nar 017 H	ne here /droCAE Subca	e} ) Softwar itchme	e Solutio ent P2: Hydro	ons LLC Overlar ograph	nd Flow to	Websto	Proposed er Street	d Condit Type II	tions - 2 Il 24-hr	2,10,25, - 2-Yea P	100-Yea ar Rainfa rinted 3	ar Storms all=3.27" 3/29/2023 Page 8 Runoff
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15 16 17

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Time (hours)

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lunoff	=	4.26 c	's@1	2.09 h	nrs, Vol	ume=	13	,421 c	rf, Dep	oth> 3.79	•							
≀unoff b `ype III	oy SCS TF 24-hr 10-	R-20 met -Year Ra	hod, Uł infall=4	1=SC8 .92"	S, Weigl	hted-CN	, Time S	pan= 5	5.00-20	).00 hrs, d	lt= 0.05	hrs						
A	Area (sf)	CN I	Descript	tion														
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1999 - Proposed
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Proposed Conditions - 2,10,25,100-Year Storms Type III 24-hr 10-Year Rainfall=4.92" Printed 3/29/2023 Page 16

#### Summary for Reach R2: Webster Street Stormwater System

 Inflow Area =
 4,167 sf, 86.87% Impervious, Inflow Depth > 4.09" for 10-Year event

 Inflow =
 0.44 cfs @
 12.09 hrs, Volume=
 1,419 cf

 Outflow =
 0.44 cfs @
 12.09 hrs, Volume=
 1,419 cf

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

#### Reach R2: Webster Street Stormwater System



ydroCAD® 1																		
			Summ	ary	for Sul	bcatch	men	t P1:	Overla	nd Flov	w to C	urtis F	Pond	BVW				
lunoff =	5.	52 cfs @	12.09	hrs,	Volume	=	17,	666 cf	f, Depth>	4.99"								
unoff by SC	CS TR-20 r_25-Yea	method, r Rainfall	UH=SC =6 22"	CS, W	eighted-	-CN, Tin	ne Sp	an= 5.	.00-20.00	) hrs, dt=	= 0.05 h	rs						
Area	(sf) CN	l Desc	ription															
18,9	990 98	B Pave	d parkin	ng, H	SG C													
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5,2 3,1	226 70 143 74	) vvood l >75%	is, Good Grass	a, HS cove	r, Good,	HSG C	;											
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10,1 32,3	126 357	23.84 76.16	% Pervi % Impe	ious erviou	Area Is Area													
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Proposed Conditions - 2,10,25,100-Year Storms Type III 24-hr 25-Year Rainfall=6.22"

Printed 3/29/2023

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Inflow Area	a =	42,483 sf, 76.16% Impervious, Inflow Depth > 4.99" for 25-Year ev	ent
Inflow	=	5.52 cfs @ 12.09 hrs, Volume= 17,666 cf	
Outflow	=	5.52 cfs @ 12.09 hrs, Volume= 17,666 cf, Atten= 0%, Lag= 0.0	) min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

#### Reach R1: Curtis Pond BVW



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Summary for Reach R2: Webster Street Stormwater System

 Inflow Area =
 4,167 sf, 86.87% Impervious, Inflow Depth > 5.29" for 25-Year event

 Inflow =
 0.56 cfs @
 12.09 hrs, Volume=
 1,835 cf

 Outflow =
 0.56 cfs @
 12.09 hrs, Volume=
 1,835 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach R2: Webster Street Stormwater System



		Summar	v for Subc	atchmont P	1. Overland	Flow to C	urtis Por	nd BVW		
Rupoff =	8 08 cfs @	12 09 brs		26 358	Cf Denth> 7					
Runoff by SCS	0.00 CIS @		Weighted-CN	20,330   Time Span=	= 5.00-20.00  br	.45 's dt=0.05 h	re			
Type III 24-hr 10	00-Year Rainfa	all=8.88"	Weighted-Or	, nine opan-	- 3.00-20.00 m	3, ut= 0.00 m	15			
<u>Area (sf)</u> 18 990	CN Desc 98 Pave	ription	HSG C							
* 1,200 * 12,167	98 Roof 98 Roof	(Small Bld (Main Bldd	g), HSG C							
5,226 3,143	70 Woo 74 >75%	ds, Good, H 6 Grass co	HSG C ver. Good. HS	SG C						
1,757	74 >75%	6 Grass co hted Avera	ver, Good, HS ide	SG C						
10,126 32,357	23.8 76.1	4% Perviou 6% Impervi	is Area ous Area							
Tc Length	n Slope Ve	elocity Ca	pacity Desc	ription						
(min) (feet) 6.0	) (ft/ft) (1	ft/sec)	(cfs) Direc	t Entry, Tc. M	Ain					
<b>1999 - Propos</b> Prepared by {e HydroCAD® 10.00	sed nter your con 0-20 s/n 04015	npany nam © 2017 Hy	ne here} droCAD Softwa	are Solutions LI	LC		Proposed <i>Typ</i>	Conditions - e III 24-hr	2,10,25, 100-Yea P	100-Year Storms ir <i>Rainfall=</i> 8.88" rinted 3/29/2023 Page 24
<b>1999 - Propos</b> Prepared by {e HydroCAD® 10.00	sed nter your con 0-20 s/n 04015	npany nam © 2017 Hy St	ne here} droCAD Softwa	are Solutions LI	LC rland Flow t	o Curtis P	Proposed Typ	Conditions - e III 24-hr	2,10,25, 100-Yea Pi	100-Year Storms <i>r Rainfall=</i> 8.88" rinted 3/29/2023 Page 24
<b>1999 - Propos</b> Prepared by {e HydroCAD® 10.00	sed nter your con 0-20 s/n 04015	npany nam © 2017 Hy St	ie here} droCAD Softwa ubcatchme	are Solutions LI nt P1: Over Hydrogra	LC rland Flow t	o Curtis Po	Proposed <i>Typ</i>	Conditions - e III 24-hr	2,10,25, 100-Yea Pi	100-Year Storms <i>r Rainfall=8.88"</i> rinted 3/29/2023 Page 24
<b>1999 - Propo</b> Prepared by {e HydroCAD® 10.00	sed nter your con 0-20 s/n 04015	npany nam © 2017 Hy St	ne here} droCAD Softwa	are Solutions LI nt P1: Over Hydrogra	LC rland Flow t	o Curtis Po	Proposed Typ	Conditions - e III 24-hr I	2,10,25, 100-Yea P	100-Year Storms ir Rainfall=8.88" rinted 3/29/2023 Page 24
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<b>1999 - Propo</b> : Prepared by {e <u>HydroCAD® 10.0</u> 9  8  6 	sed nter your con 0-20 s/n 04015	npany nam © 2017 Hy St	ne here} droCAD Softwa	are Solutions LI nt P1: Over Hydrogra 8.08 of	rland Flow t	o Curtis Po -Year Jnoff A	Proposed <i>Typ</i> ond BVW Type Rainf	Conditions - e III 24-hr e III 24 a III 24 a III 24 a III = 8.8 42,483	2,10,25, 100-Yea P -hr 38"	100-Year Storms or Rainfall=8.88" rinted 3/29/2023 Page 24 — Runoff
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				Juli	mar	, 101	Jubu				anu Pl	5.00		Jl				
unoff	=	0.81	cfs @	12.09	9 hrs,	Volur	ne=	2	2,684 cf	, Depth	> 7.73"							
unoff by ype III 2	y SCS TF 24-hr 100	R-20 m )-Year	ethod, Rainfal	UH=S I=8.88	6CS, W 8"	/eighte	ed-CN,	Time S	pan= 5	.00-20.0	0 hrs, dt	= 0.05 ł	rs					
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# SECTION 6.00 - STORMWATER MANGEMENT SYSTEM OPERATION AND MAINTENANCE PLAN



# OPERATION AND MAINTENANCE PLAN FOR WEBSTER STREET MILL RESIDENTIAL CONVERSION ASSESSOR REF. MBL 27-032-02+2A 70 WEBSTER STREET WORCESTER, MA

March 29, 2023

Prepared By: Level Design Group, L.L.C. 249 South Street, Unit 1 Plainville, MA 02762

Prepared For: Worcester Affordable Housing, llc. 6 Jacques Street Worcester, MA 01603

LDG Project No.: 1999.00



The proposed Stormwater Management System is designed to function properly provided that routine maintenance is performed. It is the responsibility during construction and until purchase of the units that the Owner and Developer, Gold Star Builders, Inc (or any other future Owner), shall be responsible for the long- term maintenance to provide the required maintenance outlined in this plan for the site infiltration system as well as the remainder of the on-site storm drainage system.

Upon completion of construction, maintenance of driveways, off-site catch basins, and the stormwater appurtenances are required to ensure that sedimentation and pollution is controlled. The system maintenance will be the responsibility of the developer / property owner. To ensure the proper functioning of these facilities the following maintenance practices will be used:

## **DRIVEWAYS & PARKING AREAS**

Driveways and Parking Areas are to be swept monthly to remove sand which has accumulated. Sand shall be removed from the site and legally disposed of. Leaves and debris which accumulates within the Driveways and Parking Areas during the summer and fall months shall be collected and legally disposed of.

### Winter Maintenance & Snow Removal

Snow removal within Driveways and Parking Area shall be stockpiled in the designated Snow Stockpile Areas outside of the traveled driveways. These areas should be located within or adjacent to the parking surface and should drain to the stormwater management system. Under no circumstances shall snow be directed onto abutting parcels or into the rain gardens.

Estimated Yearly Cost \$1,00.00 (not including cost for snow plowing)

## CATCH BASINS

Catch basins shall be inspected and cleaned four times per year or when the sumps are 50% full. This procedure is comprised of removing the catch basin grate followed by removal of sediment trapped in the structure with a clamshell shovel. The outlet pipe from the catch basin shall be inspected and any obstructions are to be removed. The sediment and debris removed from the catch basin shall be legally disposed of.

Catch basin grates shall be cleared of leaves and debris during the fall season so they may function properly during the winter and early spring.

Estimated Yearly Cost \$1,000.00



### **STORMWATER TREATMENT UNIT**

The Stormwater Treatment Units should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on-site activities than the size of the unit, i.e., unstable soils or heavy winter sanding will cause the treatment chamber to fill more quickly, but regular sweeping will slow accumulation.

#### **Inspection**

Inspection is the key to effective maintenance and is easily performed. Pollutant deposition and transport may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (i.e. spring and fall) however more frequent inspections may be necessary in equipment washdown areas and in climates where winter sanding operations may lead to rapid accumulations of a large volume of sediment. It is useful and often required as part of a permit to keep a record of each inspection. A simple inspection and maintenance log form for doing so is available for download at <u>www.ContechES.com/stormwater</u>

The Stormwater Treatment Units should be cleaned when the sediment has accumulated to a depth of two feet in the treatment chamber. This determination can be made by taking two measurements with a stadia rod or similar measuring device; one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the distance given in Table 2, the Stormwater Treatment Units should be maintained to ensure effective treatment.

### Cleaning

Cleaning of the Stormwater Treatment Units should be done during dry weather conditions when no flow is entering the system. Cleanout of the Stormwater Treatment Units with a vacuum truck is generally the most effective and convenient method of excavating pollutants from the system. Simply remove the manhole cover and insert the vacuum hose into the sump. All pollutants can be removed from this one access point from the surface with no requirements for Confined Space Entry. In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use adsorbent pads, which solidify the oils. These are usually much easier to remove from the unit individually, and less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Floating trash can be netted out if you wish to separate it from the other pollutants. Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure proper safety precautions. If anyone physically enters the unit, Confined Space Entry procedures need to be followed. Disposal of all material removed from the Stormwater Treatment Units should be done is accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal.



#### **PUBLIC SAFETY FEATURES**

Many of the Public Safety Features of the Stormwater Management System are incorporated into its design. The stormwater management features are located below the surface which provides a greater level of safety over surface basins.

Despite all the well-designed safety features within the Stormwater Management System all components of the system must be properly maintained to be effective. All maintenance procedures detailed above must be done on schedule and documented. Standing, stagnant water provides mosquito-breeding habitat and increases the potential for disease transmission. All stormwater systems. Routine monitoring for and management of mosquito-breeding conditions by qualified maintenance staff is required during the peak breading season between April and September ensure that unforeseen conditions do not develop.

While risks can be mitigated through proper design and maintenance, it is impossible to entirely eliminate risk. Therefore, public education regarding stormwater management facilities and their inherent risks is valuable and should be a part of every community's activity. Residents of the units shall be given an overview of the Stormwater System and which areas to avoid. Public participation also increases the level of maintenance as community members can notify staff if a component of the stormwater system is not functioning properly.

### **STORMWATER MANAGEMENT OPREATOIN AND MAINTENANCE LOG**



It is the responsibility of the developer / property owner to provide for maintenance of the parking areas and the storm drainage system. The log form below is a template and shall be reproduced as needed. Copies of all log forms shall be kept on file for a minimum of three years from the date of inspection.

### Name of Inspector:

### Date and Time of Inspection:

Weather Conditions:

Stormwater BMP	Observations	Action Required





# **SECTION 7.00 – LONG TERM POLLUTION PREVENTION PLAN**



# EVALUATION PREVENTION PLAN FOR WEBSTER STREET MILL RESIDENTIAL CONVERSION ASSESSOR REF. MBL 27-032-02+2A 70 WEBSTER STREET WORCESTER, MA

March 29, 2023

Prepared By: Level Design Group, L.L.C. 249 South Street, Unit 1 Plainville, MA 02762

Prepared For: Worcester Affordable Housing, LLC 6 Jacques Street Worcester, MA 01603

LDG Project No.: 1999.00



## GOOD HOUSEKEEPING PRACTICES

It is the responsibility of the site operator Worcester Affordable Housing, LLC, to provide the required maintenance outlined in this plan. The Owner shall utilize good housekeeping practices as outlined in the Operation and Maintenance Plan required for the maintenance of the Stormwater Management System.

### PROVISIONS FOR STORAGE OF MATERIALS AND WASTE PRODUCTS INSIDE OR UNDER COVER

The storage of hazardous materials and waste will not be allowed outdoors. All hazardous materials, such as waste oil, fuel, etc. shall be stored indoors and hauled by Massachusetts licensed haulers of the specified materials.

## VEHICLE WASHING CONTROLS

Outdoor vehicle washing is not allowed at this site.

### **REQUIREMENTS FOR ROUTINE INSPECTION AND MAINTENANCE OF STORMWATER BMPS**

The Owner / Operator shall keep Maintenance Log Sheets of scheduled tasks as outlined in the Stormwater Management System Operation and Maintenance Plan.

### SPILL PREVENTION AND RESPONSE PLANS

The risk of significant spills requiring action at this site is limited and will most likely be associated with motor vehicle use or maintenance. A Spill Prevention, Control, and Countermeasure (SPCC) Plan for the site covering all potential pollution sources form the sales and maintenance of large trucks. All personnel working with potentially hazardous materials shall be educated on the requirements of the site SPCC Plan In the event of a significant spill contact:

Massachusetts Department of Environmental Protection 24-hour emergency response notification line – (888) 304-1133

### PROVISIONS FOR MAINTENANCE OF LAWNS, GARDENS, AND OTHER LANDSCAPED AREAS

The use of chemical fertilizers is to be limited to the maximum extent practicable. If chemical fertilizers are to be used, the must be worked into the soil to prevent washouts and stormwater contamination of fertilizers.


#### **REQUIREMENTS FOR STORAGE AND USE OF FERTILIZERS, HERBICIDES, AND PESTICIDES**

If fertilizers, herbicides, and pesticides are to be used and stored on site they are to be stored in their original containers and keep in a dry, safe area where children do not have access to.

#### **PROVISIONS SOLID WASTE MANAGEMENT**

Solid waste management systems shall be inspected and maintained in accordance with state, local, and federal solid waste management regulations

## **EMERGENCY AND REGULATORY CONTACTS**

Worcester Fire Department:	911 / (508) 799-3473
Worcester Police Department:	911 / (508) 799-8466
Massachusetts Department of Environmental Protection - Southeast Regional Office:	(508) 946-2700
United State Environmental Protection Agency:	(617) 918-1111



# <u>SECTION 8.00 – CONSTRUCTION PERIOD POLLUTION PREVENTION AND</u> <u>EROSION & SEDIMENT CONTROL PLAN</u>

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# CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION & SEDIMENT CONTROL PLAN

FOR

WEBSTER STREET MILL RESIDENTIAL CONVERSION 70 WEBSTER STREET Worcester, Massachusetts

March 29, 2023

Prepared By: Level Design Group, L.L.C. 249 South Street, Unit 1 Plainville, MA 02762

Prepared For: Goldstar Builders, Inc. 6 Jacques Street Worcester, MA 01603

> LDG Project No.: 1999.00



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#### **INTRODUCTION**

This Construction Period Pollution Prevention and Erosion & Sediment Control Plan (CPPPESCP) is prepared in accordance Massachusetts Department of Environmental Protection (MADEP) Stormwater Guidelines. The construction activities include development of a 4-unit single family attached dwelling. Construction activities associated with the proposed building include the site grading, utilities and storm water management system. This CPPPESCP must be retained on-site during construction and available for the viewing of permitting authorities as appropriate during construction, as specified in the CPPPESCP.

The total area to be disturbed for overall site development includes approximately  $10,674\pm$  sf., including the new building, driveways, drainage, utilities, landscaping and associated grading.



# SECTION 1 – SITE & ACTIVITY DESCRIPTION

# 1.1 PROJECT SITE OPERATOR

Gold Star Builders, Inc. 6 Jaques Street Worcester, MA goldstarbuilder@gmail.com

#### 1.2 SITE AND PROJECT DESCRIPTION

#### **PRE-DEVELOPMENT CONDITIONS**

The development site is identified as Assessor Ref. MBL 27-032-02+2A and consists of a  $1.0\pm$  Ac. The site is bound by Webster Street to the east, an existing commercial parcel / mill building to the south, a National Grid parcel containing a transformer station to the north, and Curtis Pond to the west. The parcel is fully developed and contains an existing  $17,250\pm$ sf. footprint historic mill building with associated parking, loading, and utilities. There is no established on-site stormwater management system as all surface and rooftop runoff from 90% of the site draining west towards Curtis Pond with the remining area draining towards Webster Street

The parcel is located in an MG-2.0 Zoning District and is also within an Adaptive Reuse Overlay District. The on-site wetland and resource area boundary which consists of the bank of Curtis Pond was flagged by has been flagged by Goddard Consulting, LLC in February of 2022. An Order of Conditions (OOC) for MADEP File # 349-1354 was issued by the demolition of approximately 5,000±sf. of the existing structure by City of Worcester Conservation Commission in March of 2023.

The on-site soils within the area of the limits of the development are classified by the Worcester County Soil Survey, Northern Part:

- 1 Water
- 602 Urban Land

See the SCS soils documentation included herein for additional on-site soil details.

# **RE-DEVELOPMENT CONDITIONS**

The Applicant to redevelop the  $17,250\pm$ sf. mill building as residential apartments. As detailed above, a  $5,000\pm$ sf. single story section of the building will be demolished. The remaining existing three story  $9,640\pm$ sf. footprint will be redeveloped and an additional two story addition is proposed to be built on-top of the remaining  $2,524\pm$ sf single story footprint. The residential conversion will contain 8 two-bedroom units and 25 one-bedroom units. The building slab area of the demolished  $5,000\pm$ sf. single story structure will be converted into a parking area and the remaining existing



paved parking and loading area will be converted into a new residential parking lot. The residential parking lot will contain newly cutout directional island and landscaping.

Impervious coverage (building and pared parking) from the site will increase slight from  $35,896\pm$ sf to  $34,642\pm$ sf, a net increase of  $1,254\pm$ sf. This minor increase in pavement is mitigated by conversion of  $6,782\pm$ sf. of hard packed gravel currently used as additional parking area adjacent to Curtis Brook to cleaned and resorted landscaped area.

#### **1.3 CONSTRUCTION SEQUENCING**

- 1. install erosion and sediment controls;
- 2. demo site existing site features which are not included in the redevelopment;
- 3. construct building foundation;
- 4. install stormwater management system and other new site utilities;
- 7. construct retaining wall;
- 7. construct redeveloped parking area and install binder coat pavement;
- 8. Install site landscaping;
- 9. Fine grade site and loam and seed all remaining disturbed areas;
- 10. Install top coat pavement and pavement striping;
- 11. Project close out.

#### 1.4 ESTIMATED DISTURBANCE

The total area expected to be disturbed by excavation, grading, or other construction activities is approximately 0.70±Ac. The area includes required disturbance for building construction, utility installation, and site grading for the new parking areas and driveways.

#### 1.5 APPROVED STATE OR LOCAL PLANS

The project requires Approval from the City of Worcester Planning Board, Conservation Commission, and Historical Commission. This CPPPESCP will be modified accordingly once all approvals are obtained.



# **SECTION 2 – CONTROLS TO REDUCE POLLUTANTS**

## 2.1 POLLUTION CONTROL & STABILIZATION MEASURES

The area which will be disturbed during construction activities will hereafter be referred to as the 'Site'. Areas where no earthwork is proposed shall be protected from disturbance with construction fencing, or other physical demarcation in the field to prevent unnecessary disturbance. Once Site earthwork begins, it should progress without delay until disturbed areas are stabilized. Soil shall be stockpiled outside of the resource areas and their associated buffer zone and be surrounded by staked or ballasted hay bales. If the stockpile will not be disturbed for 30 days or more, temporary seeding shall be spread over it within 7 days of the last disturbance.

The scope of the proposed project renders permanent stabilization more practical than temporary measures. Disturbed areas not proposed to be paved or occupied by the building shall be loamed and seeded upon completion of the subgrade and any utility excavation. Diversion swales shall be installed around the perimeter of the site, if necessary, to collect stormwater runoff during construction. The swales, if necessary, are to be constructed during the "rough grading" phase of the site work. The diversion swales are to be constructed in a manner where they do not intercept ground water and shall discharge to the on-site settling dewatering basin.

Completion driveway and parking area improvement shall be followed immediately by the placement of the pavement binder course (finished paving may be delayed to prevent damage during other activities). Stabilization must be in place within 14 days of a temporary or permanent stop of construction activity, unless precluded by snow cover or if work is scheduled to restart within 21 days.

# 2.2 CONSTRUCTION RECORDS

A record of the dates of key site activities shall be kept on the note pages provided in Appendix A of this document. The record shall include the following:

- 1. Dates when the site is cleared and grubbed.
- 2. Dates when major grading activities occur.
- 3. Dates when construction activities temporarily or permanently cease on a portion of the site.
- 4. Dates when stabilization measures are initiated.

#### 2.3 STRUCTURAL PRACTICES

The erosion control plan details a 12" silt sock to be installed along the westerly edge of the parking area. The proposed outlet structure will contain a new rip-rap dispersion pad when each outlet is installed. The erosion control line is to be inspected by Level Design Group, LLC after installation and prior to site work commencing on site.



Installation of a silt-sac or similar sediment control devices are to be installed at all existing and proposed catch basins within the site and the Webster Street right-of-way, as shown on the attached Erosion Control Plan. The existing site is primarily paved and will remain paved during a majority of the site construction.

#### 2.4 STORM WATER MANAGEMENT

New curbing is proposed within the parking area to collect and treat stormwater runoff. Two new proposed catch basins are proposed within the parking area which connect to a CDS Stormwater Treatment Unit for additional TSS removal prior to discharge. A new on-site discharge from the treatment system is proposed along the bank of Curtis Pond in an area which will be regraded to provide a level discharge area new faired end section and rip-rap pad.

#### 2.5 DISCHARGE OF SOLID MATERIALS

A construction dumpster or other suitable receptacle shall be provided on-site for solid waste accumulation to preclude its entry into storm water systems.

Appropriate portable toilets shall be available at the site from the time when construction commences until the end of construction.

#### 2.6 SEDIMENT TRACKING AND DUST CONTROL

Trucks are expected to arrive and leave the site with construction materials. The exit is to be established to control both dust and the tracking of soils onto public ways. This area will remain paved and the entry on to Webster Street will be monitor and swept as required. If sediment accumulation is evident truck will be required to be rinsed off prior to exiting the site. Dust shall be controlled with limited amounts of water; calcium chloride shall not be utilized.

#### 2.7 CONSTRUCTION WASTE STORAGE

A construction dumpster will be available at all times on-site throughout the construction process. If the need to store construction waste arises during construction the Project Site Operator will notify the City of Worcester Building Inspector in writing as to what materials are to be stored and what controls will be put in place to minimize exposure of the materials to storm water.

#### 2.8 POLLUTANT SOURCES FROM NON-CONSTRUCTION AREAS

There are no anticipated pollutant sources from areas other than the proposed construction.



# 2.9 CONSTRUCTION DEWATERING

Construction dewatering is not anticipated to be necessary due to the limited amount of excavation work. If constructed dewatering is required a dewatering a temporary dewatering back such as a Dirt Bag will be provided onsite. The discharge from the bag shall be monitored and directed to an area on-site which provides the longest possible vegetated pathway towards Curtis Pond.



# **SECTION 3 – MAINTENANCE OF CONTROLS**

#### 3.1 STANDARD MAINTENANCE

The Erosion and Sedimentation Controls, Storm Water Management Controls and Other Controls implemented as part of the work should be expected to require maintenance. The installed compost silt sacs may also require maintenance after significant storms or inadvertent disturbance by construction equipment.

If any of the perimeter controls are displaced from its intended location they shall be replaced and re-set to maintain a continuous barrier. At the completion of the project, all adjacent off-site catch basins shall be inspected for sediment in the sumps, and the sediment shall be removed, if present.

The control of dust will require frequent maintenance efforts to dampen disturbed areas as they are exposed or dry out.

Portable toilets shall be maintained according to applicable local state and federal regulations, and the recommendations of the service employed for the maintenance.

Loamed and seeded areas may require periodic irrigation depending upon weather conditions during the several weeks after planting. The site shall not be considered stabilized until the seeded areas are well established.

#### 3.2 MODIFICATIONS OR ADDITIONAL BMPs

Any modifications to this CPPPESCP or additional required BMPs that appear to be necessary must be approved by the Design Engineer. Approved changes must be completed prior to the next storm event when practicable. If implementation before the next storm event is impracticable, the event must be recorded in the CPPPESCP and alternative BMPs must be implemented as soon as possible.



#### **SECTION 4 - INSPECTIONS**

Bi-weekly inspections, no more than 14 days apart, shall be performed on the pollution prevention controls, and the conditions of the site environs relating to erosion, dust, mud tracking, and materials storage. These inspections shall begin the first week of site construction and continue throughout the project until all areas are permanently stabilized, including seeded areas becoming well established. The EPA, MADEP and other state and local agencies may visit the site and ask to inspect these logs along with this CPPPESCP. Inspections are also required within 24 hours of a major storm event, producing a total rainfall greater than 0.5 inches. All inspection must be followed by a report made on the pages bound in Appendix A. This report is to be kept on the site.

Inspections are to be made by qualified personnel with a technical background in construction period pollution prevention.

Inspections shall include all of the specified Erosion and Sedimentation Controls, Storm Water Management Controls and Other Controls. The report shall describe the scope of the inspection, the name and qualifications of the person making the inspection and the date of the inspection. Notes shall be taken describing the condition of disturbed areas and areas recently stabilized to assess the adequacy of the controls and/or the success of the permanent stabilization measures. Comments shall be entered regarding any major rainfall events and the success or problems with the control measures. Records of repairs or improvements shall also be made.

Any problems identified during the inspection shall be rectified by maintaining or repairing the controls specified in this CPPPESCP. If the controls are in good repair, but failing to effectively control pollution, this CPPPESCP must be revised within seven days of an unsatisfactory inspection, and noted in the inspection report.



## **SECTION 5 - NON-STORM WATER DISCHARGES**

This CPPPESCP does not provide for the discharge of any flows other than storm water, with the exception of firefighting water, which is excluded from the regulations.

The proponent and contractor shall develop a spill management plan for and hazardous materials that may be stored on-site or employed during work in or around the buffer adjacent to the wetlands. Specifically, the proponent should be prepared to effectively deal with spillage of fuel or hydraulic fluids from equipment. A quick-absorbent material, such as Speedy Dry® or equivalent, will be stored in a dry readily available area, and used in the event petroleum-based fluids are spilled or leaked. The spent material is then to be containerized and disposed of properly. An emergency fuel boom or absorbent pads shall be readily available in case any such spill threatens the wetlands or surrounding waterways

No storage of hazardous materials shall take place within 50-feet of any installed and active drainage structure. If such storage takes place on a temporary basis, oil and sediment rolls shall be placed around such structure to prevent the movement of such materials into the structure.



# APPENDIX A

NOTE PAGES FOR PROJECT DOCUMENTATION

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