

**Evergreen Walk  
Tamarack Avenue  
South Windsor, Connecticut  
January 7, 2021**

**Stormwater Management Narrative**



Evergreen Walk, LLC proposes to construct a roadway connecting Unit 8 and Unit 3 at Evergreen Walk in South Windsor, Connecticut. The proposed project area is approximately 1.1 acres and is bounded by Evergreen Crossings Retirement Community to the north, West Access Drive and parking to the south, wetlands and parking to the east and wetlands to the west. A site location map is presented as *Figure 1*.

### Existing Conditions

The existing site consists of roadway, wetlands, an intermittent stream, and existing vegetation. Stormwater runoff is generated from an upstream area contributing to Buckland Road, existing adjacent vegetated area, and several building roof drains in Evergreen Walk. The project area contains moderate to severely sloping land.

Currently, stormwater runoff generated by the project area drains to the northwest towards the wetlands and intermittent stream at the center of the site. The upstream drainage area contributing from Buckland Road is discharged through one (1) 30" pipe and two (2) 36" pipes towards the wetlands and intermittent stream at the center of the site. In calculating existing peak flow runoff, these three (3) pipes were assumed to be flowing full. The roof drains in Evergreen Walk discharge towards the wetlands and intermittent stream at the center of the site. The wetlands and intermittent stream drain to the west out of the project area. Existing peak flow calculations for the 100-yr design storm leaving the site are included in *Appendix A*.

A summary of the existing peak flows to the design point are as follows:

<b>Buckland Existing Pipe Discharge:</b>	<b>CFS</b>
Existing 30" RCP	83.05
Existing 36" RCP	98.92
Existing 36" RCP	107.54
<b>Existing Site Runoff:</b>	
Sheet flow/roof drains to wetlands	24.03
<b>Total Flow:</b>	<b>313.54</b>

Federal Emergency Management Agency (FEMA) mapping shows that the site lies in an area outside the 500-year floodplain, "Zone X". A portion of relevant FEMA Flood Insurance Rate Maps (Panel Number 09003C0383F, Effective Date: 9/26/2008 is presented as *Figure 2*.

## Proposed Conditions

Proposed improvements include roadway construction, curbing, sidewalks, site lighting, traffic signage and markings, and stormwater management system. The proposed roadway will be constructed in fill over the existing wetlands and intermittent stream. A box culvert under the roadway is proposed to convey the upstream drainage area to the wetlands and intermittent stream to the west. Box culvert sizing calculations for the required design flow are included in *Appendix B*.

A summary of existing peak flow required as well as the box culvert capacity is shown below:

	CFS
<b>Existing Flow:</b>	313.54
<b>Box Culvert Capacity :</b>	358.03

The drainage pattern for the upstream drainage area will mimic existing conditions. Stormwater runoff from the southern portion of the roadway drains into a proposed catch basin before tying into the existing system to the south. Stormwater is treated in an existing stormwater quality structure before being discharged to an existing swale that conveys stormwater to the existing detention pond to the west. Stormwater runoff from the northern portion of the roadway drains into proposed catch basins before tying into the existing system to the north. Stormwater is treated in an existing stormwater quality structure before being discharged towards the wetlands and intermittent stream to the west.

## Summary

The box culvert under the roadway is designed to convey the existing conditions upstream drainage area peak stormwater flow. The stormwater runoff from the roadway is conveyed in a proposed system and connected into the existing system where it is treated prior to discharging to the west.

## Figures

- 1 Site Location Map
- 2 FEMA Flood Insurance Rate Map

## Appendices

- A Peak Flow Calculations
- B Proposed Box Culvert Calculation

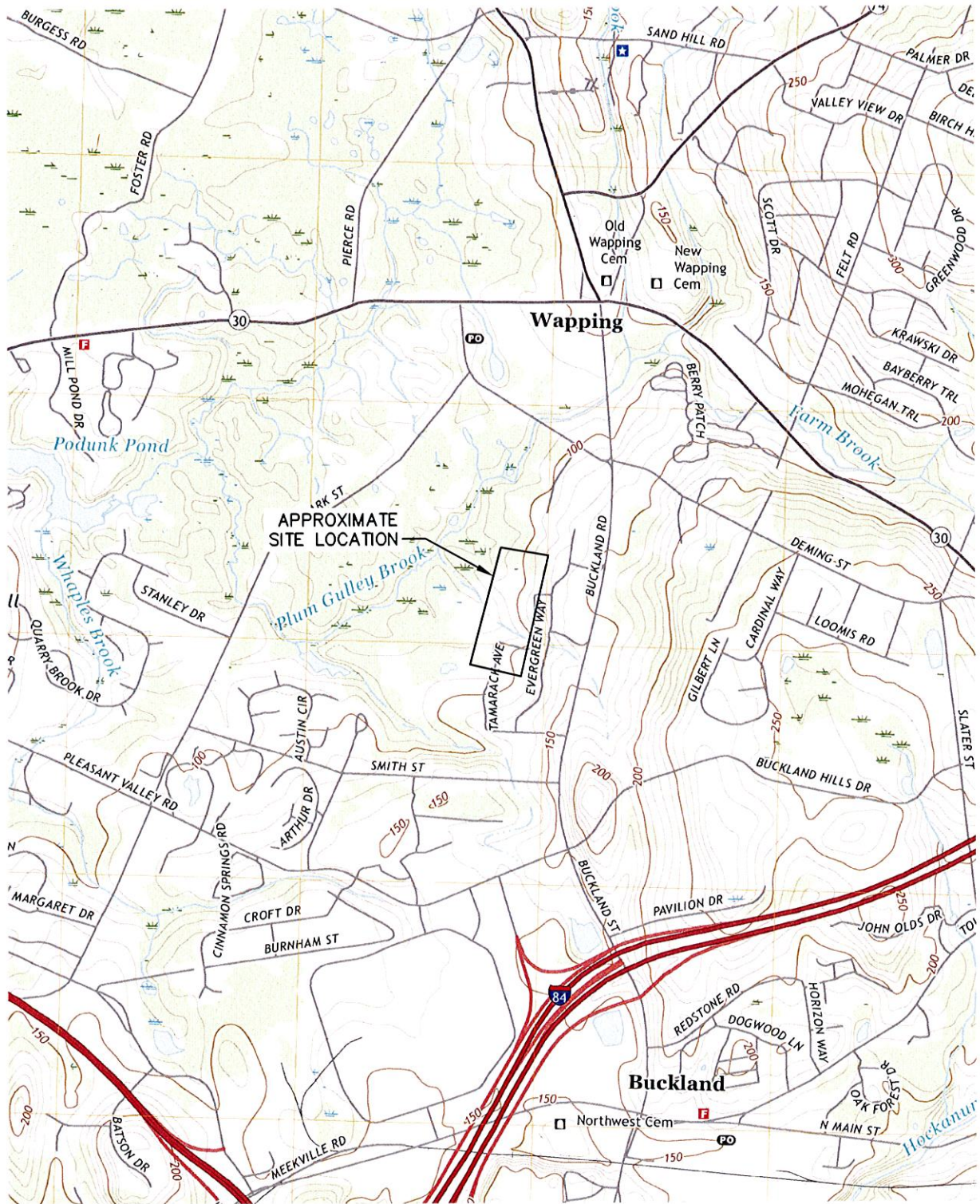
## **Figure 1**

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Site Location Map



File Path: J:\DWG\20200481\Y21\Civil\Plan\Tamarack Ave\20200481Y21\_LOC01.dwg Layout: Thu, November 12, 2020 - 1:55 PM User: jdeninger  
 Plotter: DWG TO PDF.PC3 CTB File: FO.STB  
 MS VIEW: LAYER STATE:



**MAP REFERENCE:**  
 THIS MAP WAS PREPARED FROM THE FOLLOWING 7.5 MINUTE SERIES TOPOGRAPHICAL MAP:  
 MANCHESTER, CONNECTICUT QUADRANGLE, 2018

SCALE:	
HORZ.: 1" = 2000'	
VERT.:	
DATUM:	
HORZ.:	
VERT.:	
0 1000 2000	
GRAPHIC SCALE	



**FUSS & O'NEILL**  
 146 HARTFORD ROAD  
 MANCHESTER, CONNECTICUT 06040  
 860.646.2469  
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EVERGREEN WALK, LLC

SITE LOCATION MAP

EVERGREEN WALK PLANNED COMMUNITY

SOUTH WINDSOR

CONNECTICUT

PROJ. No.: 2000481.Y21  
 DATE: 11/12/2020

**FIGURE 1**

## Figure 2

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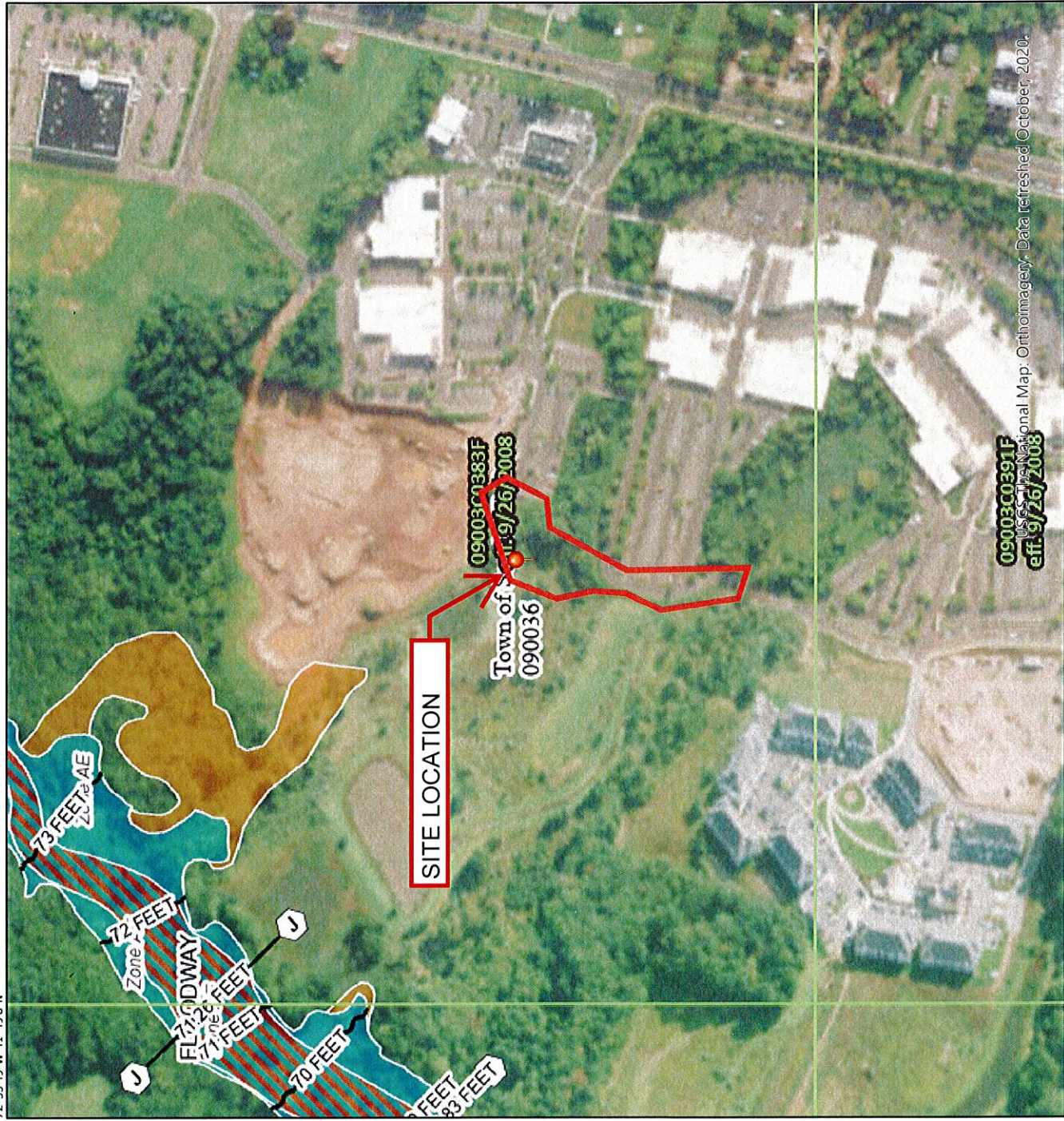
FEMA Flood Insurance Rate Map



# National Flood Hazard Layer FIRMette



72°33'49"W 41°49'6"N



0 250 500 1,000 1,500 2,000 Feet 1:6,000

72°33'11"W 41°48'39"N

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

<b>SPECIAL FLOOD HAZARD AREAS</b>	Without Base Flood Elevation (BFE) Zone A, V, A99
	With BFE or Depth Zone AE, AO, AH, VE, AR Regulatory Floodway
<b>OTHER AREAS OF FLOOD HAZARD</b>	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
	Area with Reduced Flood Risk due to Levee, See Notes, Zone X
	Area with Flood Risk due to Levee Zone D
<b>OTHER AREAS</b>	NO SCREEN Area of Minimal Flood Hazard Zone X
	Effective LOMRs Area of Undetermined Flood Hazard Zone D
<b>GENERAL STRUCTURES</b>	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
<b>OTHER FEATURES</b>	Cross Sections with 1% Annual Chance Water Surface Elevation Coastal Transect Base Flood Elevation Line (BFE) Limit of Study Jurisdiction Boundary Coastal Transect Baseline Profile Baseline Hydrographic Feature
<b>MAP PANELS</b>	Digital Data Available No Digital Data Available Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/12/2020 at 11:28 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



## **Appendix A**

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### Existing Peak Flow Calculations

## Existing 30"

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.041
Normal Depth	30.0
Diameter	30.0
Discharge	83.05
Results	
Discharge	83.05
Normal Depth	30.0
Flow Area	4.9
Wetted Perimeter	7.9
Hydraulic Radius	7.5
Top Width	0.00
Critical Depth	29.6
Percent Full	100.0
Critical Slope	0.037
Velocity	16.92
Velocity Head	4.45
Specific Energy	6.95
Froude Number	(N/A)
Maximum Discharge	89.34
Discharge Full	83.05
Slope Full	0.041
Flow Type	Undefined
GVF Input Data	
Downstream Depth	0.0
Length	0.0
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0
Profile Description	N/A
Profile Headloss	0.00
Average End Depth Over Rise	0.0
Normal Depth Over Rise	100.0
Downstream Velocity	Infinity
Upstream Velocity	Infinity
Normal Depth	30.0
Critical Depth	29.6
Channel Slope	0.041
Critical Slope	0.037

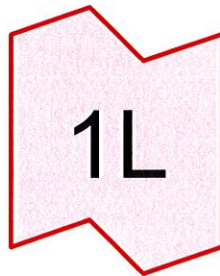


## Existing 36" (1)

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.022
Normal Depth	36.0
Diameter	36.0
Discharge	98.92
Results	
Discharge	98.92
Normal Depth	36.0
Flow Area	7.1
Wetted Perimeter	9.4
Hydraulic Radius	9.0
Top Width	0.00
Critical Depth	34.7
Percent Full	100.0
Critical Slope	0.019
Velocity	13.99
Velocity Head	3.04
Specific Energy	6.04
Froude Number	(N/A)
Maximum Discharge	106.41
Discharge Full	98.92
Slope Full	0.022
Flow Type	Undefined
GVF Input Data	
Downstream Depth	0.0
Length	0.0
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0
Profile Description	N/A
Profile Headloss	0.00
Average End Depth Over Rise	0.0
Normal Depth Over Rise	100.0
Downstream Velocity	Infinity
Upstream Velocity	Infinity
Normal Depth	36.0
Critical Depth	34.7
Channel Slope	0.022
Critical Slope	0.019

## Existing 36" (2)

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.026
Normal Depth	36.0
Diameter	36.0
Discharge	107.54
Results	
Discharge	107.54
Normal Depth	36.0
Flow Area	7.1
Wetted Perimeter	9.4
Hydraulic Radius	9.0
Top Width	0.00
Critical Depth	35.1
Percent Full	100.0
Critical Slope	0.023
Velocity	15.21
Velocity Head	3.60
Specific Energy	6.60
Froude Number	(N/A)
Maximum Discharge	115.68
Discharge Full	107.54
Slope Full	0.026
Flow Type	Undefined
GVF Input Data	
Downstream Depth	0.0
Length	0.0
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0
Profile Description	N/A
Profile Headloss	0.00
Average End Depth Over Rise	0.0
Normal Depth Over Rise	100.0
Downstream Velocity	Infinity
Upstream Velocity	Infinity
Normal Depth	36.0
Critical Depth	35.1
Channel Slope	0.026
Critical Slope	0.023



Tamarack Ave



Routing Diagram for 2000481.Y21

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**2000481.Y21**

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Page 2

**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
1.187	61	>75% Grass cover, Good, HSG B (1S)
1.538	74	>75% Grass cover, Good, HSG C (1S)
1.119	98	Roofs, HSG B (1S)
0.461	55	Woods, Good, HSG B (1S)
1.076	70	Woods, Good, HSG C (1S)
<b>5.381</b>	<b>74</b>	<b>TOTAL AREA</b>

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Page 3

**Soil Listing (all nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
2.767	HSG B	1S
2.614	HSG C	1S
0.000	HSG D	
0.000	Other	
<b>5.381</b>		<b>TOTAL AREA</b>

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Page 4

**Ground Covers (all nodes)**

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	1.187	1.538	0.000	0.000	2.726	>75% Grass cover, Good	1S
0.000	1.119	0.000	0.000	0.000	1.119	Roofs	1S
0.000	0.461	1.076	0.000	0.000	1.537	Woods, Good	1S
<b>0.000</b>	<b>2.767</b>	<b>2.614</b>	<b>0.000</b>	<b>0.000</b>	<b>5.381</b>	<b>TOTAL AREA</b>	



**2000481.Y21**

*Type III 24-hr 100-Year Rainfall=8.63"*

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Page 5

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S:**

Runoff Area=234,405 sf 20.80% Impervious Runoff Depth=5.49"

Flow Length=1,329' Tc=18.6 min CN=74 Runoff=24.03 cfs 2.463 af

**Link 1L: Tamarack Ave**

Inflow=24.03 cfs 2.463 af

Primary=24.03 cfs 2.463 af

**Total Runoff Area = 5.381 ac Runoff Volume = 2.463 af Average Runoff Depth = 5.49"**

**79.20% Pervious = 4.262 ac 20.80% Impervious = 1.119 ac**

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Type III 24-hr 100-Year Rainfall=8.63"

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Page 6

**Summary for Subcatchment 1S:**

Runoff = 24.03 cfs @ 12.25 hrs, Volume= 2.463 af, Depth= 5.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

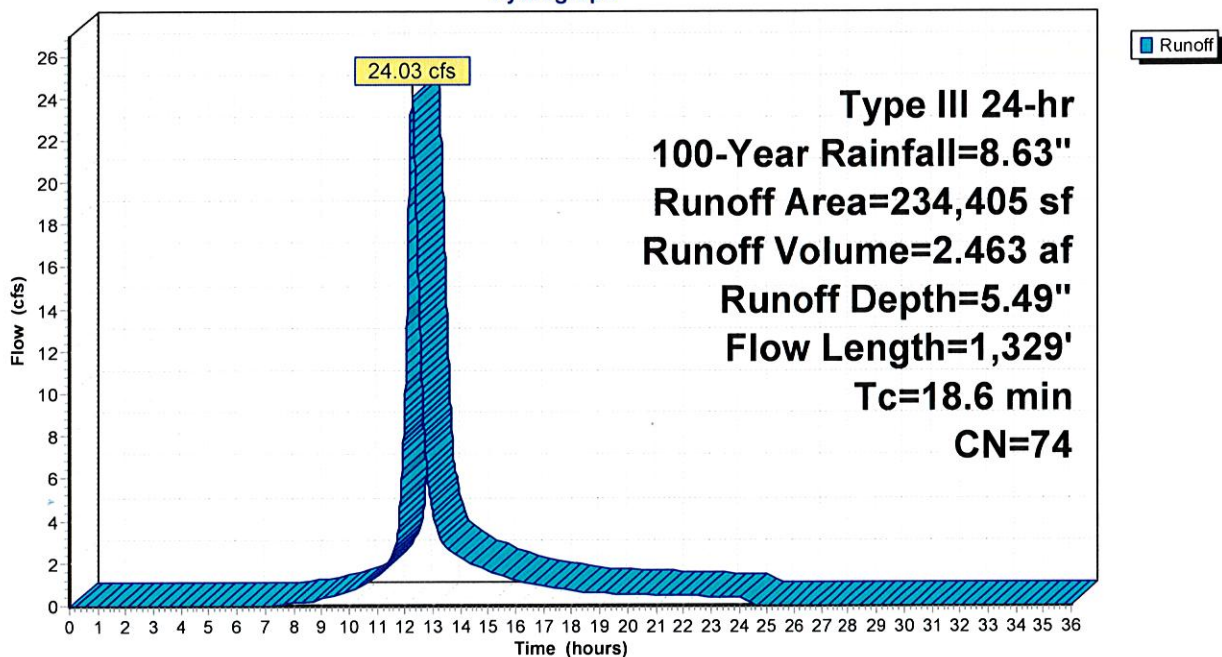
Type III 24-hr 100-Year Rainfall=8.63"

Area (sf)	CN	Description
51,727	61	>75% Grass cover, Good, HSG B
67,002	74	>75% Grass cover, Good, HSG C
20,077	55	Woods, Good, HSG B
46,854	70	Woods, Good, HSG C
48,745	98	Roofs, HSG B
234,405	74	Weighted Average
185,660		79.20% Pervious Area
48,745		20.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.0150	0.15		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.26"
1.3	105	0.0380	1.36		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
6.4	1,124	0.0380	2.92		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
18.6	1,329	Total			

**Subcatchment 1S:**

Hydrograph



2000481.Y21

Type III 24-hr 100-Year Rainfall=8.63"

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Page 7

### Summary for Link 1L: Tamarack Ave

Inflow Area = 5.381 ac, 20.80% Impervious, Inflow Depth = 5.49" for 100-Year event

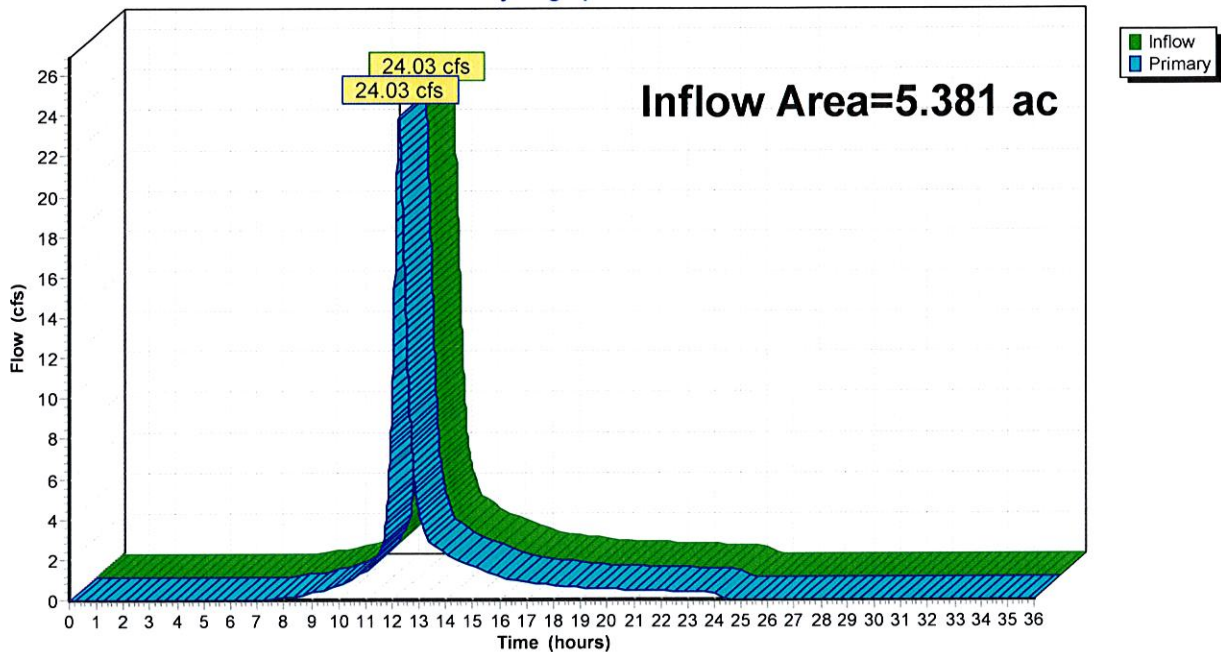
Inflow = 24.03 cfs @ 12.25 hrs, Volume= 2.463 af

Primary = 24.03 cfs @ 12.25 hrs, Volume= 2.463 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

### Link 1L: Tamarack Ave

Hydrograph







## **Appendix B**

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### Proposed Box Culvert Calculation

## Proposed Box Culvert

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity
Input Data	
Roughness Coefficient	0.030
Channel Slope	0.004
Normal Depth	72.0
Height	6.0
Bottom Width	12.00
Discharge	358.03
Results	
Flow Area	72.0
Wetted Perimeter	36.0
Hydraulic Radius	24.0
Top Width	12.00
Critical Depth	36.3
Percent Full	100.0
Critical Slope	0.016
Velocity	4.97
Velocity Head	0.38
Specific Energy	6.38
Froude Number	0.358
Discharge Full	358.03
Slope Full	0.004
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0
Length	0.0
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0
Profile Description	N/A
Profile Headloss	0.00
Average End Depth Over Rise	0.0
Normal Depth Over Rise	0.0
Downstream Velocity	0.00
Upstream Velocity	0.00
Normal Depth	72.0
Critical Depth	36.3
Channel Slope	0.004
Critical Slope	0.016