



March 18, 2025

344 North Main Street | Andover • MA 01810  
(978) 416-0920 | [www.civildci.com](http://www.civildci.com)

Alison Manugian  
Community Development Director  
62 Arlington Street  
Dracut, MA 01826

CDCI File #: 23-10524  
Murphy's Farm – Comprehensive Permit  
231 Wheeler Street (Map 22/ Lot 53)  
(Map 39 / Block 53 / Lots 1-23)  
Dracut, MA 01826

**Civil Design Consultants, Inc. (CDCI)**, is pleased to provide the following supplementary information with regards to the status of the depressions associated with certified vernal pools VP-4937, VP-4116, and VP-4117 as Isolated Land Subject to Flooding (ILSF). Per 310 CMR 10.57(2)(b)1., ILSF is defined as an isolated depression or closed basin without an inlet or outlet which at least once a year confines standing water to a volume of at least ¼ Acre-Feet (10,890-Cubic Feet) and to an average depth of at least 6 inches. In accordance with the Town of Dracut Stormwater Regulations, the Cornell one-year storm depth of 2.56 inches was used in the following calculations.

Elevations used in calculating the storage capacity of the depressions is per the topographic information in the project plan set. Stage data was entered in the calculations for every half-foot interval, up to the overflow of the depressions. No infiltration credit is taken for storage within the depressions. The contributing watershed for each vernal pool consists of 'A' soils in wooded conditions.

The results show that the depressions do not receive enough flow to store the requisite 0.25-Acre Feet (10,890-Cubic Feet), and therefore does not meet the jurisdictional requirements to be considered Isolated Land Subject to Flooding.

|                                              | Base Elevation(Ft) | Peak Elevation(Ft) | Stored Volume (CF) |
|----------------------------------------------|--------------------|--------------------|--------------------|
| Depression Associated with VP-4937           | 135.00             | 135.00             | 0                  |
| Depression Associated with VP-4116 & VP-4117 | 131.00             | 131.00             | 0                  |

Very Truly Yours,

**CIVIL DESIGN CONSULTANTS, INC.**

  
Thomas Schomburg, EIT,  
Project Engineer



# Extreme Precipitation Tables

## Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

### Metadata for Point

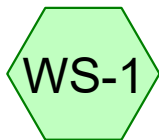
|           |                                                           |
|-----------|-----------------------------------------------------------|
| Smoothing | Yes                                                       |
| State     | Massachusetts                                             |
| Location  | Massachusetts, United States                              |
| Latitude  | 42.685 degrees North                                      |
| Longitude | 71.246 degrees West                                       |
| Elevation | 40 feet                                                   |
| Date/Time | Tue Mar 18 2025 11:04:25 GMT-0400 (Eastern Daylight Time) |

### Extreme Precipitation Estimates

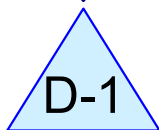
|       | 5min | 10min | 15min | 30min | 60min | 120min |       | 1hr  | 2hr  | 3hr  | 6hr  | 12hr  | 24hr  | 48hr  |       | 1day  | 2day  | 4day  | 7day  | 10day |       |
|-------|------|-------|-------|-------|-------|--------|-------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1yr   | 0.27 | 0.42  | 0.52  | 0.68  | 0.85  | 1.08   | 1yr   | 0.74 | 1.02 | 1.25 | 1.58 | 2.01  | 2.56  | 2.77  | 1yr   | 2.26  | 2.66  | 3.11  | 3.79  | 4.42  | 1yr   |
| 2yr   | 0.33 | 0.52  | 0.64  | 0.85  | 1.06  | 1.34   | 2yr   | 0.92 | 1.23 | 1.55 | 1.95 | 2.45  | 3.08  | 3.39  | 2yr   | 2.72  | 3.26  | 3.78  | 4.49  | 5.12  | 2yr   |
| 5yr   | 0.40 | 0.62  | 0.77  | 1.04  | 1.33  | 1.69   | 5yr   | 1.14 | 1.54 | 1.96 | 2.47 | 3.11  | 3.90  | 4.33  | 5yr   | 3.45  | 4.17  | 4.79  | 5.68  | 6.43  | 5yr   |
| 10yr  | 0.45 | 0.70  | 0.89  | 1.20  | 1.57  | 2.01   | 10yr  | 1.35 | 1.82 | 2.35 | 2.97 | 3.73  | 4.68  | 5.21  | 10yr  | 4.14  | 5.01  | 5.73  | 6.78  | 7.65  | 10yr  |
| 25yr  | 0.53 | 0.84  | 1.07  | 1.47  | 1.96  | 2.54   | 25yr  | 1.69 | 2.28 | 2.97 | 3.77 | 4.75  | 5.94  | 6.66  | 25yr  | 5.26  | 6.41  | 7.26  | 8.58  | 9.62  | 25yr  |
| 50yr  | 0.59 | 0.95  | 1.22  | 1.72  | 2.32  | 3.04   | 50yr  | 2.00 | 2.71 | 3.58 | 4.55 | 5.72  | 7.13  | 8.03  | 50yr  | 6.31  | 7.72  | 8.70  | 10.25 | 11.45 | 50yr  |
| 100yr | 0.68 | 1.11  | 1.43  | 2.02  | 2.75  | 3.62   | 100yr | 2.37 | 3.22 | 4.28 | 5.45 | 6.86  | 8.55  | 9.68  | 100yr | 7.57  | 9.31  | 10.42 | 12.25 | 13.63 | 100yr |
| 200yr | 0.78 | 1.27  | 1.64  | 2.36  | 3.26  | 4.33   | 200yr | 2.81 | 3.82 | 5.13 | 6.55 | 8.24  | 10.26 | 11.67 | 200yr | 9.08  | 11.22 | 12.48 | 14.65 | 16.24 | 200yr |
| 500yr | 0.93 | 1.54  | 2.01  | 2.91  | 4.08  | 5.48   | 500yr | 3.52 | 4.80 | 6.51 | 8.33 | 10.50 | 13.08 | 14.96 | 500yr | 11.57 | 14.38 | 15.86 | 18.57 | 20.47 | 500yr |

### Lower Confidence Limits

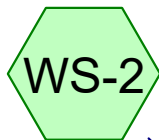
|       | 5min | 10min | 15min | 30min | 60min | 120min |       | 1hr  | 2hr  | 3hr  | 6hr  | 12hr | 24hr | 48hr  |       | 1day | 2day  | 4day  | 7day  | 10day |       |
|-------|------|-------|-------|-------|-------|--------|-------|------|------|------|------|------|------|-------|-------|------|-------|-------|-------|-------|-------|
| 1yr   | 0.24 | 0.37  | 0.45  | 0.60  | 0.74  | 0.85   | 1yr   | 0.64 | 0.83 | 1.12 | 1.36 | 1.69 | 2.38 | 2.57  | 1yr   | 2.11 | 2.47  | 2.78  | 3.29  | 4.07  | 1yr   |
| 2yr   | 0.32 | 0.49  | 0.61  | 0.82  | 1.01  | 1.21   | 2yr   | 0.87 | 1.18 | 1.39 | 1.83 | 2.34 | 3.00 | 3.31  | 2yr   | 2.65 | 3.18  | 3.69  | 4.39  | 5.00  | 2yr   |
| 5yr   | 0.37 | 0.57  | 0.71  | 0.97  | 1.23  | 1.45   | 5yr   | 1.06 | 1.42 | 1.65 | 2.14 | 2.73 | 3.66 | 4.06  | 5yr   | 3.24 | 3.90  | 4.50  | 5.33  | 6.07  | 5yr   |
| 10yr  | 0.41 | 0.63  | 0.78  | 1.09  | 1.40  | 1.65   | 10yr  | 1.21 | 1.61 | 1.87 | 2.41 | 3.06 | 4.26 | 4.71  | 10yr  | 3.77 | 4.53  | 5.22  | 6.15  | 7.01  | 10yr  |
| 25yr  | 0.47 | 0.71  | 0.89  | 1.26  | 1.66  | 1.94   | 25yr  | 1.44 | 1.90 | 2.21 | 2.82 | 3.56 | 5.19 | 5.73  | 25yr  | 4.60 | 5.51  | 6.35  | 7.46  | 8.46  | 25yr  |
| 50yr  | 0.51 | 0.78  | 0.98  | 1.40  | 1.89  | 2.21   | 50yr  | 1.63 | 2.16 | 2.51 | 3.19 | 4.01 | 6.03 | 6.64  | 50yr  | 5.33 | 6.38  | 7.38  | 8.63  | 9.74  | 50yr  |
| 100yr | 0.57 | 0.87  | 1.09  | 1.57  | 2.16  | 2.50   | 100yr | 1.86 | 2.45 | 2.84 | 3.61 | 4.50 | 6.89 | 7.70  | 100yr | 6.09 | 7.40  | 8.58  | 9.97  | 11.22 | 100yr |
| 200yr | 0.64 | 0.96  | 1.22  | 1.77  | 2.47  | 2.84   | 200yr | 2.13 | 2.78 | 3.22 | 4.08 | 5.08 | 7.98 | 8.93  | 200yr | 7.06 | 8.59  | 9.97  | 11.50 | 12.90 | 200yr |
| 500yr | 0.74 | 1.11  | 1.42  | 2.07  | 2.94  | 3.36   | 500yr | 2.54 | 3.29 | 3.80 | 4.82 | 5.97 | 9.65 | 10.87 | 500yr | 8.54 | 10.46 | 12.18 | 13.88 | 15.49 | 500yr |



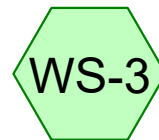
Watershed Contributing  
to VP-4937



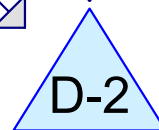
Depression Associated  
with VP-4937



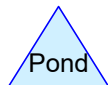
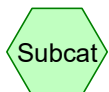
Watershed Contributing  
to VP-4116



Watershed Contributing  
to VP-4117



Depression Associated  
with VP-4116 and 4117



**Routing Diagram for 23-10524 - Pre - R2**

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**23-10524 - Pre - R2**

Prepared by Civil Design Consultants, Inc

Printed 3/18/2025

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**Area Listing (selected nodes)**

| Area<br>(acres) | CN | Description<br>(subcatchment-numbers) |
|-----------------|----|---------------------------------------|
| 2.34            | 30 | Woods, Good, HSG A (WS-1, WS-2, WS-3) |

**23-10524 - Pre - R2***Type III 24-hr 1-Yr Rainfall=2.56"*

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Time span=5.00-32.00 hrs, dt=0.05 hrs, 541 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**SubcatchmentWS-1: Watershed**

Runoff Area=0.21 ac 0.00% Impervious Runoff Depth=0.00"  
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.000 af

**SubcatchmentWS-2: Watershed**

Runoff Area=1.39 ac 0.00% Impervious Runoff Depth=0.00"  
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.000 af

**SubcatchmentWS-3: Watershed**

Runoff Area=0.74 ac 0.00% Impervious Runoff Depth=0.00"  
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.000 af

**Pond D-1: DepressionAssociatedwith VP-4937** Peak Elev=135.00' Storage=0 cf Inflow=0.00 cfs 0.000 af  
Outflow=0.00 cfs 0.000 af

**Pond D-2: DepressionAssociatedwith VP-4116** Peak Elev=131.00' Storage=0 cf Inflow=0.00 cfs 0.000 af  
Outflow=0.00 cfs 0.000 af

**Summary for Subcatchment WS-1: Watershed Contributing to VP-4937**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Routed to Pond D-1 : Depression Associated with VP-4937

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs  
Type III 24-hr 1-Yr Rainfall=2.56"

| Area (ac) | CN | Description           |
|-----------|----|-----------------------|
| 0.21      | 30 | Woods, Good, HSG A    |
| 0.21      |    | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 6.0      |               |               |                   |                | Direct Entry, |

**Summary for Subcatchment WS-2: Watershed Contributing to VP-4116**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Routed to Pond D-2 : Depression Associated with VP-4116 and 4117

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs  
Type III 24-hr 1-Yr Rainfall=2.56"

| Area (ac) | CN | Description           |
|-----------|----|-----------------------|
| 1.39      | 30 | Woods, Good, HSG A    |
| 1.39      |    | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 6.0      |               |               |                   |                | Direct Entry, |

**Summary for Subcatchment WS-3: Watershed Contributing to VP-4117**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Routed to Pond D-2 : Depression Associated with VP-4116 and 4117

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs  
Type III 24-hr 1-Yr Rainfall=2.56"

| Area (ac) | CN | Description           |
|-----------|----|-----------------------|
| 0.74      | 30 | Woods, Good, HSG A    |
| 0.74      |    | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 6.0      |               |               |                   |                | Direct Entry, |

**Summary for Pond D-1: Depression Associated with VP-4937**

Inflow Area = 0.21 ac, 0.00% Impervious, Inflow Depth = 0.00" for 1-Yr event  
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs  
**Peak Elev= 135.00' @ 5.00 hrs Surf.Area= 332 sf Storage= 0 cf**

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no inflow)

| Volume              | Invert               | Avail.Storage             | Storage Description                                        |
|---------------------|----------------------|---------------------------|------------------------------------------------------------|
| #1                  | 135.00'              | 809 cf                    | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet)                                  |
| 135.00              | 332                  | 0                         | 0                                                          |
| 135.50              | 460                  | 198                       | 198                                                        |
| 136.00              | 612                  | 268                       | 466                                                        |
| 136.50              | 758                  | 343                       | 809                                                        |

**Summary for Pond D-2: Depression Associated with VP-4116 and 4117**

Inflow Area = 2.13 ac, 0.00% Impervious, Inflow Depth = 0.00" for 1-Yr event  
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs  
**Peak Elev= 131.00' @ 5.00 hrs Surf.Area= 2,106 sf Storage= 0 cf**

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no inflow)

| Volume              | Invert               | Avail.Storage             | Storage Description                                        |
|---------------------|----------------------|---------------------------|------------------------------------------------------------|
| #1                  | 131.00'              | 40,619 cf                 | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet)                                  |
| 131.00              | 2,106                | 0                         | 0                                                          |
| 131.50              | 2,588                | 1,174                     | 1,174                                                      |
| 132.00              | 3,441                | 1,507                     | 2,681                                                      |
| 132.50              | 3,914                | 1,839                     | 4,520                                                      |
| 133.00              | 7,336                | 2,813                     | 7,332                                                      |
| 133.50              | 9,762                | 4,275                     | 11,607                                                     |
| 134.00              | 12,513               | 5,569                     | 17,175                                                     |
| 134.50              | 14,441               | 6,739                     | 23,914                                                     |
| 135.00              | 16,225               | 7,667                     | 31,580                                                     |
| 135.50              | 19,931               | 9,039                     | 40,619                                                     |

