

**Hydrologic & Hydraulic Narrative**  
**To analyze the impact of the Residential Subdivision of**  
**Lots 37 & 38, Block 1303**  
**Located in**  
**The Village of South Orange Township, Essex County, New Jersey**  
**December 10, 2020**



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**Synopsis of Calculations:**

This narrative is provided in response to item #9 in the November 24, 2020 review letter by the Village of South Orange Township Planning Board's Engineer, Eric Keller. The project calls for the subdivision of this property and the replacement of the existing single family dwelling with two new single family homes. Each of the proposed lots will be equipped with an on-site drywell. The design parameters and assumptions are as follows:

1. Each drywell is designed to store 3" of runoff over the proposed rooftop area on the lot. (Note that there will actually be no increase in proposed impervious surfaces, because the large existing dwelling and parking area will be removed. Therefore, the drywells will even more to reduce any increase in runoff.)
2. Based on conversations with the board engineer's office, the drywells have been moved to the flat area in the front yard of each lot and both will overflow into the existing drainage system in North Ridgewood Road.
3. The NRCS web soil survey indicates that both drywells will be installed within soils designated as DunB (Dunellen sandy loam, 3-8% slopes). This soil is described as having a depth to water table of more than 80" and the layer from 42" to 70" deep is classified as "loamy sand". According to the soil textural triangle, loamy sand has a permeability of K-4 or 6-20 inches per hour. Using the midpoint of this range (i.e. 13 inches per hour) and dividing by 2 to account for siltation over time yields a final permeability value of 6.5 inches per hour. Therefore the exfiltration rate through the bottom of the drywell is  $22' \times 14' \times 6.5 \text{ in/hr} \times 1/12 \times 1/3600 = 0.046 \text{ CFS}$ .
4. The drywells are designed to have a maximum depth of 56" (which is 24" above the presumed groundwater depth of 80").

**Methodology & Assumptions:**

The following methodology & assumptions are employed in this analysis:

1. The runoff is calculated using the Rational Method. Because there is actually a decrease in the amount of impervious surfaces, only the proposed rooftop areas are considered in this analysis. Furthermore, a c value of 0.99 (for impervious) is used in both existing & proposed conditions. This is not a standard approach but it is applicable to the present case because of the proposed overall decrease in impervious surfaces. The results simply show the proposed reduction in flows from the rooftop areas caused by the drywells.
2. Due to the short reach lengths involved, a minimum Tc of 10 minutes is assumed in all cases.
3. Only the 100 year storms is analyzed because the outflow from the drywell during even this storm is so low. A variety of storm durations are analyzed to determine the critical storm duration that causes the most storage within the drywell. Only this critical storm is included in the appendix.
4. All hydrographs are calculated using the "Hydrology Studio" software package.

5. The geometry and sizing calculations for the drywells are shown on Sheet 4 of the Minor Subdivision Development Plans prepared by this office. (The drywells are also designed to store 3" of runoff over the rooftop areas).

**Summary:**

| Lot 37 Existing 100<br>Year Peak Q (CFS) | Lot 37 Proposed 100<br>Year Peak Q (CFS) | Lot 38 Existing 100<br>Year Peak Q (CFS) | Lot 38 Proposed 100<br>Year Peak Q (CFS) |
|------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|
| 0.297                                    | 0                                        | 0.310                                    | 0.086                                    |

In the table above, "Lot 37" and "Lot 38" actually refer to the proposed roof areas on those lots. This table shows that the drywells will significantly reduce the peak flow from each of these areas.

# Hydrograph 100-yr Summary

Project Name:

Hydrology Studio v 3.0.0.16

12-10-2020

| Hyd. No. | Hydrograph Type | Hydrograph Name | Peak Flow (cfs) | Time to Peak (hrs) | Hydrograph Volume (cuft) | Inflow Hyd(s) | Maximum Elevation (ft) | Maximum Storage (cuft) |
|----------|-----------------|-----------------|-----------------|--------------------|--------------------------|---------------|------------------------|------------------------|
| 1        | Rational        | Lot 37          | 0.297           | 0.17               | 223                      | ----          |                        |                        |
| 2        | Pond Route      | Lot 37 Routing  | 0.000           | 0.00               | 0.000                    | 1             | 99.69                  | 223                    |
| 3        | Rational        | 20 Lot 37       | 0.215           | 0.33               | 323                      | ----          |                        |                        |
| 4        | Pond Route      | 20 Lot 37       | 0.000           | 0.00               | 0.000                    | 3             | 100.44                 | 323                    |
| 5        | Rational        | 30 Lot 37       | 0.177           | 0.50               | 398                      | ----          |                        |                        |
| 6        | Pond Route      | 30 Lot 37       | 0.000           | 0.00               | 0.000                    | 5             | 100.74                 | 398                    |
| 7        | Rational        | 40 Lot 37       | 0.153           | 0.67               | 460                      | ----          |                        |                        |
| 8        | Pond Route      | 40 Lot 37       | 0.000           | 0.00               | 0.000                    | 7             | 100.71                 | 460                    |
| 9        | Rational        | 50 Lot 37       | 0.137           | 0.83               | 514                      | ----          |                        |                        |
| 10       | Pond Route      | 50 Lot 37       | 0.000           | 0.00               | 0.000                    | 9             | 100.75                 | 514                    |
| 11       | Rational        | 60 Lot 37       | 0.114           | 1.00               | 512                      | ----          |                        |                        |
| 12       | Pond Route      | 60 Lot 37       | 0.000           | 0.00               | 0.000                    | 11            | 100.72                 | 512                    |
| 13       | Rational        | Lot 38          | 0.310           | 0.17               | 233                      | ----          |                        |                        |
| 14       | Pond Route      | Lot 38 Routing  | 0.000           | 0.00               | 0.000                    | 13            | 93.76                  | 233                    |
| 15       | Rational        | 20 Lot 38       | 0.245           | 0.33               | 367                      | ----          |                        |                        |
| 16       | Pond Route      | 20 Lot 38       | 0.000           | 0.00               | 0.000                    | 15            | 94.78                  | 367                    |
| 17       | Rational        | 30 Lot 38       | 0.185           | 0.50               | 416                      | ----          |                        |                        |
| 18       | Pond Route      | 30 Lot 38       | 0.000           | 0.00               | 0.000                    | 17            | 100.72                 | 416                    |
| 19       | Rational        | 40 Lot 38       | 0.160           | 0.67               | 481                      | ----          |                        |                        |
| 20       | Pond Route      | 40 Lot 38       | 0.071           | 1.22               | 104                      | 19            | 95.01                  | 398                    |
| 21       | Rational        | 50 Lot 38       | 0.143           | 0.83               | 537                      | ----          |                        |                        |
| 22       | Pond Route      | 50 Lot 38       | 0.081           | 1.37               | 161                      | 21            | 95.03                  | 399                    |
| 23       | Rational        | 60 Lot 38       | 0.131           | 1.00               | 588                      | ----          |                        |                        |
| 24       | Pond Route      | 60 Lot 38       | 0.085           | 1.53               | 212                      | 23            | 95.03                  | 400                    |
| 25       | Rational        | 70 Lot 38       | 0.121           | 1.17               | 635                      | ----          |                        |                        |
| 26       | Pond Route      | 70 Lot 38       | 0.086           | 1.68               | 258                      | 25            | 95.03                  | 400                    |
| 27       | Rational        | 80 Lot 38       | 0.113           | 1.33               | 678                      | ----          |                        |                        |
| 28       | Pond Route      | 80 Lot 38       | 0.085           | 1.82               | 301                      | 27            | 95.03                  | 400                    |

# Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

12-10-2020

**Lot 37**

**Hyd. No. 1**

|                    |              |                      |              |
|--------------------|--------------|----------------------|--------------|
| Hydrograph Type    | = Rational   | Peak Flow            | = 0.297 cfs  |
| Storm Frequency    | = 100-yr     | Time to Peak         | = 0.17 hrs   |
| Time Interval      | = 1 min      | Runoff Volume        | = 223 cuft   |
| Drainage Area      | = 0.044 ac   | Runoff Coeff.        | = 0.98       |
| Tc Method          | = User       | Time of Conc. (Tc)   | = 10.0 min   |
| IDF Curve          | = NJRSIS.idf | Intensity            | = 6.88 in/hr |
| Freq. Corr. Factor | = 1.00       | Asc/Rec Limb Factors | = 1/1.5      |

**Hydrograph Discharge Table**

| Time (min) | Outflow (cfs) | Time (min) | Outflow (cfs) | Time (min) | Outflow (cfs) | Time (min) | Outflow (cfs) | Time (min) | Outflow (cfs) |
|------------|---------------|------------|---------------|------------|---------------|------------|---------------|------------|---------------|
| 1          | 0.030         | ...end     | ...end        |            |               |            |               |            |               |
| 2          | 0.059         |            |               |            |               |            |               |            |               |
| 3          | 0.089         |            |               |            |               |            |               |            |               |
| 4          | 0.119         |            |               |            |               |            |               |            |               |
| 5          | 0.148         |            |               |            |               |            |               |            |               |
| 6          | 0.178         |            |               |            |               |            |               |            |               |
| 7          | 0.208         |            |               |            |               |            |               |            |               |
| 8          | 0.237         |            |               |            |               |            |               |            |               |
| 9          | 0.267         |            |               |            |               |            |               |            |               |
| 10         | 0.297         |            |               |            |               |            |               |            |               |
| 11         | 0.277         |            |               |            |               |            |               |            |               |
| 12         | 0.257         |            |               |            |               |            |               |            |               |
| 13         | 0.237         |            |               |            |               |            |               |            |               |
| 14         | 0.218         |            |               |            |               |            |               |            |               |
| 15         | 0.198         |            |               |            |               |            |               |            |               |
| 16         | 0.178         |            |               |            |               |            |               |            |               |
| 17         | 0.158         |            |               |            |               |            |               |            |               |
| 18         | 0.139         |            |               |            |               |            |               |            |               |
| 19         | 0.119         |            |               |            |               |            |               |            |               |
| 20         | 0.099         |            |               |            |               |            |               |            |               |
| 21         | 0.079         |            |               |            |               |            |               |            |               |
| 22         | 0.059         |            |               |            |               |            |               |            |               |
| 23         | 0.040         |            |               |            |               |            |               |            |               |
| 24         | 0.020         |            |               |            |               |            |               |            |               |
| 25         | 0.000         |            |               |            |               |            |               |            |               |

Printed values > 1% of Qpeak. nth-point print interval = 1

# Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

12-10-2020

**40 Lot 37**

Hyd. No. 8

|                   |                  |                   |              |
|-------------------|------------------|-------------------|--------------|
| Hydrograph Type   | = Pond Route     | Peak Flow         | = 0.000 cfs  |
| Storm Frequency   | = 100-yr         | Time to Peak      | = 0.00 hrs   |
| Time Interval     | = 1 min          | Hydrograph Volume | = 0.000 cuft |
| Inflow Hydrograph | = 7 - 40 Lot 37  | Max. Elevation    | = 100.71 ft  |
| Pond Name         | = Lot 37 Drywell | Max. Storage      | = 460 cuft   |

### Pond Routing by Storage Indication Method

### Hydrograph Discharge Table

| Time<br>(hrs) | Outflow<br>(cfs) | Time<br>(hrs) | Outflow<br>(cfs) | Time<br>(hrs) | Outflow<br>(cfs) | Time<br>(hrs) | Outflow<br>(cfs) | Time<br>(hrs) | Outflow<br>(cfs) |
|---------------|------------------|---------------|------------------|---------------|------------------|---------------|------------------|---------------|------------------|
| 0.02          | 0.000            |               |                  |               |                  |               |                  |               |                  |
| ...end        | ...end           |               |                  |               |                  |               |                  |               |                  |

Printed values > 1% of Qpeak. nth-point print interval = 1

# Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

12-10-2020

**50 Lot 37**

**Hyd. No. 9**

|                    |              |                      |              |
|--------------------|--------------|----------------------|--------------|
| Hydrograph Type    | = Rational   | Peak Flow            | = 0.137 cfs  |
| Storm Frequency    | = 100-yr     | Time to Peak         | = 0.83 hrs   |
| Time Interval      | = 1 min      | Runoff Volume        | = 514 cuft   |
| Drainage Area      | = 0.044 ac   | Runoff Coeff.        | = 0.98       |
| Tc Method          | = User       | Time of Conc. (Tc)   | = 50.0 min   |
| IDF Curve          | = NJRSIS.idf | Intensity            | = 3.18 in/hr |
| Freq. Corr. Factor | = 1.00       | Asc/Rec Limb Factors | = 1/1.5      |

**Hydrograph Discharge Table**

| Time (hrs) | Outflow (cfs) | Time (hrs)  | Outflow (cfs) | Time (hrs) | Outflow (cfs) | Time (hrs) | Outflow (cfs) | Time (hrs) | Outflow (cfs) |
|------------|---------------|-------------|---------------|------------|---------------|------------|---------------|------------|---------------|
| 0.02       | 0.003         | 0.43        | 0.071         | 0.85       | 0.135         | 1.27       | 0.090         | 1.68       | 0.044         |
| 0.03       | 0.005         | 0.45        | 0.074         | 0.87       | 0.133         | 1.28       | 0.088         | 1.70       | 0.042         |
| 0.05       | 0.008         | 0.47        | 0.077         | 0.88       | 0.132         | 1.30       | 0.086         | 1.72       | 0.040         |
| 0.07       | 0.011         | 0.48        | 0.080         | 0.90       | 0.130         | 1.32       | 0.084         | 1.73       | 0.038         |
| 0.08       | 0.014         | 0.50        | 0.082         | 0.92       | 0.128         | 1.33       | 0.082         | 1.75       | 0.037         |
| 0.10       | 0.016         | 0.52        | 0.085         | 0.93       | 0.126         | 1.35       | 0.080         | 1.77       | 0.035         |
| 0.12       | 0.019         | 0.53        | 0.088         | 0.95       | 0.124         | 1.37       | 0.079         | 1.78       | 0.033         |
| 0.13       | 0.022         | 0.55        | 0.090         | 0.97       | 0.122         | 1.38       | 0.077         | 1.80       | 0.031         |
| 0.15       | 0.025         | 0.57        | 0.093         | 0.98       | 0.121         | 1.40       | 0.075         | 1.82       | 0.029         |
| 0.17       | 0.027         | 0.58        | 0.096         | 1.00       | 0.119         | 1.42       | 0.073         | 1.83       | 0.027         |
| 0.18       | 0.030         | 0.60        | 0.099         | 1.02       | 0.117         | 1.43       | 0.071         | 1.85       | 0.026         |
| 0.20       | 0.033         | 0.62        | 0.101         | 1.03       | 0.115         | 1.45       | 0.069         | 1.87       | 0.024         |
| 0.22       | 0.036         | 0.63        | 0.104         | 1.05       | 0.113         | 1.47       | 0.068         | 1.88       | 0.022         |
| 0.23       | 0.038         | 0.65        | 0.107         | 1.07       | 0.112         | 1.48       | 0.066         | 1.90       | 0.020         |
| 0.25       | 0.041         | 0.67        | 0.110         | 1.08       | 0.110         | 1.50       | 0.064         | 1.92       | 0.018         |
| 0.27       | 0.044         | 0.68        | 0.112         | 1.10       | 0.108         | 1.52       | 0.062         | 1.93       | 0.016         |
| 0.28       | 0.047         | 0.70        | 0.115         | 1.12       | 0.106         | 1.53       | 0.060         | 1.95       | 0.015         |
| 0.30       | 0.049         | 0.72        | 0.118         | 1.13       | 0.104         | 1.55       | 0.058         | 1.97       | 0.013         |
| 0.32       | 0.052         | 0.73        | 0.121         | 1.15       | 0.102         | 1.57       | 0.057         | 1.98       | 0.011         |
| 0.33       | 0.055         | 0.75        | 0.123         | 1.17       | 0.101         | 1.58       | 0.055         | 2.00       | 0.009         |
| 0.35       | 0.058         | 0.77        | 0.126         | 1.18       | 0.099         | 1.60       | 0.053         | 2.02       | 0.007         |
| 0.37       | 0.060         | 0.78        | 0.129         | 1.20       | 0.097         | 1.62       | 0.051         | 2.03       | 0.005         |
| 0.38       | 0.063         | 0.80        | 0.132         | 1.22       | 0.095         | 1.63       | 0.049         | 2.05       | 0.004         |
| 0.40       | 0.066         | 0.82        | 0.134         | 1.23       | 0.093         | 1.65       | 0.048         | 2.07       | 0.002         |
| 0.42       | 0.069         | <b>0.83</b> | <b>0.137</b>  | 1.25       | 0.091         | 1.67       | 0.046         | 2.08       | 0.000         |

Printed values > 1% of Qpeak. nth-point print interval = 1

# Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

12-10-2020

**70 Lot 38**

**Hyd. No. 25**

|                    |              |                      |              |
|--------------------|--------------|----------------------|--------------|
| Hydrograph Type    | = Rational   | Peak Flow            | = 0.121 cfs  |
| Storm Frequency    | = 100-yr     | Time to Peak         | = 1.17 hrs   |
| Time Interval      | = 1 min      | Runoff Volume        | = 635 cuft   |
| Drainage Area      | = 0.046 ac   | Runoff Coeff.        | = 0.98       |
| Tc Method          | = User       | Time of Conc. (Tc)   | = 70.0 min   |
| IDF Curve          | = NJRSIS.idf | Intensity            | = 2.68 in/hr |
| Freq. Corr. Factor | = 1.00       | Asc/Rec Limb Factors | = 1/1.5      |

**Hydrograph Discharge Table**

| Time (hrs) | Outflow (cfs) | Time (hrs) | Outflow (cfs) | Time (hrs)  | Outflow (cfs) | Time (hrs) | Outflow (cfs) | Time (hrs) | Outflow (cfs) |
|------------|---------------|------------|---------------|-------------|---------------|------------|---------------|------------|---------------|
| 0.02       | 0.002         | 0.43       | 0.045         | 0.85        | 0.088         | 1.27       | 0.114         | 1.68       | 0.085         |
| 0.03       | 0.003         | 0.45       | 0.047         | 0.87        | 0.090         | 1.28       | 0.113         | 1.70       | 0.084         |
| 0.05       | 0.005         | 0.47       | 0.048         | 0.88        | 0.092         | 1.30       | 0.112         | 1.72       | 0.083         |
| 0.07       | 0.007         | 0.48       | 0.050         | 0.90        | 0.093         | 1.32       | 0.111         | 1.73       | 0.082         |
| 0.08       | 0.009         | 0.50       | 0.052         | 0.92        | 0.095         | 1.33       | 0.109         | 1.75       | 0.081         |
| 0.10       | 0.010         | 0.52       | 0.054         | 0.93        | 0.097         | 1.35       | 0.108         | 1.77       | 0.079         |
| 0.12       | 0.012         | 0.53       | 0.055         | 0.95        | 0.098         | 1.37       | 0.107         | 1.78       | 0.078         |
| 0.13       | 0.014         | 0.55       | 0.057         | 0.97        | 0.100         | 1.38       | 0.106         | 1.80       | 0.077         |
| 0.15       | 0.016         | 0.57       | 0.059         | 0.98        | 0.102         | 1.40       | 0.105         | 1.82       | 0.076         |
| 0.17       | 0.017         | 0.58       | 0.060         | 1.00        | 0.104         | 1.42       | 0.104         | 1.83       | 0.075         |
| 0.18       | 0.019         | 0.60       | 0.062         | 1.02        | 0.105         | 1.43       | 0.102         | 1.85       | 0.074         |
| 0.20       | 0.021         | 0.62       | 0.064         | 1.03        | 0.107         | 1.45       | 0.101         | 1.87       | 0.073         |
| 0.22       | 0.022         | 0.63       | 0.066         | 1.05        | 0.109         | 1.47       | 0.100         | 1.88       | 0.071         |
| 0.23       | 0.024         | 0.65       | 0.067         | 1.07        | 0.111         | 1.48       | 0.099         | 1.90       | 0.070         |
| 0.25       | 0.026         | 0.67       | 0.069         | 1.08        | 0.112         | 1.50       | 0.098         | 1.92       | 0.069         |
| 0.27       | 0.028         | 0.68       | 0.071         | 1.10        | 0.114         | 1.52       | 0.097         | 1.93       | 0.068         |
| 0.28       | 0.029         | 0.70       | 0.073         | 1.12        | 0.116         | 1.53       | 0.096         | 1.95       | 0.067         |
| 0.30       | 0.031         | 0.72       | 0.074         | 1.13        | 0.117         | 1.55       | 0.094         | 1.97       | 0.066         |
| 0.32       | 0.033         | 0.73       | 0.076         | 1.15        | 0.119         | 1.57       | 0.093         | 1.98       | 0.064         |
| 0.33       | 0.035         | 0.75       | 0.078         | <b>1.17</b> | <b>0.121</b>  | 1.58       | 0.092         | 2.00       | 0.063         |
| 0.35       | 0.036         | 0.77       | 0.079         | 1.18        | 0.120         | 1.60       | 0.091         | 2.02       | 0.062         |
| 0.37       | 0.038         | 0.78       | 0.081         | 1.20        | 0.119         | 1.62       | 0.090         | 2.03       | 0.061         |
| 0.38       | 0.040         | 0.80       | 0.083         | 1.22        | 0.117         | 1.63       | 0.089         | 2.05       | 0.060         |
| 0.40       | 0.041         | 0.82       | 0.085         | 1.23        | 0.116         | 1.65       | 0.088         | 2.07       | 0.059         |
| 0.42       | 0.043         | 0.83       | 0.086         | 1.25        | 0.115         | 1.67       | 0.086         | 2.08       | 0.058         |

Printed values > 1% of Qpeak. nth-point print interval = 1

Hydrograph Discharge Table, cont'd

70 Lot 38

| Time<br>(hrs) | Outflow<br>(cfs) | Time<br>(hrs) | Outflow<br>(cfs) | Time<br>(hrs) | Outflow<br>(cfs) | Time<br>(hrs) | Outflow<br>(cfs) | Time<br>(hrs) | Outflow<br>(cfs) |
|---------------|------------------|---------------|------------------|---------------|------------------|---------------|------------------|---------------|------------------|
| 2.10          | 0.056            | 2.70          | 0.015            |               |                  |               |                  |               |                  |
| 2.12          | 0.055            | 2.72          | 0.014            |               |                  |               |                  |               |                  |
| 2.13          | 0.054            | 2.73          | 0.013            |               |                  |               |                  |               |                  |
| 2.15          | 0.053            | 2.75          | 0.012            |               |                  |               |                  |               |                  |
| 2.17          | 0.052            | 2.77          | 0.010            |               |                  |               |                  |               |                  |
| 2.18          | 0.051            | 2.78          | 0.009            |               |                  |               |                  |               |                  |
| 2.20          | 0.050            | 2.80          | 0.008            |               |                  |               |                  |               |                  |
| 2.22          | 0.048            | 2.82          | 0.007            |               |                  |               |                  |               |                  |
| 2.23          | 0.047            | 2.83          | 0.006            |               |                  |               |                  |               |                  |
| 2.25          | 0.046            | 2.85          | 0.005            |               |                  |               |                  |               |                  |
| 2.27          | 0.045            | 2.87          | 0.003            |               |                  |               |                  |               |                  |
| 2.28          | 0.044            | 2.88          | 0.002            |               |                  |               |                  |               |                  |
| 2.30          | 0.043            | 2.90          | 0.001            |               |                  |               |                  |               |                  |
| 2.32          | 0.041            | ...end        | ...end           |               |                  |               |                  |               |                  |
| 2.33          | 0.040            |               |                  |               |                  |               |                  |               |                  |
| 2.35          | 0.039            |               |                  |               |                  |               |                  |               |                  |
| 2.37          | 0.038            |               |                  |               |                  |               |                  |               |                  |
| 2.38          | 0.037            |               |                  |               |                  |               |                  |               |                  |
| 2.40          | 0.036            |               |                  |               |                  |               |                  |               |                  |
| 2.42          | 0.035            |               |                  |               |                  |               |                  |               |                  |
| 2.43          | 0.033            |               |                  |               |                  |               |                  |               |                  |
| 2.45          | 0.032            |               |                  |               |                  |               |                  |               |                  |
| 2.47          | 0.031            |               |                  |               |                  |               |                  |               |                  |
| 2.48          | 0.030            |               |                  |               |                  |               |                  |               |                  |
| 2.50          | 0.029            |               |                  |               |                  |               |                  |               |                  |
| 2.52          | 0.028            |               |                  |               |                  |               |                  |               |                  |
| 2.53          | 0.026            |               |                  |               |                  |               |                  |               |                  |
| 2.55          | 0.025            |               |                  |               |                  |               |                  |               |                  |
| 2.57          | 0.024            |               |                  |               |                  |               |                  |               |                  |
| 2.58          | 0.023            |               |                  |               |                  |               |                  |               |                  |
| 2.60          | 0.022            |               |                  |               |                  |               |                  |               |                  |
| 2.62          | 0.021            |               |                  |               |                  |               |                  |               |                  |
| 2.63          | 0.020            |               |                  |               |                  |               |                  |               |                  |
| 2.65          | 0.018            |               |                  |               |                  |               |                  |               |                  |
| 2.67          | 0.017            |               |                  |               |                  |               |                  |               |                  |
| 2.68          | 0.016            |               |                  |               |                  |               |                  |               |                  |

Printed values > 1% of Qpeak. nth-point print interval = 1

# Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

12-10-2020

## 70 Lot 38

## Hyd. No. 26

|                   |                  |                   |             |
|-------------------|------------------|-------------------|-------------|
| Hydrograph Type   | = Pond Route     | Peak Flow         | = 0.086 cfs |
| Storm Frequency   | = 100-yr         | Time to Peak      | = 1.68 hrs  |
| Time Interval     | = 1 min          | Hydrograph Volume | = 258 cuft  |
| Inflow Hydrograph | = 25 - 70 Lot 38 | Max. Elevation    | = 95.03 ft  |
| Pond Name         | = Lot 38         | Max. Storage      | = 400 cuft  |

Pond Routing by Storage Indication Method

Center of mass detention time = 41 min

### Hydrograph Discharge Table

| Time (hrs)  | Outflow (cfs) | Time (hrs) | Outflow (cfs) | Time (hrs) | Outflow (cfs) | Time (hrs) | Outflow (cfs) | Time (hrs) | Outflow (cfs) |
|-------------|---------------|------------|---------------|------------|---------------|------------|---------------|------------|---------------|
| 1.48        | 0.004         | 1.90       | 0.074         | 2.32       | 0.046         | 2.73       | 0.018         | 3.15       | 0.002         |
| 1.50        | 0.016         | 1.92       | 0.073         | 2.33       | 0.044         | 2.75       | 0.017         | 3.17       | 0.002         |
| 1.52        | 0.031         | 1.93       | 0.071         | 2.35       | 0.043         | 2.77       | 0.016         | 3.18       | 0.002         |
| 1.53        | 0.046         | 1.95       | 0.070         | 2.37       | 0.042         | 2.78       | 0.015         | 3.20       | 0.002         |
| 1.55        | 0.058         | 1.97       | 0.069         | 2.38       | 0.041         | 2.80       | 0.014         | 3.22       | 0.002         |
| 1.57        | 0.067         | 1.98       | 0.068         | 2.40       | 0.040         | 2.82       | 0.013         | 3.23       | 0.002         |
| 1.58        | 0.074         | 2.00       | 0.067         | 2.42       | 0.039         | 2.83       | 0.012         | 3.25       | 0.002         |
| 1.60        | 0.079         | 2.02       | 0.066         | 2.43       | 0.038         | 2.85       | 0.011         | 3.27       | 0.001         |
| 1.62        | 0.082         | 2.03       | 0.065         | 2.45       | 0.037         | 2.87       | 0.010         | 3.28       | 0.001         |
| 1.63        | 0.084         | 2.05       | 0.063         | 2.47       | 0.036         | 2.88       | 0.009         | 3.30       | 0.001         |
| 1.65        | 0.085         | 2.07       | 0.062         | 2.48       | 0.034         | 2.90       | 0.008         | 3.32       | 0.001         |
| 1.67        | 0.086         | 2.08       | 0.061         | 2.50       | 0.033         | 2.92       | 0.007         | 3.33       | 0.001         |
| <b>1.68</b> | <b>0.086</b>  | 2.10       | 0.060         | 2.52       | 0.032         | 2.93       | 0.007         | 3.35       | 0.001         |
| 1.70        | 0.085         | 2.12       | 0.059         | 2.53       | 0.031         | 2.95       | 0.006         | 3.37       | 0.001         |
| 1.72        | 0.085         | 2.13       | 0.058         | 2.55       | 0.030         | 2.97       | 0.005         | 3.38       | 0.000         |
| 1.73        | 0.084         | 2.15       | 0.057         | 2.57       | 0.029         | 2.98       | 0.005         | ...end     | ...end        |
| 1.75        | 0.083         | 2.17       | 0.056         | 2.58       | 0.028         | 3.00       | 0.004         |            |               |
| 1.77        | 0.082         | 2.18       | 0.055         | 2.60       | 0.027         | 3.02       | 0.004         |            |               |
| 1.78        | 0.081         | 2.20       | 0.053         | 2.62       | 0.026         | 3.03       | 0.004         |            |               |
| 1.80        | 0.080         | 2.22       | 0.052         | 2.63       | 0.025         | 3.05       | 0.003         |            |               |
| 1.82        | 0.079         | 2.23       | 0.051         | 2.65       | 0.024         | 3.07       | 0.003         |            |               |
| 1.83        | 0.078         | 2.25       | 0.050         | 2.67       | 0.023         | 3.08       | 0.003         |            |               |
| 1.85        | 0.077         | 2.27       | 0.049         | 2.68       | 0.022         | 3.10       | 0.003         |            |               |
| 1.87        | 0.076         | 2.28       | 0.048         | 2.70       | 0.020         | 3.12       | 0.002         |            |               |
| 1.88        | 0.075         | 2.30       | 0.047         | 2.72       | 0.019         | 3.13       | 0.002         |            |               |

Printed values > 1% of Qpeak. nth-point print interval = 1