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| Resolute Engineering Group Ltd | | Page 1 |
| 1a Moyne Road Baldoyle Co. Dublin, D13 YV4X | Shannonside Recrational Centre 25.2l/s 100YRP+10% |  |
| Date 16/06/2021 16:20 File | Designed by STORMTECH SC740 Checked by LP | |
| Innovyze | Source Control 2020.1 | |

Summary of Results for 100 year Return Period (+10%)

Half Drain Time : 615 minutes.

| Storm Event | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Control (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|------------------|---------------|---------------|------------------------|-------------------|---------------------|-----------------|--------|
| 15 min Winter | 0.369 | 0.369 | 0.0 | 25.1 | 25.1 | 641.6 | O K |
| 30 min Winter | 0.507 | 0.507 | 0.0 | 25.2 | 25.2 | 882.7 | O K |
| 60 min Winter | 0.652 | 0.652 | 0.0 | 25.2 | 25.2 | 1134.9 | O K |
| 120 min Winter | 0.801 | 0.801 | 0.0 | 25.2 | 25.2 | 1393.6 | O K |
| 180 min Winter | 0.885 | 0.885 | 0.0 | 25.2 | 25.2 | 1540.7 | O K |
| 240 min Winter | 0.941 | 0.941 | 0.0 | 25.2 | 25.2 | 1636.5 | O K |
| 360 min Winter | 1.006 | 1.006 | 0.0 | 25.2 | 25.2 | 1749.9 | O K |
| 480 min Winter | 1.038 | 1.038 | 0.0 | 25.2 | 25.2 | 1806.9 | O K |
| 600 min Winter | 1.053 | 1.053 | 0.0 | 25.2 | 25.2 | 1832.5 | O K |
| 720 min Winter | 1.057 | 1.057 | 0.0 | 25.2 | 25.2 | 1838.8 | O K |
| 960 min Winter | 1.054 | 1.054 | 0.0 | 25.2 | 25.2 | 1834.3 | O K |
| 1440 min Winter | 1.026 | 1.026 | 0.0 | 25.2 | 25.2 | 1785.4 | O K |
| 2160 min Winter | 0.948 | 0.948 | 0.0 | 25.2 | 25.2 | 1650.2 | O K |
| 2880 min Winter | 0.853 | 0.853 | 0.0 | 25.2 | 25.2 | 1483.9 | O K |
| 4320 min Winter | 0.622 | 0.622 | 0.0 | 25.2 | 25.2 | 1081.4 | O K |
| 5760 min Winter | 0.438 | 0.438 | 0.0 | 25.2 | 25.2 | 761.5 | O K |
| 7200 min Winter | 0.310 | 0.310 | 0.0 | 25.0 | 25.0 | 539.8 | O K |
| 8640 min Winter | 0.236 | 0.236 | 0.0 | 24.2 | 24.2 | 410.4 | O K |
| 10080 min Winter | 0.209 | 0.209 | 0.0 | 22.5 | 22.5 | 363.3 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|------------------|--------------|---------------------|-----------------------|------------------|
| 15 min Winter | 73.507 | 0.0 | 617.9 | 26 |
| 30 min Winter | 50.895 | 0.0 | 866.2 | 40 |
| 60 min Winter | 33.228 | 0.0 | 1175.1 | 68 |
| 120 min Winter | 20.979 | 0.0 | 1487.4 | 126 |
| 180 min Winter | 15.899 | 0.0 | 1692.3 | 184 |
| 240 min Winter | 13.026 | 0.0 | 1849.3 | 240 |
| 360 min Winter | 9.809 | 0.0 | 2089.1 | 354 |
| 480 min Winter | 8.010 | 0.0 | 2273.9 | 466 |
| 600 min Winter | 6.840 | 0.0 | 2426.1 | 574 |
| 720 min Winter | 6.011 | 0.0 | 2556.3 | 674 |
| 960 min Winter | 4.899 | 0.0 | 2772.2 | 762 |
| 1440 min Winter | 3.670 | 0.0 | 3091.1 | 1074 |
| 2160 min Winter | 2.749 | 0.0 | 3555.1 | 1540 |
| 2880 min Winter | 2.238 | 0.0 | 3857.7 | 1992 |
| 4320 min Winter | 1.673 | 0.0 | 4317.1 | 2772 |
| 5760 min Winter | 1.359 | 0.0 | 4703.8 | 3464 |
| 7200 min Winter | 1.157 | 0.0 | 5001.6 | 4104 |
| 8640 min Winter | 1.014 | 0.0 | 5255.4 | 4664 |
| 10080 min Winter | 0.906 | 0.0 | 5472.8 | 5248 |

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Rainfall Details

| | | | |
|-----------------------|----------------------|-----------------------|-------|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.750 |
| Region | Scotland and Ireland | Cv (Winter) | 0.840 |
| M5-60 (mm) | 15.300 | Shortest Storm (mins) | 15 |
| Ratio R | 0.280 | Longest Storm (mins) | 10080 |
| Summer Storms | No | Climate Change % | +10 |

Time Area Diagram

Total Area (ha) 4.300

| Time (mins) Area | | | Time (mins) Area | | | Time (mins) Area | | |
|------------------|-----|-------|------------------|-----|-------|------------------|-----|-------|
| From: | To: | (ha) | From: | To: | (ha) | From: | To: | (ha) |
| 0 | 4 | 1.433 | 4 | 8 | 1.433 | 8 | 12 | 1.433 |

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Model Details

Storage is Online Cover Level (m) 2.000

Cellular Storage Structure

Invert Level (m) 0.000 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.60
 Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m ²) | Inf. Area (m ²) | Depth (m) | Area (m ²) | Inf. Area (m ²) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000 | 2900.0 | 2900.0 | 1.200 | 0.0 | 3137.6 |
| 1.100 | 2900.0 | 3137.6 | | | |

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0218-2520-1100-2520
 Design Head (m) 1.100
 Design Flow (l/s) 25.2
 Flush-Flo™ Calculated
 Objective Minimise upstream storage
 Application Surface
 Sump Available Yes
 Diameter (mm) 218
 Invert Level (m) 0.000
 Minimum Outlet Pipe Diameter (mm) 300
 Suggested Manhole Diameter (mm) 1500

| Control Points | Head (m) | Flow (l/s) |
|---------------------------|----------|------------|
| Design Point (Calculated) | 1.100 | 25.1 |
| Flush-Flo™ | 0.376 | 25.2 |
| Kick-Flo® | 0.793 | 21.5 |
| Mean Flow over Head Range | - | 21.2 |

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| 0.100 | 7.4 | 1.200 | 26.2 | 3.000 | 40.7 | 7.000 | 61.3 |
| 0.200 | 21.5 | 1.400 | 28.2 | 3.500 | 43.8 | 7.500 | 63.4 |
| 0.300 | 24.9 | 1.600 | 30.1 | 4.000 | 46.8 | 8.000 | 65.5 |
| 0.400 | 25.1 | 1.800 | 31.8 | 4.500 | 49.5 | 8.500 | 67.4 |
| 0.500 | 24.8 | 2.000 | 33.5 | 5.000 | 52.1 | 9.000 | 69.3 |
| 0.600 | 24.3 | 2.200 | 35.0 | 5.500 | 54.6 | 9.500 | 71.2 |
| 0.800 | 21.6 | 2.400 | 36.5 | 6.000 | 56.9 | | |
| 1.000 | 24.0 | 2.600 | 38.0 | 6.500 | 59.2 | | |