

Glen Isle  
Glen Cove Waterfront Redevelopment  
5-5-2011

## Drainage Calculations

Nassau County Drainage Requirements:

Intensity =  $i = 120 / (T + 20)$

Storage Volume Design: Use 2"

Runoff Coefficients:

Surface Impervious Areas = 0.95

Pervious Roof = 0.50

Surface Pervious = 0.30

Wetlands = 0.15

Weighted Coefficient for Watershed Area = 0.61

Calculations:

Watershed Area = 47.9 AC (+/-)

Storage Volume Required = Area x Coefficient x Runoff

$V = (47.9 \text{ AC}) \times (0.61) \times (2''/12)$

$V = 212,847 \text{ CF}$

### Drainage Storage Required/Provided per Nassau County

DATE: 5/2/2011  
 PROJECT NO.: 03610-001  
 PROJECT NAME: **Glen Isle**  
**Glen Cove Waterfront Redevelopment**  
 PROJECT TOWN: City of Glen Cove, NY  
 PREPARED BY: LMM

|   | P-DA-1  | P-DA-2  | P-DA-3 | P-DA-4  | P-DA-5  | P-DA-6  | Total Project Site |
|---|---------|---------|--------|---------|---------|---------|--------------------|
| <b>Total Area (SF)</b>                          | 520,691 | 254,719 | 76,239 | 512,714 | 194,729 | 526,407 | 2,085,499          |
| Pervious Area (incl green roof and wetlands)    | 273,210 | 95,861  | 53,821 | 345,948 | 63,606  | 298,107 | 1,130,553          |
| Impervious Area (incl impervious roof)          | 247,481 | 158,858 | 22,418 | 166,766 | 131,123 | 228,300 | 954,946            |
| Total Area (ac)                                 | 11.95   | 5.85    | 1.75   | 11.77   | 4.47    | 12.08   | 47.88              |
| Weighted Coefficient (C) ~ from Coverage Calc   | 0.643   | 0.734   | 0.491  | 0.528   | 0.769   | 0.565   | 0.612              |
| 2" Storage of Rainfall                          | 0.167   | 0.167   | 0.167  | 0.167   | 0.167   | 0.167   | 0.167              |
| <b>Storage Required (V = A x C x 2")</b>        |         |         |        |         |         |         |                    |
| <b>Total Volume Required (CF)</b>               | 55,801  | 31,161  | 6,239  | 45,119  | 24,958  | 49,570  | 212,847            |
| Option: Storage Chamber (5' deep)               | 11,160  | 6,232   | 1,248  | 9,024   | 4,992   | 9,914   | 42,569             |
| Option: Seepage Pits (10' Φ 5' deep)            | 142.1   | 79.3    | 15.9   | 114.9   | 63.6    | 126.2   | 542.0              |
| <b>Storage Provided:</b>                        |         |         |        |         |         |         |                    |
| StormTrap 5'-8" inside Ht (43,860cf / 9,210 sf) |         |         |        |         |         |         |                    |
| StormTrap surface area (sf)                     | 17,895  | 0       | 0      | 0       | 0       | 17,770  | 35,665             |
| StormTrap volume (cf)                           | 85,220  | 0       | 0      | 0       | 0       | 84,625  | 169,846            |
| StormTrap 3'-0" inside Ht (13,555cf / 5,290sf)  |         |         |        |         |         |         |                    |
| StormTrap surface area (sf)                     | 0       | 0       | 0      | 0       | 0       | 6,165   | 6,165              |
| StormTrap volume (cf)                           | 0       | 0       | 0      | 0       | 0       | 15,797  | 15,797             |
| StormTrap 2'-0" inside Ht (11,495cf / 7,130sf)  |         |         |        |         |         |         |                    |
| StormTrap surface area (sf)                     | 0       | 12,629  | 0      | 0       | 0       | 0       | 12,629             |
| StormTrap volume (cf)                           | 0       | 20,360  | 0      | 0       | 0       | 0       | 20,360             |
| Seepage Pits (10' Φ 5' deep)                    |         |         |        |         |         |         |                    |
| Amount of Pits (each)                           | 25      | 0       | 16     | 0       | 0       | 0       | 41                 |
| Volume (cf)                                     | 9,817   | 0       | 6,283  | 0       | 0       | 0       | 16,101             |
| <b>Total Volume Provided (CF)</b>               | 95,037  | 20,360  | 6,283  | 0       | 0       | 100,422 | 222,104            |

**References / Notes:**

1. Impervious Coefficient (C<sub>R</sub>) = 0.95                      Pervious Coefficient (C<sub>P</sub>) = 0.30  
     Wetlands/Docks Coefficient (C<sub>P</sub>) = 0.15              Pervious Roof Coefficient (C<sub>P</sub>) = 0.50
2. Surface area is including 1' thick walls
3. Storage Provided Calculations do not include stone voids
4. Storage Volume is based on ratios shown; the volume will vary when final design is prepared by StormTrap Co.
5. Nassau County Department of Public Works Drainage Requirements  
     Storage Volume = Area x Coefficient x Runoff Storage

**Drainage Storage Required per Nassau County**

DATE: 5/2/2011  
PROJECT NO.: 03810-001  
PROJECT NAME: **Glen Isle**  
PROJECT TOWN: **Glen Cove Waterfront Redevelopment**  
PREPARED BY: **City of Glen Cove, NY**  
LMM

| Description       | Total Area   |                  | Pervious Area<br>(incl green roof<br>areas & wetlands) |                  | Impervious Area<br>(incl impervious<br>roof areas) |                | Weighted<br>Coefficient (C) ~<br>Coverage Calc | 2 Inch<br>Storage<br>(FT) | Storage Volume<br>Required<br>- Nassau Co.<br>(CF) | OPTIONS                                 |   |
|-------------------|--------------|------------------|--|------------------|--|----------------|--|---------------------------|--|---|---|
|                   | (AC)         | (SF)             | (AC)   | (SF)             | (AC)   | (SF)           |  |                           |  | Infiltration Box<br>(5' deep)<br>(each) | OR<br>Seepage Pits<br>(10' Φ 5' deep max)<br>(each) |
| P-DA-1            | 11.95        | 520,691          | 6.27   | 273,210          | 5.68   | 247,481        | 0.643  | 0.167                     | 55,801   | 11160.1                                 | 142.1   |
| P-DA-2            | 5.85         | 254,719          | 2.20   | 95,861           | 3.65   | 158,858        | 0.734  | 0.167                     | 31,161   | 6232.1                                  | 79.3  |
| P-DA-3            | 1.75         | 76,239           | 1.24   | 53,821           | 0.51   | 22,418         | 0.491  | 0.167                     | 6,239  | 1247.8                                  | 15.9  |
| P-DA-4            | 11.77        | 512,714          | 7.94   | 345,948          | 3.83   | 166,766        | 0.528  | 0.167                     | 45,119   | 9023.8                                  | 114.9   |
| P-DA-5            | 4.47         | 194,729          | 1.46   | 63,606           | 3.01   | 131,123        | 0.769  | 0.167                     | 24,958   | 4991.6                                  | 63.6  |
| P-DA-6            | 12.08        | 526,407          | 6.84   | 298,107          | 5.24   | 228,300        | 0.565  | 0.167                     | 49,570   | 9914.0                                  | 126.2   |
| <b>Total Site</b> | <b>47.88</b> | <b>2,085,499</b> | <b>25.95</b>   | <b>1,130,553</b> | <b>21.92</b>                                       | <b>954,946</b> | <b>0.612</b>                                   | <b>0.167</b>              | <b>212,847</b>                                     | <b>42569.4</b>                          | <b>542.0</b>  |

**References / Notes:**

- Impervious Coefficient (C<sub>R</sub>) = 0.95 Pervious Coefficient (C<sub>P</sub>) = 0.30  
Wetlands/Docks Coefficient (C<sub>P</sub>) = 0.15 Pervious Roof Coefficient (C<sub>P</sub>) = 0.50
- Nassau County Department of Public Works Drainage Requirements  
Storage Volume = Area x Coefficient x Runoff Storage

**Drainage Storage Chamber Design**

DATE: 5/2/2011  
PROJECT NO.: 03610-001  
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PREPARED BY: LMM

|  | Provided Storage | Structure description           |
|--|------------------|---------------------------------|
|  | CF               |                                 |
| Storage Chamber #1 (P-DA-1)                      | 20,100           | StormTrap 5'-8"                 |
| Storage Chamber #2 (P-DA-1)                      | 2,830            | StormTrap 5'-8"                 |
| Storage Chamber #3 (P-DA-1)                      | 62,290           | StormTrap 5'-8"                 |
| Seepage Pit Area #4 (P-DA-1)                     | 9,817            | 25 Seepage Pits (10' Φ 5' deep) |
| Storage Chamber #5 (P-DA-2) (incl 30% of bldg C) | 9,323            | StormTrap 2'-0"                 |
| Storage Chamber #6 (P-DA-2) (incl 45% of bldg C) | 11,037           | StormTrap 2'-0"                 |
| Seepage Pit Area #7 (P-DA-3)                     | 6,283            | 16 Seepage Pits (10' Φ 5' deep) |
| Storage Chamber #8 (P-DA-6)                      | 84,625           | StormTrap 5'-8"                 |
| Storage Chamber #9 (P-DA-6)                      | 11,945           | StormTrap 3'-0"                 |
| Storage Chamber #10 (P-DA-6)                     | 3,854            | StormTrap 3'-0"                 |
| <b>TOTALS</b>                                    | <b>222,104</b>   |                                 |

*References / Notes:*

- Impervious Coefficient ( $C_R$ ) = 0.95  
Wetlands/Docks Coefficient ( $C_P$ ) = 0.15  
Pervious Coefficient ( $C_P$ ) = 0.30  
Pervious Roof Coefficient ( $C_P$ ) = 0.50
- Surface area is including 1' thick walls
- Storage Provided Calculations do not include stone voids
- Storage Volume is based on ratios shown; the volume will vary when final design is prepared by StormTrap Co.
- Nassau County Department of Public Works Drainage Requirements  
Storage Volume = Area x Coefficient x Runoff Storage

**Water Quality Volume per NYSDEC**

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CITY OF GLEN COVE, NY  
LMM  
PROJECT TOWN:  
PREPARED BY:

| Description  | Total Area |           | Pervious Area (incl green roof areas & wetlands/docks) |           | Impervious Area (incl Impervious roof areas) |         | Ratio including Impervious Coverage (Rv) | 90% Rainfall Event number (P) | Water Quality Volume Required (WQV) - NYSDEC |                    | OPTIONS                           |       |
|--------------|------------|-----------|--|-----------|--|---------|--|-------------------------------|--|--------------------|-----------------------------------|-------|
|              | (acre)     | (sf)      | (acre)   | (sf)      | (acre)                                       | (sf)    |  |                               | (acre-ft)                                    | (ft <sup>3</sup> ) | Infiltration Box (5' deep) (each) | OR    |
| P-DA-1       | 11.95      | 520,691   | 6.27   | 273,210   | 5.68   | 247,481 | 48%                                      | 1.20                          | 0.571  | 24,877             | 4975.3                            | 63.3  |
| P-DA-2       | 5.85       | 254,719   | 2.20   | 95,861    | 3.65   | 158,858 | 62%                                      | 1.20                          | 0.357  | 15,571             | 3114.2                            | 39.7  |
| P-DA-3       | 1.75       | 76,239    | 1.24   | 53,821    | 0.51   | 22,418  | 29%                                      | 1.20                          | 0.055  | 2,399              | 479.8                             | 6.1   |
| P-DA-4       | 11.77      | 512,714   | 7.94   | 345,948   | 3.83   | 166,766 | 33%                                      | 1.20                          | 0.403  | 17,573             | 3514.5                            | 44.7  |
| P-DA-5       | 4.47       | 194,729   | 1.46   | 63,606    | 3.01   | 131,123 | 67%                                      | 1.20                          | 0.293  | 12,775             | 2554.9                            | 32.5  |
| P-DA-6       | 12.08      | 526,407   | 6.84   | 298,107   | 5.24   | 228,300 | 43%                                      | 1.20                          | 0.532  | 23,179             | 4635.8                            | 59.0  |
| <b>TOTAL</b> | 47.88      | 2,085,499 | 25.95  | 1,130,553 | 21.92  | 954,946 | 46%                                      | 1.20                          | 2.212  | 96,373             | 19274.5                           | 245.4 |

References / Notes:

- Impervious Coefficient (C<sub>R</sub>) = 0.95 Pervious Coefficient (C<sub>P</sub>) = 0.30  
Wetlands/Docks Coefficient (C<sub>P</sub>) = 0. Pervious Roof Coefficient (C<sub>P</sub>) = 0.50
- New York State Stormwater Management Design Manual, April 2008, Chapter 4  
 $WQV = [(P) \times (Rv) \times (A)] / 12$   
 $Rv = (0.05) + (0.009 \times I) \sim \text{minimum } Rv = 0.2$   
 I ~ percent impervious cover  
 P = 90% Rainfall Event Number (Figure 4.1)  
 A = Site area in acres (contributing area)

**IRRIGATION DESIGN PROVIDED  
(COLLECTION FROM ROOF AREAS ONLY)**

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| Description                             | Roof Area    |                | Volume Collected<br>from 1" Runoff (I)<br>~ A x I <sup>2</sup> | Storage<br>Provided<br>(5' deep tank) |
|---|--------------|----------------|--|---------------------------------------|
|   | (AC)         | (SF)           | (CF)   | (CF)                                  |
| <b>P-DA-1</b><br>Roof Area A            | 1.88         | 81,796         | 6,816  | 6855.0                                |
| <b>P-DA-1</b><br>Roof Area B1           | 1.78         | 77,678         | 6,473  | 6330.0                                |
| <b>P-DA-1</b><br>Roof Area B2           | 1.85         | 80,382         | 6,699  | 6825.0                                |
| <b>P-DA-2</b><br>Roof Area C            | 2.59         | 113,002        | 9,417  | 8950.0                                |
| <b>P-DA-4 and P-DA-6</b><br>Roof Area D | 0.80         | 34,991         | 2,916  | 0.0                                   |
| Roof Area I                             | 2.59         | 113,002        | 9,417  | 0.0                                   |
| Total Roof Area                         | 3.40         | 147,993        | 12,333   | 14800.0                               |
| <b>P-DA-4 and P-DA-5</b><br>Roof Area E | 1.82         | 79,294         | 6,608  | 0.0                                   |
| Roof Area H                             | 1.71         | 74,487         | 6,207  | 0.0                                   |
| Total Roof Area                         | 3.53         | 153,781        | 12,815   | 12825.0                               |
| <b>P-DA-6</b><br>Roof Area J            | 0.25         | 10,991         | 916  | 2820.0                                |
| <b>P-DA-6</b><br>Roof Area J2           | 0.06         | 2,438          | 203  | 0.0                                   |
| Roof Area J3                            | 0.05         | 2,364          | 197  | 0.0                                   |
| Roof Area J4                            | 0.10         | 4,427          | 369  | 0.0                                   |
| Total Roof Area                         | 0.21         | 9,229          | 769  | 835.0                                 |
| <b>Total Roof All Areas</b>             | <b>15.49</b> | <b>674,852</b> | <b>56,238</b>  | <b>60,240.0</b>                       |

1. See Water Demand Calculations for further Irrigation demands
2. For sizing of irrigation chamber, runoff coefficient for roof assumed to be 1.0 (assumes no runoff reduction within green roof zones to provide larger storage volume)