SWRv Calculations

Example #1

1150 50th Pl NE

Renovation planned for interior of entire building

Building area: 37,250 square feet

SWRv = ?

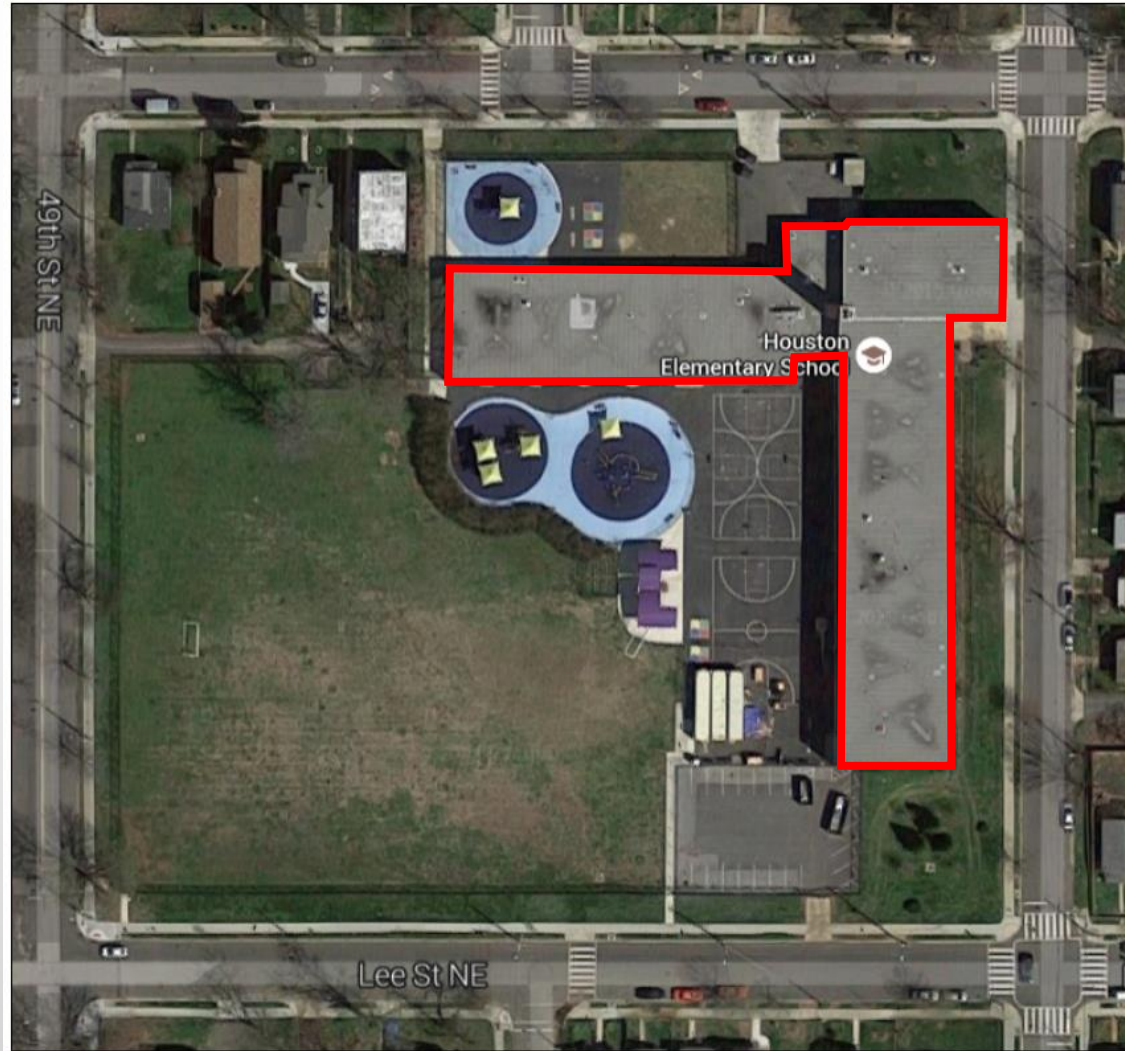$$SWRv(cf) = \frac{P}{12\ in/ft} \times [0.95 \times (Impervious\ Area) + 0.25 \times (Compacted\ Area)]$$

Example #1

1150 50th Pl NE

Renovation planned for interior of entire building

Building area: 37,250 square feet

SWRv = ?

$$SWRv(cf) = \frac{0.8\ in}{12\ \frac{in}{ft}} \times [0.95 \times (37{,}250\ ft^2) + 0.25 \times (0\ ft^2)]$$
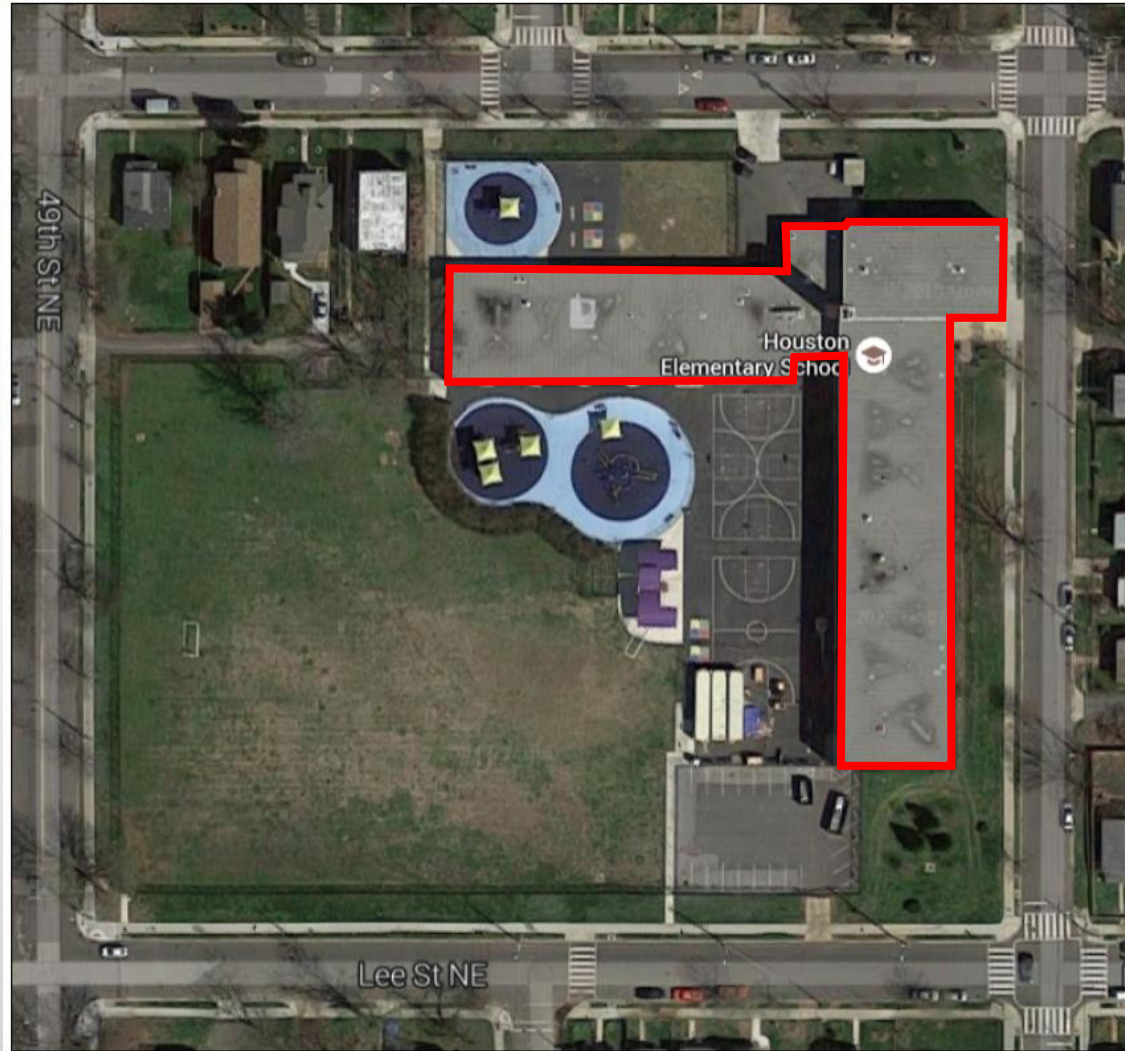
Example #1

1150 50th Pl NE

Renovation planned for interior of entire building

Building area: 37,250 square feet

SWRv = 2,359 ft³ or 17,646 gal

Example #2

1333 Emerson St. NE

Replacement of baseball diamond with artificial surface.

Limits of Disturbance: 61,439 square feet

Proposed impervious cover: 0 square feet

Proposed BMP area: 54,082 square feet

Proposed grass area: 7,357 square feet

SWRv = ?

$$SWRv(cf) = \frac{P}{12\ in/ft} \times [0.95 \times (Impervious\ Area) + 0.25 \times (Compacted\ Area)]$$

Example #2

1333 Emerson St. NE

Replacement of baseball diamond with artificial surface.

Limits of Disturbance: 61,439 square feet

Proposed impervious cover: 0 square feet
Proposed BMP area: 54,082 square feet
Proposed grass area: 7,357 square feet

SWRv = ?

Grass Area
Dry Swale
Permeable

$$SWRv(cf) = \frac{1.2\ in}{12\ in/ft} \times [0.95 \times (54{,}082\ ft^2) + 0.25 \times (7{,}357\ ft^2)]$$

Example #2

1333 Emerson St. NE

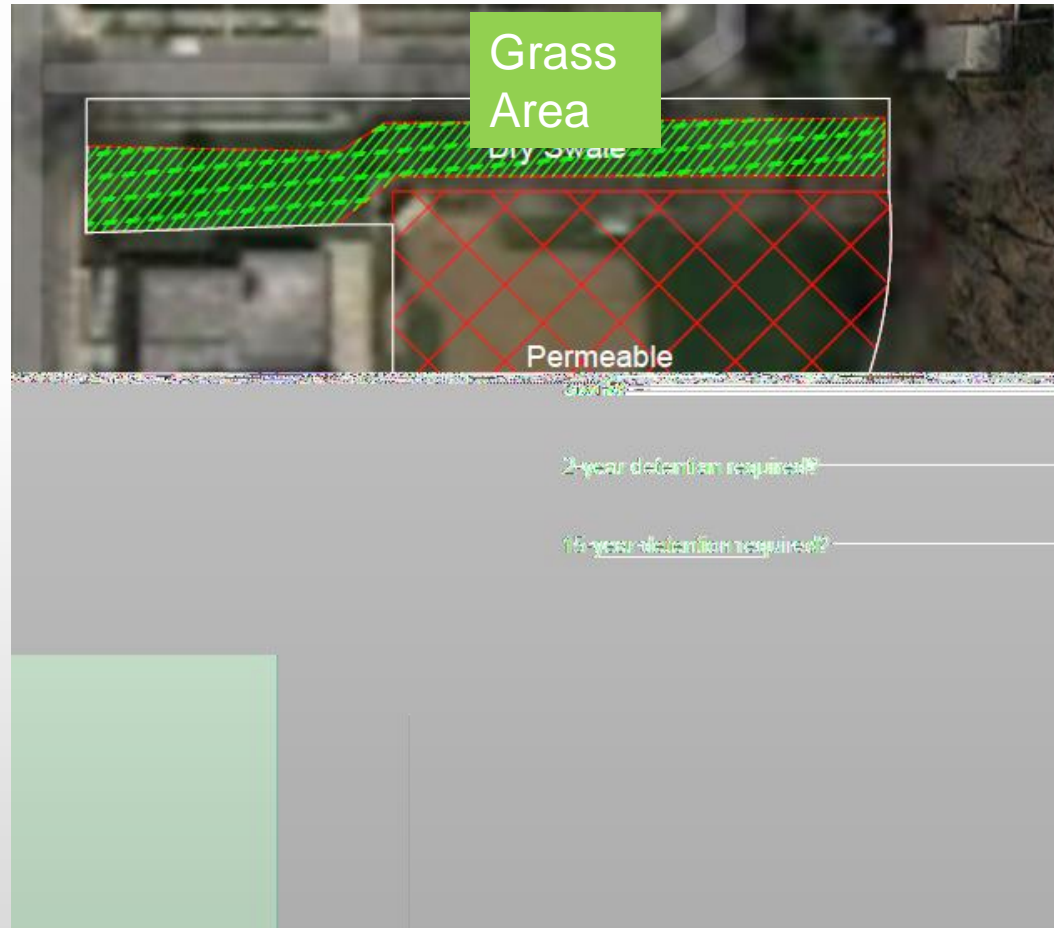Replacement of baseball diamond with artificial surface.

Limits of Disturbance: 61,439 square feet
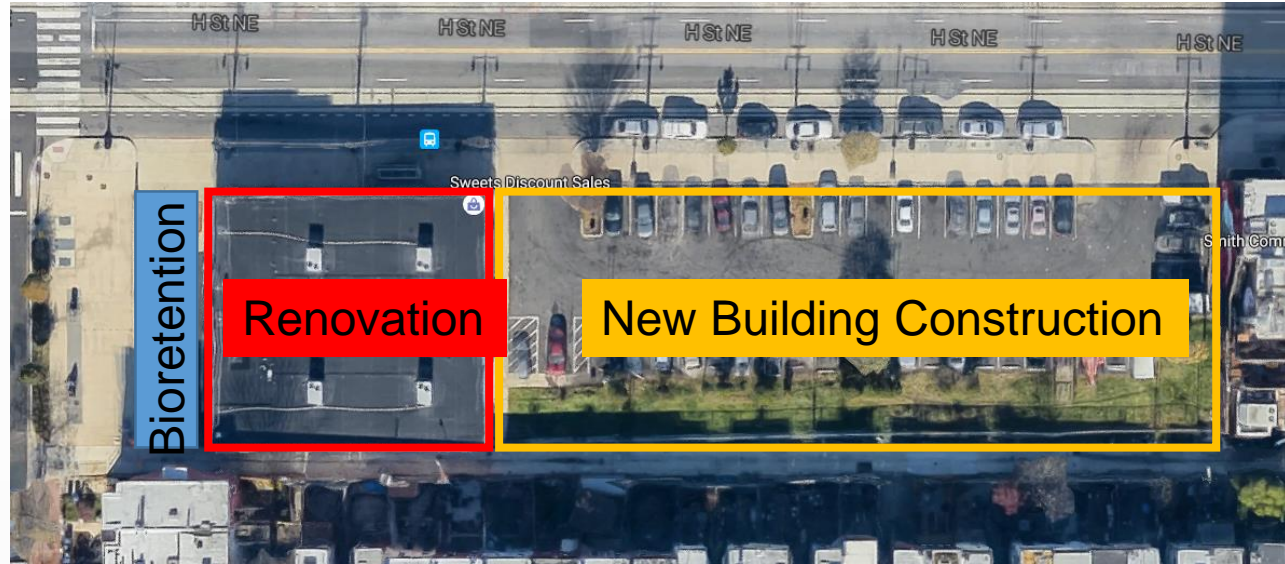
Proposed impervious cover: 0 square feet

Proposed BMP area: 54,082 square feet

Proposed grass area: 7,357 square feet

SWRv = 5,322 ft³ or 39,806 gal

Grass Area

Permeable

Example #3

1207 H St NE

Renovate existing building and construct new building in parking lot

Property area: 23,220 square feet

Proposed renovated building area: 4,225 square feet
Proposed bioretention area: 3,795 square feet
Proposed new building area: 15,200 square feet

SWRv = ?

$$SWRv(cf) = \frac{P}{12\ in/ft} \times [0.95 \times (Impervious\ Area) + 0.25 \times (Compacted\ Area)]$$

Example #3

1207 H St NE

Renovate existing building and construct new building in parking lot

Property area: 23,220 square feet
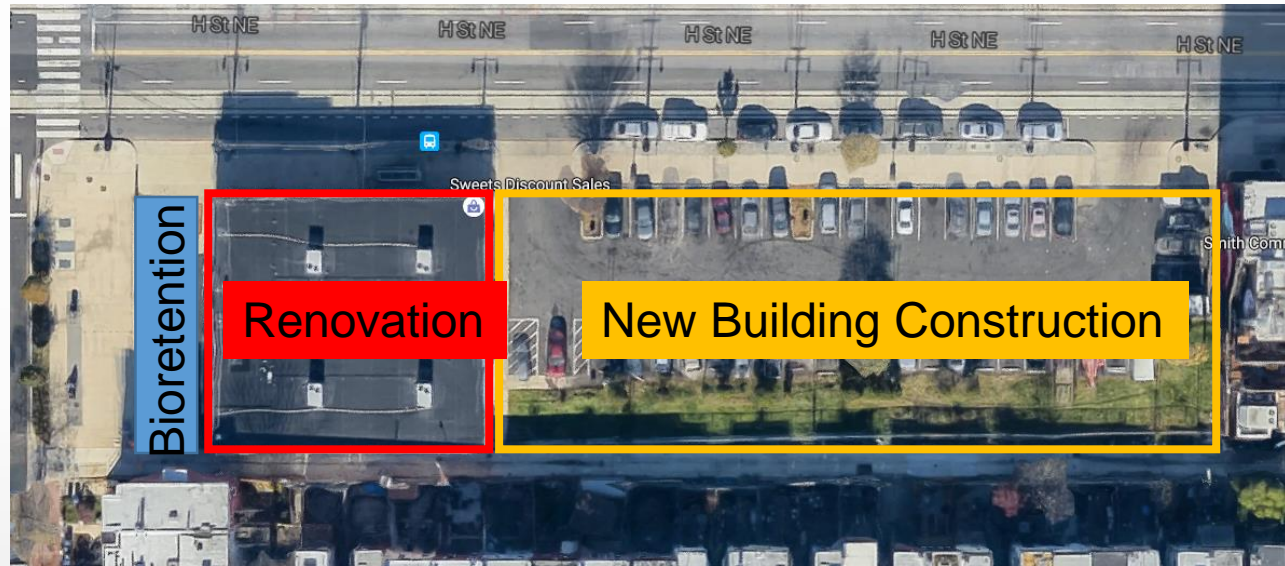
Proposed renovated building area: 4,225 square feet
Proposed bioretention area: 3,795 square feet
Proposed new building area: 15,200 square feet

SWRv = ?

$$SWRv(cf) = \frac{0.8\ in}{12\ in/ft} \times (0.95 \times 4{,}225\ ft^2) + \frac{1.2\ in}{12\ in/ft} \times [0.95 \times (3{,}795 ft^2 + 15{,}200\ ft^2)]$$

Example #3

1207 H St NE

Renovate existing building and construct new building in parking lot

Property area: 23,220 square feet

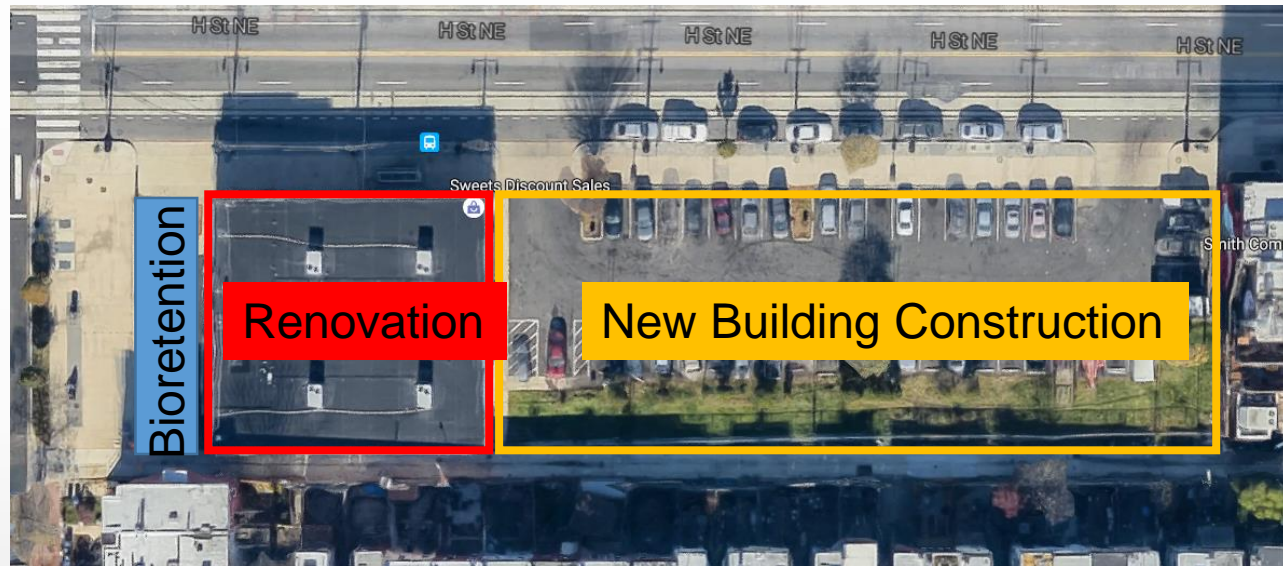Proposed renovated building area: 4,225 square feet
Proposed bioretention area: 3,795 square feet
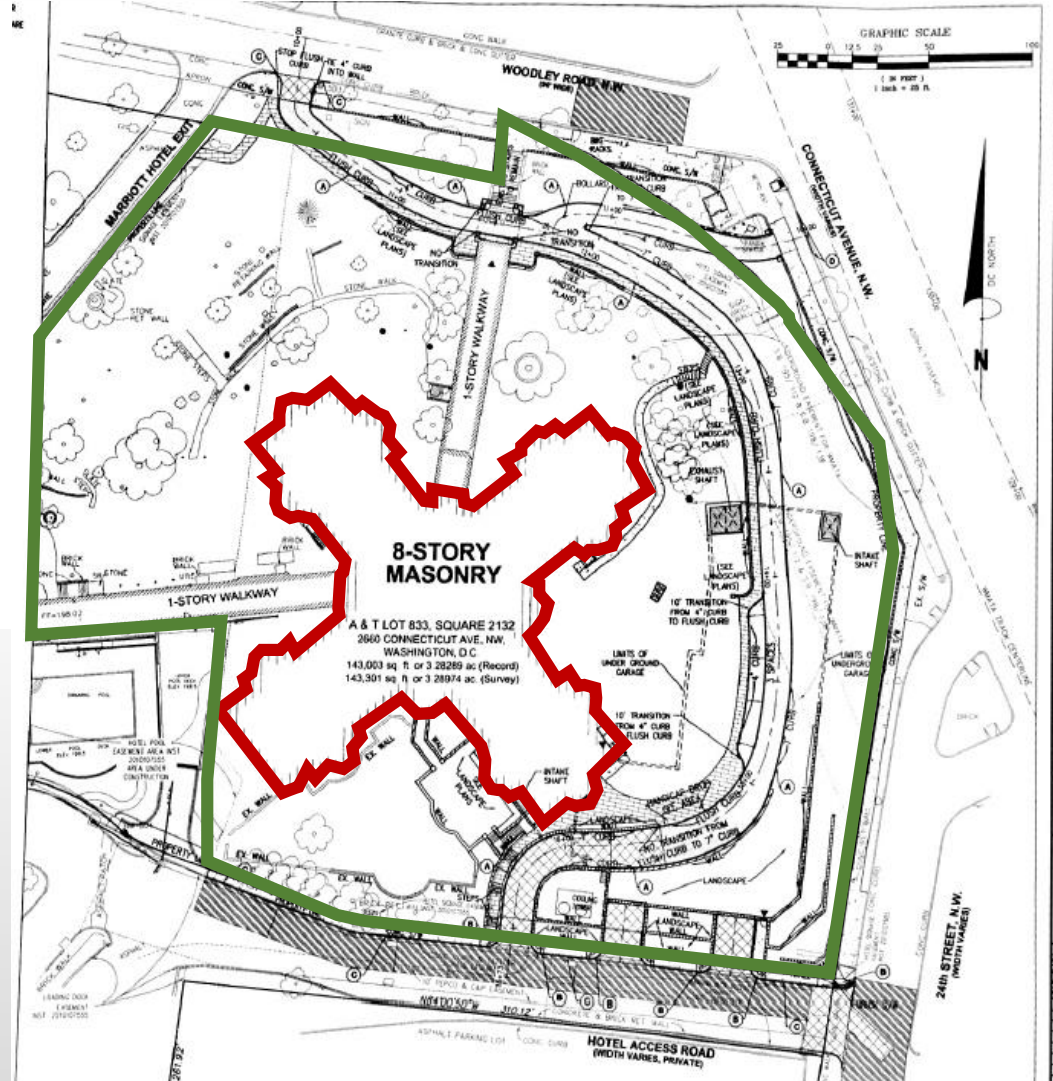Proposed new building area: 15,200 square feet
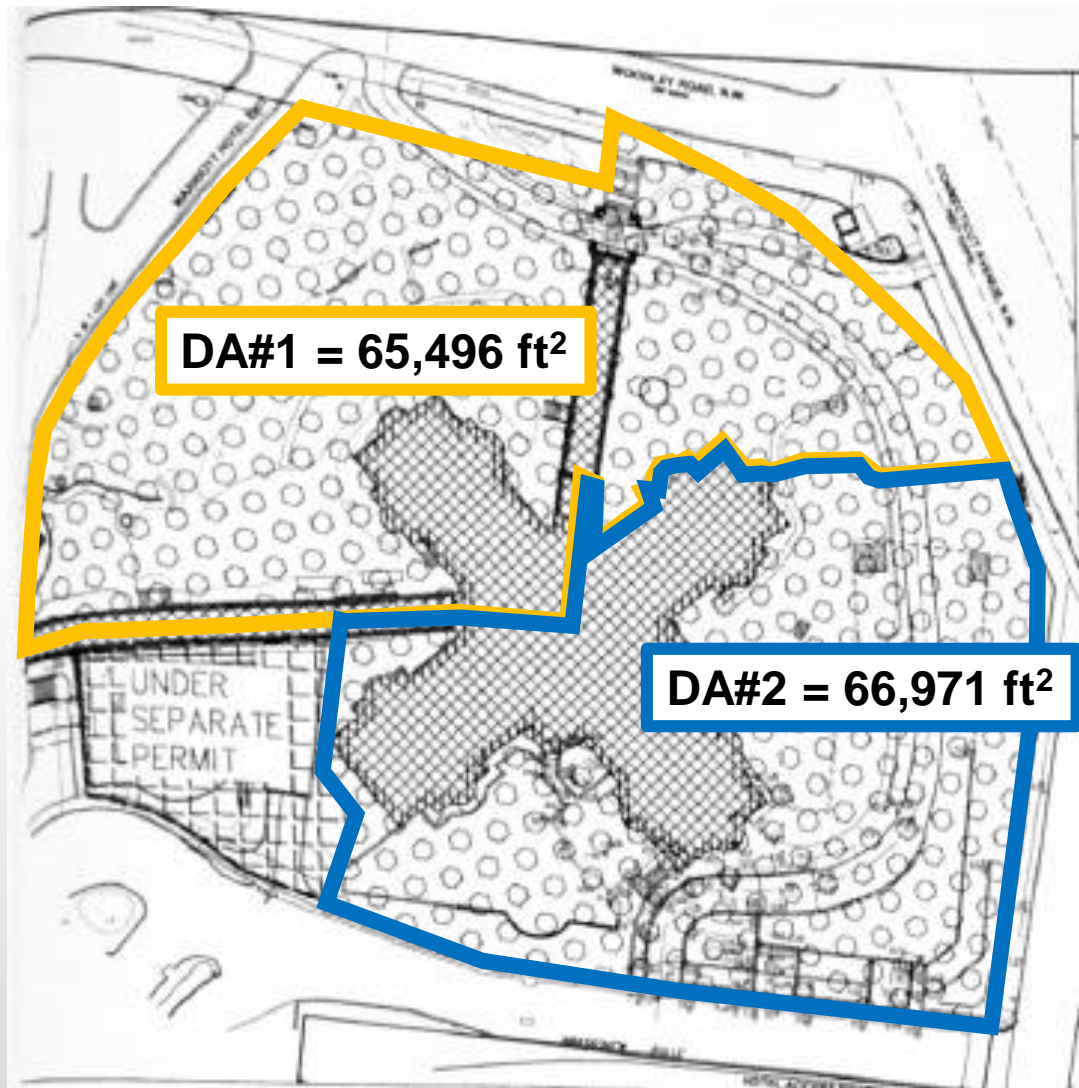
SWRv = 2,072 ft³ or 15,499 gal

Site Drainage Areas (SDAs)
vs.
Contributing Drainage Areas (CDAs)

- Building is undergoing a complete renovation.

- Surrounding land is being regraded with new sidewalks and construction of an underground parking facility.

Building = Major Substantial Improvement (0.8")

Land Area = Major Land Disturbing (1.2")

Site Drainage Areas
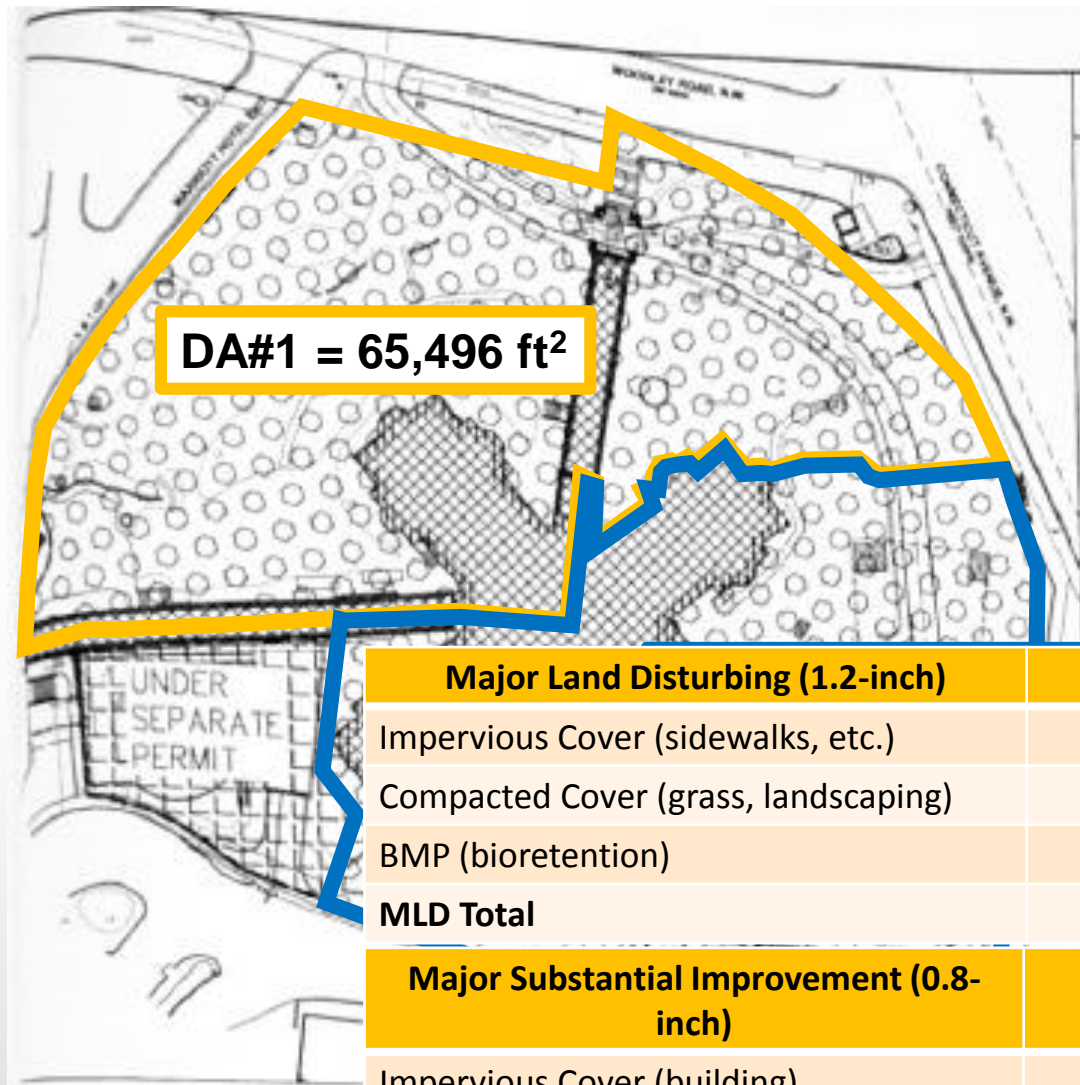
DA#1 = 65,496 ft^2

DA#2 = 66,971 ft^2

Site Drainage Area #1

DA#1 = 65,496 ft^2

Major Land Disturbing (1.2-inch)	Land Area (ft^2)	Rv	SWRv (ft^3)
Impervious Cover (sidewalks, etc.)	11,197	0.95	1,064
Compacted Cover (grass, landscaping)	43,685	0.25	1,092
BMP (bioretention)	1,489	0.95	141
MLD Total			2,297
Major Substantial Improvement (0.8-inch)	Land Area (ft^2)	Rv	SWRv (ft^3)
Impervious Cover (building)	9,125	0.95	578
Total	65,496		2,875

Major Land Disturbing (1.2-inch)	Land Area (ft^2)	Rv	SWRv (ft^3)
Impervious Cover (sidewalks, etc.)	11,704	0.95	1,112
Compacted Cover (grass, landscaping)	27,289	0.25	682
BMP (bioretention, green roof)	9,878	0.95	938
MLD Total			2,732
Major Substantial Improvement (0.8-inch)	Land Area (ft^2)	Rv	SWRv (ft^3)
Impervious Cover (building)	18,100	0.95	1,146
Total	66,971		3,878

DA#2 = 66,971 ft^2

UNDER SEPARATE PERMIT
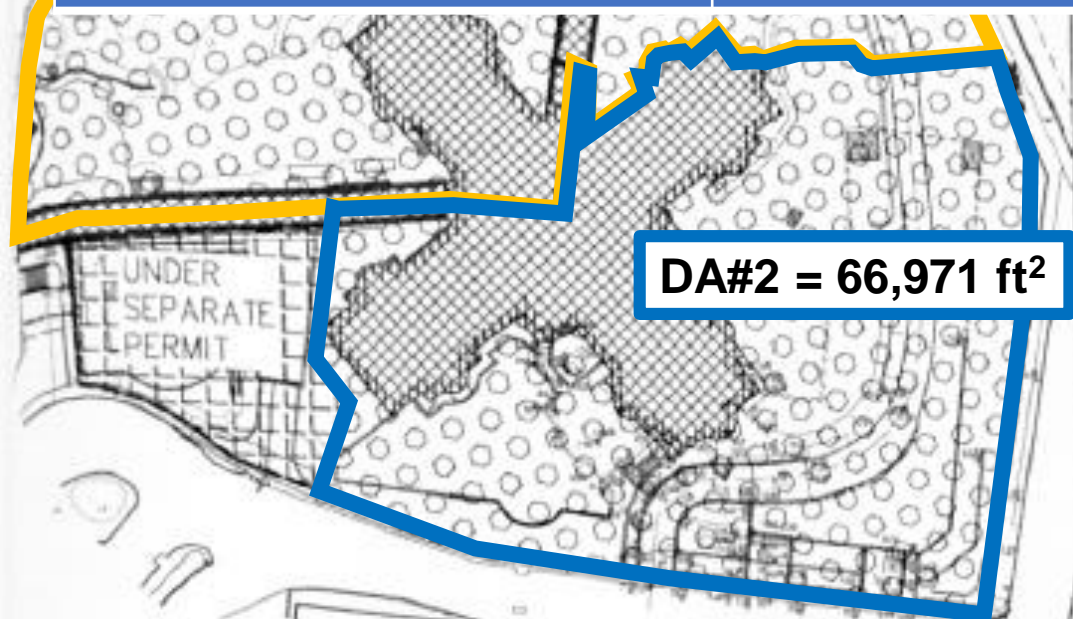
Site Drainage Area #2

Total SWRv for Site

Site Drainage Area #1	**2,875 ft^3**
Site Drainage Area #2	**3,878 ft^3**

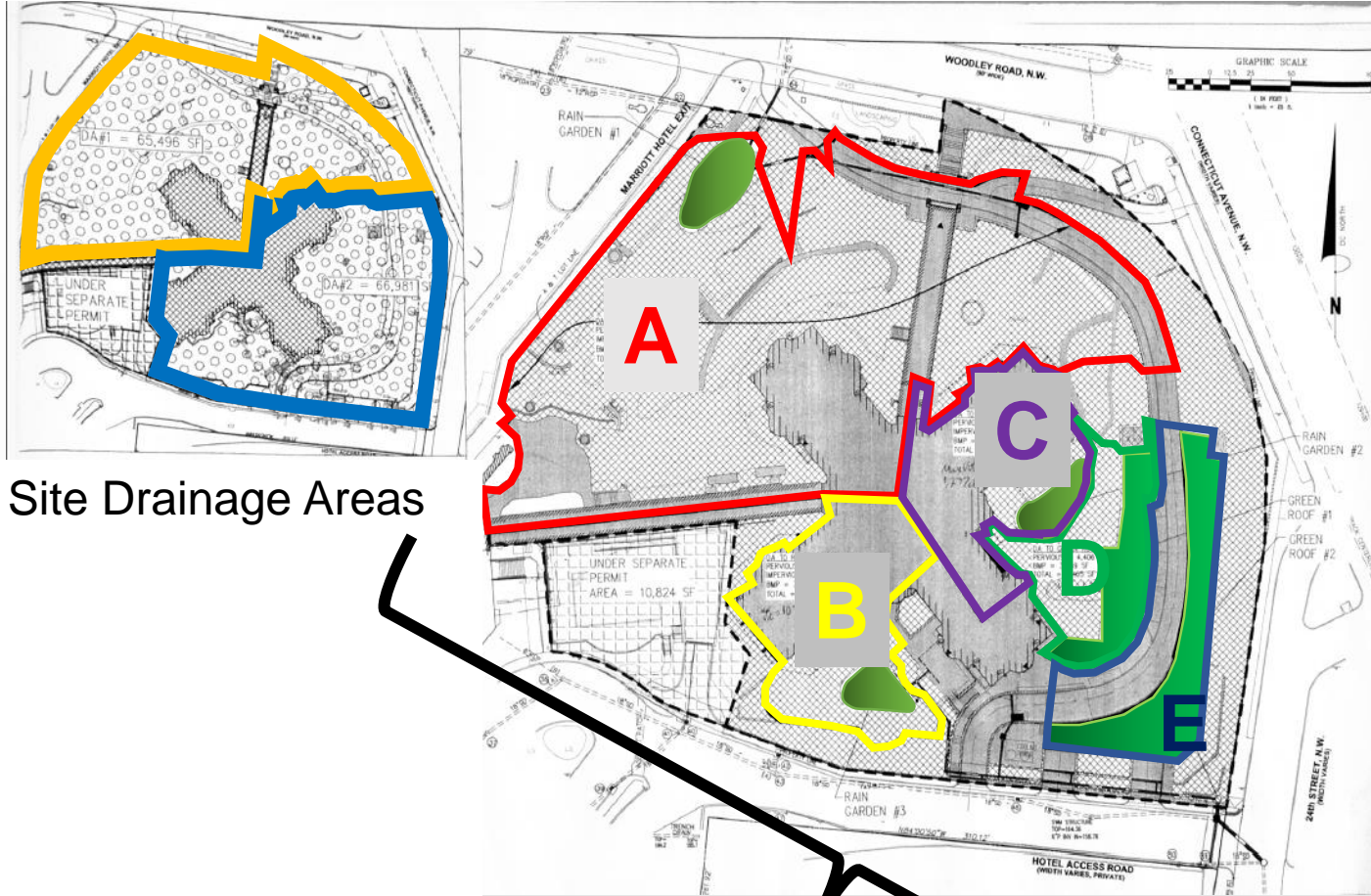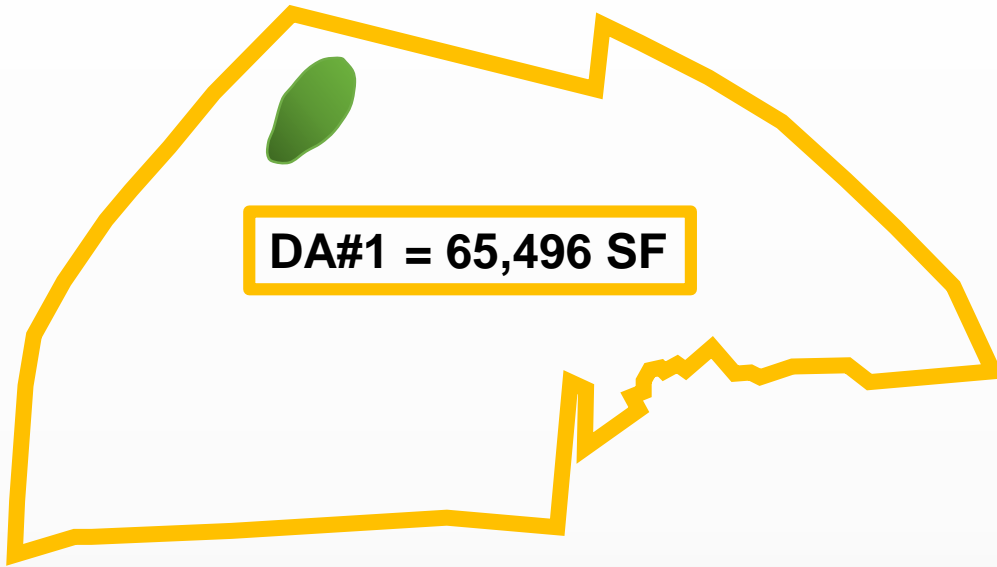**Total = 6,753**

BMP Locations

Bioretention
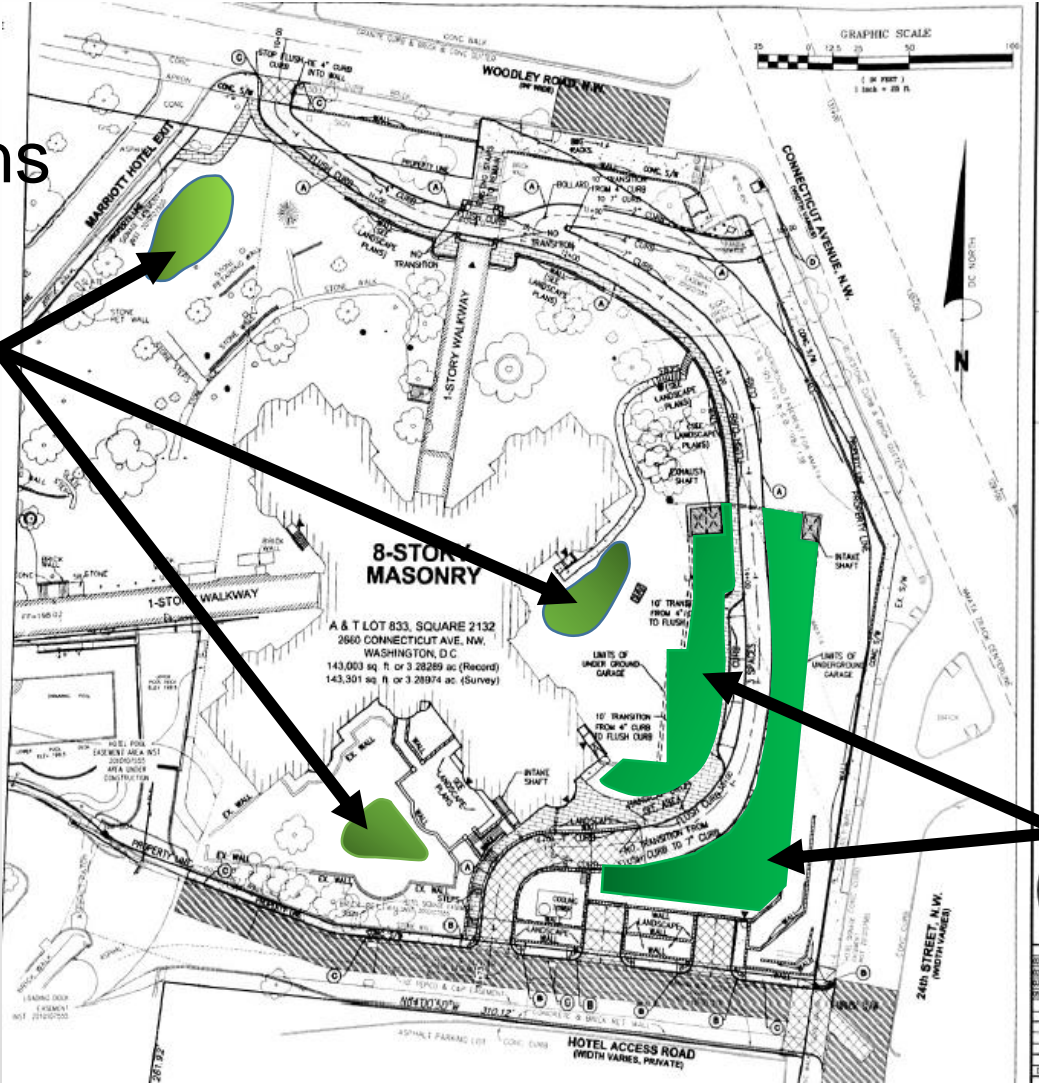
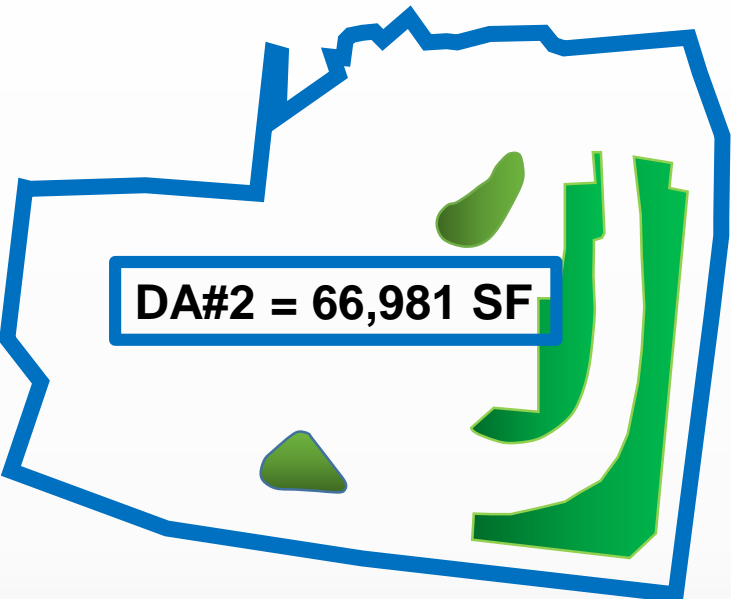Green Roof

Site Drainage Areas

Contributing Drainage Areas

DA#1 = 65,496 SF

Land Cover Type	CDA Area (ft²)	Rv	Max. Retention Vol. (ft³) (1.7-in)
Impervious Cover	18,067	0.95	2,432
Compacted Cover	36,566	0.25	1,295
BMP	1,489	0.95	200
Total	56,122		3,927

A

SDA #1 SWRv (1.2-inch) = 2,875 ft³
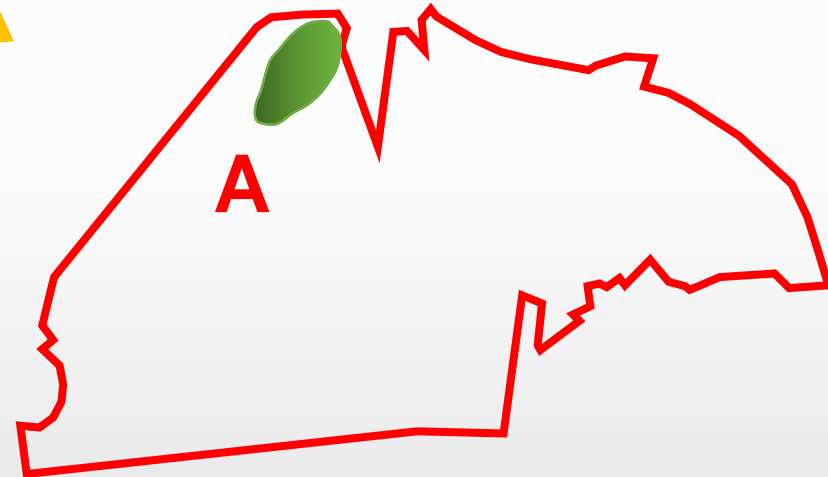
Retention Volume Bioretention	3,076 ft³
Actual Retention Value	3,076 ft³

DA#2 = 66,981 SF

SDA #2 SWRv (1.2-inch) =	3,878 ft³
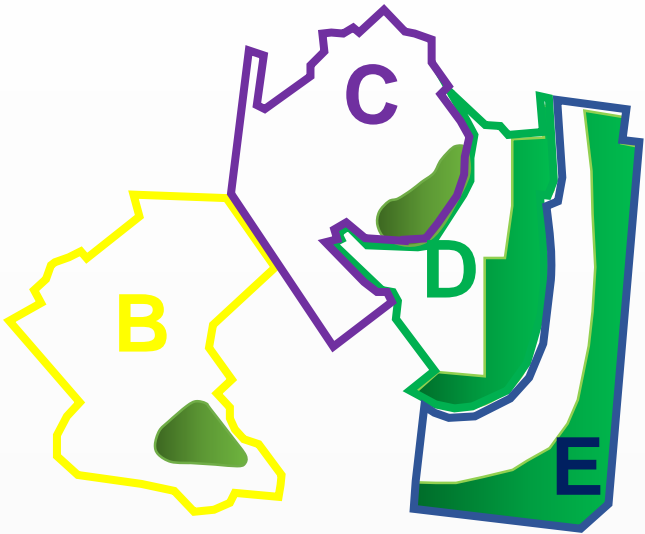
BMP	Max. Retention Vol. (ft³) (1.7-inch)	BMP Retention Volume (ft³)
B	997	1,047
C	1,314	1,402
D	923	859
E	1,241	1,157
Total	**4,475**	**4,465**

Retention Value	4,327 ft³

Total SWRv for Site

Site Drainage Area #1	2,875 ft^3
Site Drainage Area #2	3,878 ft^3

Total = 6,753

Maximum Retention Volume BMP A	3,076 ft^3
Maximum Retention Volume BMPs B - E	4,327 ft^3

Total = 7,403

Met their stormwater obligation!