HYDROLOGY & WATER QUALITY STUDY

FOR

NEIGHBORS FEED & SEED

LAND LOT 700 - 17TH DISTRICT – 2ND SECTION

COBB COUNTY, GEORGIA

CITY OF SMYRNA

PREPARED BY

PLANNING · ENGINEERING · LAND SURVEYING

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SITE ANALYSIS

SITE LOCATION

The site to be developed consists of 0.954 acres located in Land Lot 700 of the 17th District, 2nd Section, Cobb County, Georgia, City of Smyrna and is located on the west side of Atlanta Road just north of Belridge Drive at 3410 Atlanta Road.

PRE DEVELOPMENT

The pre-developed surface condition is a former developed lot with the remains of an existing concrete slab and asphalt drive with mature trees along the side and rear property lines. In the southwest corner of the site, the property sits at a peak which causes all drainage to flow northwesterly to an existing drainage swale that carries the flow to an 18" corrugated metal pipe through the Devonshire Court Subdivision.

POST DEVELOPMENT

The proposed development will cause the site to be mass graded with a detention facility constructed in the northwest corner of the tract. Water quality will be addressed using the Runoff Reduction Method with detention for the 1 year – 100 year storm events being placed above the water quality pool.

This report is a preliminary analysis showing the site will use modular walls to provide sufficient volume to address both water quality and detention volume to reduce the site runoff after development to the mandatory 10% reduction of all Pre-Development flows as the site exists today.

FLOODPLAIN

The property is not in an area having flood hazards as per F.I.R.M. Map No 13067C0226 G dated 12/18/2008.

STORMWATER MANAGEMENT CRITERIA

All design is carried through a 100-year storm event. All hydrologic and hydraulic calculations are based on the latest standards and specifications of the SCS method to analyze the pre and post development runoffs. Rainfall intensity tables pertain to Atlanta; runoff coefficients and all other data used for calculations were obtained from the Georgia Storm Water Management Manual, Volume 2, and other related textbooks.

Erosion and sedimentation measures are based on "The Manual for Erosion and Sedimentation Control in Georgia".

PRE-DEVELOPMENT

DRAINAGE AREA: *0.954 Acres*
0.12 Acres – Existing Concrete & Asphalt
0.834 Acres - Grass

RUNOFF CURVE NUMBER (CN):

$$\text{Onsite CN} = \frac{(1.2\ \text{Ac})(98) + (0.834\ \text{Ac})(55)}{0.954} = 60$$

TIME OF CONCENTRATION, Tc = 5 minutes

RUNOFFS (cfs) See Hydrograph Report #1

1 YR	2 YR	5 YR	10 YR	25 YR	50 YR	100 YR
0.63	1.21	1.87	2.59	3.62	4.44	5.28

10% Reduction Required by City Code

1 YR	2 YR	5 YR	10 YR	25 YR	50 YR	100 YR
0.57	1.09	1.68	2.33	3.26	4.00	4.75

Maximum Q from site after development.

POST DEVELOPMENT

PREDICTED BYPASS

TOTAL AREA: 0.06 Acres

RUNOFF CURVE NUMBER (CN): 61

TIME OF CONCENTRATION, Tc = 5 minutes

RUNOFFS (cfs) See Hydrograph Report #2

1 YR	2 YR	5 YR	10 YR	25 YR	50 YR	100 YR
0.05	0.08	0.13	0.17	0.24	0.29	0.34

ALLOWABLE FLOW SUMMARY

Runoff Flows (cfs)

	1 YR	2 YR	5 YR	10 YR	25 YR	50 YR	100 YR
Q pre	0.57	1.09	1.68	2.33	3.26	4.00	4.75
Q post	0.05	0.08	0.13	0.17	0.24	0.29	0.34
	0.52	1.01	1.55	2.16	3.02	3.71	4.41

INTO POND

TOTAL TRACT AREA: 0.894 Acres

RUNOFF CURVE NUMBER (CN): 61

$$\text{Onsite CN} = \frac{(0.56\ \text{Ac})(98) + (0.334\ \text{Ac})(61)}{0.894} = 84$$

TIME OF CONCENTRATION, Tc = 5 minutes

RUNOFFS (cfs) See Hydrograph Report #3

1 YR	2 YR	5 YR	10 YR	25 YR	50 YR	100 YR
2.72	3.63	4.54	5.47	6.70	7.63	8.55

See Routing and Combined Hydrographs for detention control.

RUNOFF REDUCTION

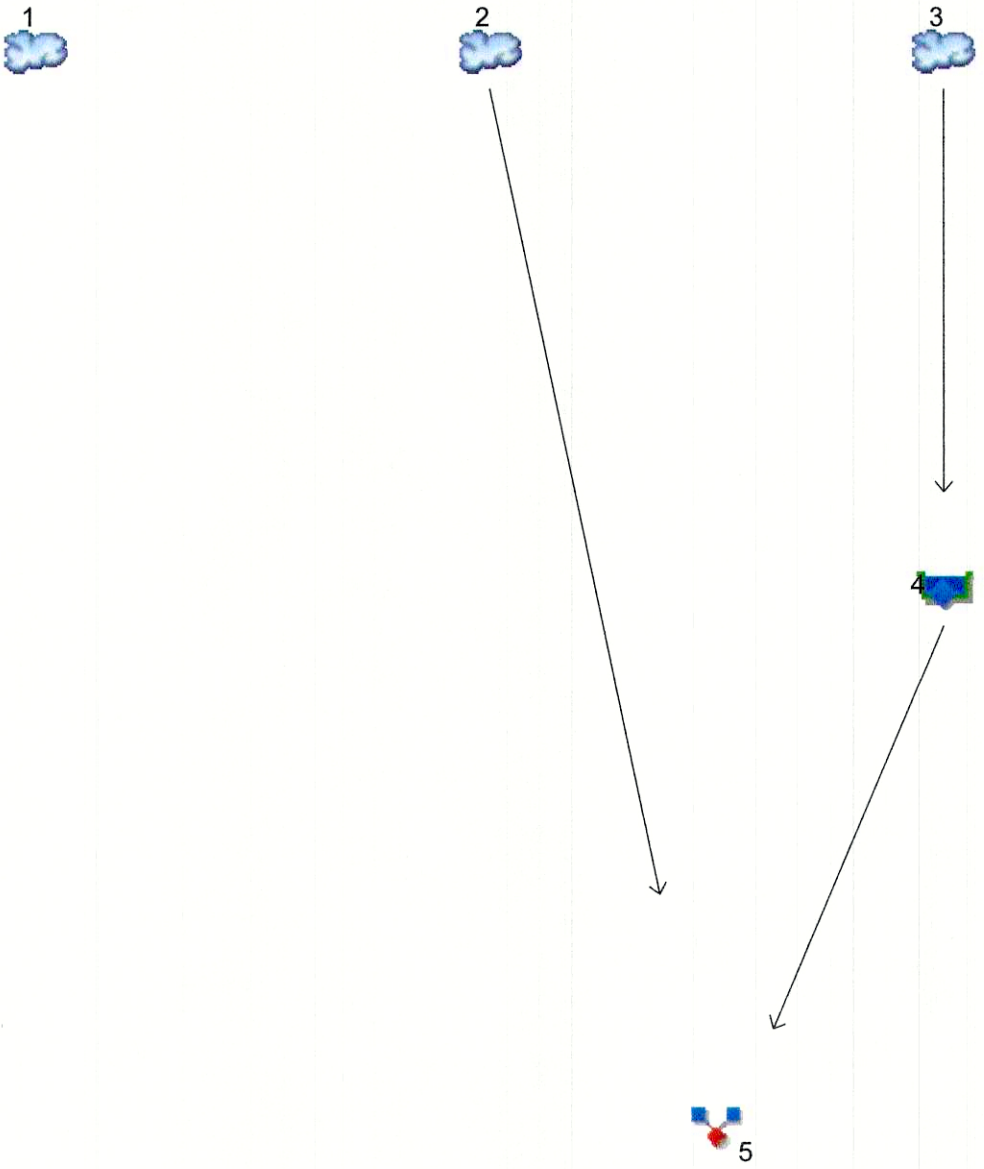
$$RRv = \frac{(1.0)[(0.05 + 0.009(59)](0.954\ \text{Ac})(43560)}{12}$$

= 2012 C.F. Required

See Pond Report for Volume Provided.

APPENDIX

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	Pre Development
2	SCS Runoff	Post Bypass
3	SCS Runoff	Into Pond
4	Reservoir	Routing
5	Combine	Combined

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	0.632	1.212	-------	1.870	2.591	3.623	4.439	5.282	Pre Development
2	SCS Runoff	------	0.045	0.083	-------	0.125	0.172	0.238	0.291	0.344	Post Bypass
3	SCS Runoff	------	2.718	3.625	-------	4.544	5.468	6.703	7.627	8.549	Into Pond
4	Reservoir	3	0.018	0.027	-------	0.034	0.098	0.297	0.609	1.129	Routing
5	Combine	2, 4	0.045	0.083	-------	0.132	0.190	0.311	0.636	1.181	Combined

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.632	2	718	1,527	------	------	------	Pre Development
2	SCS Runoff	0.045	2	718	104	------	------	------	Post Bypass
3	SCS Runoff	2.718	2	716	5,504	------	------	------	Into Pond
4	Reservoir	0.018	2	1442	1,782	3	1043.52	4,945	Routing
5	Combine	0.045	2	718	1,887	2, 4	------	------	Combined

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1.212	2	718	2,591	------	------	------	Pre Development
2	SCS Runoff	0.083	2	718	174	------	------	------	Post Bypass
3	SCS Runoff	3.625	2	716	7,395	------	------	------	Into Pond
4	Reservoir	0.027	2	1442	3,674	3	1044.10	6,363	Routing
5	Combine	0.083	2	718	3,848	2, 4	------	------	Combined

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1.870	2	718	3,834	------	------	------	Pre Development
2	SCS Runoff	0.125	2	718	255	------	------	------	Post Bypass
3	SCS Runoff	4.544	2	716	9,353	------	------	------	Into Pond
4	Reservoir	0.034	2	1442	5,604	3	1044.75	7,973	Routing
5	Combine	0.132	2	718	5,859	2, 4	------	------	Combined

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	2.591	2	718	5,221	------	------	------	Pre Development
2	SCS Runoff	0.172	2	718	345	------	------	------	Post Bypass
3	SCS Runoff	5.468	2	716	11,356	------	------	------	Into Pond
4	Reservoir	0.098	2	964	7,572	3	1045.08	8,773	Routing
5	Combine	0.190	2	718	7,917	2, 4	------	------	Combined

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	3.623	2	718	7,249	------	------	------	Pre Development
2	SCS Runoff	0.238	2	718	476	------	------	------	Post Bypass
3	SCS Runoff	6.703	2	716	14,077	------	------	------	Into Pond
4	Reservoir	0.297	2	786	10,291	3	1045.28	9,261	Routing
5	Combine	0.311	2	786	10,768	2, 4	------	------	Combined

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	4.439	2	718	8,878	------	------	------	Pre Development
2	SCS Runoff	0.291	2	718	581	------	------	------	Post Bypass
3	SCS Runoff	7.627	2	716	16,144	------	------	------	Into Pond
4	Reservoir	0.609	2	748	12,358	3	1045.48	9,758	Routing
5	Combine	0.636	2	746	12,939	2, 4	------	------	Combined

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	5.282	2	718	10,583	------	------	------	Pre Development
2	SCS Runoff	0.344	2	718	691	------	------	------	Post Bypass
3	SCS Runoff	8.549	2	716	18,229	------	------	------	Into Pond
4	Reservoir	1.129	2	728	14,442	3	1045.75	10,411	Routing
5	Combine	1.181	2	728	15,133	2, 4	------	------	Combined

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Monday, 08 / 15 / 2022

Pond No. 1 - Runoff Reduction Pond

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1040.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1040.00	00	0	0
1.00	1041.00	2,450	817	817
1.50	1041.50	2,450	1,225	2,041

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .000	.000	.000	n/a
Orifice Coeff.	= 0.00	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 0.00	0.00	0.00	0.00
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	1040.00	---	---	---	---	---	---	---	---	---	---	0.000
1.00	817	1041.00	---	---	---	---	---	---	---	---	---	---	0.000
1.50	2,041	1041.50	---	---	---	---	---	---	---	---	---	---	0.000

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Monday, 08 / 15 / 2022

Pond No. 2 - Pond

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1041.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1041.50	2,450	0	0
0.50	1042.00	2,450	1,225	1,225
2.50	1044.00	2,450	4,900	6,124
4.50	1046.00	2,450	4,900	11,024
6.50	1048.00	2,450	4,900	15,923

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	1.00	0.00	0.00
Span (in)	= 24.00	1.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 1041.50	1043.00	0.00	0.00
Length (ft)	= 5.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	0.50	0.00	0.00
Crest El. (ft)	= 1047.00	1045.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	---	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	1041.50	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.50	1,225	1042.00	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
2.50	6,124	1044.00	0.03 ic	0.03 ic	---	---	0.00	0.00	---	---	---	---	0.026
4.50	11,024	1046.00	1.71 oc	0.05 ic	---	---	0.00	1.66	---	---	---	---	1.710
6.50	15,923	1048.00	34.33 ic	0.02 ic	---	---	29.95 s	4.36 s	---	---	---	---	34.33