DRAINAGE & HYDROLOGIC ANALYSIS
CLARENDON AVE./BERKELY RD. AREA

CITY OF AVONDALE ESTATES, GEORGIA

PREPARED FOR:
CITY OF AVONDALE ESATES
Department of Public Works
21 North Avondale Plaza
Avondale Estates, GA 30002

PREPARED BY:

SKYLINE
ENGINEERING & CONSTRUCTION

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Civil Engineer

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August 18, 2016

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EXHIBITS

I. Introduction

This report summarizes the preliminary hydrologic analysis performed for the Clarendon Ave./Berkeley Rd. area within the City of Avondale Estates, Georgia (GA). The area consists of an established residential single family neighborhood with lot sizes averaging approximately 12,000 square feet (sf). Known existing flooding issues have been documented both within the City's right-of-way and private properties.

II. Site Location

The original study area was defined as noted in the attached Exhibit "A". However, after further analysis the study area increased to include the limits of total stormwater contributing area as shown in Exhibit "B".

III. Project Due Diligence

The following evaluation of the existing drainage conveyance and stormwater patterns of the project area is based on review of City of Avondale Estates mapping (Exhibit "A") and DeKalb County Topographic information (Exhibit "B"). Mapping from the City of Avondale Estates provided limited information and locations of storm sewers, catch basins, inlets and ditches located within the subject area. Site visits of the subject area were performed to record photographs, study the drainage area and patterns, interview available residents and verify both DeKalb County and the City's mapping information.

IV. Existing Conditions

The study area discharges from the City via two drainage basins referred to as Drainage Basins 1 and 2 on attached Exhibit "B".

Drainage Basin 1
Drainage Basin 1 discharges into Shoal Creek East Fork Middle Branch via an existing 36" corrugated metal pipe (CMP) pipe located in Avondale Park west of the intersection of Clarendon Place and Dartmouth Avenue. Stormwater runoff is collected upstream via six curb inlets located at the intersection of Clarendon Place and Dartmouth Avenue. This location has been depicted as Study Point (SP) 1 on attached Exhibit "B". The total drainage basin area at this location is approximately 71 acres and the peak rate of flow for the 25-year storm event has been calculated to be approximately 240 cubic feet per second (cfs).

In comparison, it is important to note that the capacity of the existing 36" CMP has been calculated to be approximately 62.57 cfs. Thus, stormwater discharge to the existing stormwater conveyance system greatly exceeds its capacity and therefore the system creates a "ponding" area at the intersection of Clarendon Place and Dartmouth Avenue where stormwater backs up from the existing 36" pipe and the six existing curb inlets.

Within Drainage Basin 1 is sub-basin 1A as shown in Exhibit "B". Property owners in this area have experienced severe flooding issues along the existing ditch at the rear of the shared lot lines which discharges south into Kingstone Road. The drainage area of sub-basin 1A is approximately 8.7 acres.

Drainage Basin 2
Drainage Basin 2 of the project study area discharges via an existing 18" CMP pipe located north of the Avondale Swim and Tennis Club and also discharges into Shoal Creek East Fork Middle Branch. Stormwater Runoff from Drainage Basin 2 discharges into the existing 18" CMP pipe via two curb inlets/catch basins located at the low point along Dartmouth Avenue. The total drainage basin area at this location is approximately 32 acres and the peak rate of flow for the 25-year storm event has been calculated to be approximately 180 cfs.

In comparison, it is important to note that the capacity of the existing 18" CMP has been calculated to be approximately 5.69 cfs. Stormwater discharge to the existing stormwater conveyance system greatly exceeds its capacity and therefore the system creates a "ponding" area at the low point of Dartmouth Avenue where stormwater backs up from the existing 18" pipe and the two existing curb inlets.

V. Recommendations

In both Drainage Basin 1 and 2 the existing capacity of their respective receiving conveyance pipes and inlets are currently undersized. It is our opinion that a proposed pipe network as depicted on Exhibit "C" would help mitigate flooding issues within the study area. By adding additional curb inlets and the subsurface storm sewer system, stormwater runoff can be collected and conveyed underground prior to accumulating at the surface and creating the current flooding issues as experienced by multiple city residents. Additionally, the existing storm sewer systems for each basin can be modified to meet the volumes for the 25-year storm event and incorporated into the proposed system. All proposed improvements for Basin 1 and Basin 2 will be shown as "Proposed Storm Sewers - Phase 1" and "Proposed Storm Sewers - Phase 2" respectively.

Please note it is also important to analyze the downstream receiving channel, Shoal Creek East Fork Middle Branch, to ensure it has the capacity to handle the increase in stormwater runoff velocity and volume as a result of the proposed recommendations. This tasks may result in preparing the downstream streambank as recommended in the Georgia Stormwater Manual.

VI. Methodology

SCS Hydrologic Methodology was applied in the following analysis using the Type II rainfall distribution for the 24 hour storm in Atlanta, Georgia. Time of concentration values for existing conditions were calculated using the SCS TR-55 methodology and curve number calculations are based on Type "C" soils and Table 2.1.5-1 of the Georgia Stormwater Management Manual. Analysis for all storm events was performed using Hydraflow Hydrographs 2004, hydrology & hydraulics software program, version 6.0 by Intellisolve.

See Appendix B-1 for Methodology Support Information.

VII. Preliminary Cost Estimate

The cost estimate is conceptual in nature and should not be used for construction purposes. All final costs should be based on construction plans and specifications that are sealed by a licensed professional engineer in the State of Georgia.

Skyline's approach to this estimate consisted of a table-top review and approximating units of the proposed pipe network depicted on Exhibit "C". A conceptual table was created depicting the major elements of a typical infrastructure improvement project, Refer to Table I. Major work divisions are roadway, concrete, reinforced concrete pipe (RCP), grassing and appurtenances. Line items were evaluated for approximate quantities (Qty.), unit of measurement (Units), unit price, and amount in U.S. dollars ($). Typical elements are as follows:

- Traffic control
- Erosion and sedimentation control
- Asphalt
- Signage
- Striping
- Driveways
- Curbs
- Gutters
- Base pavement
- RCP (18" – 72" o.d.)
- Catch basins
- Drop inlets
- Head wall
- Grassing (permanent)

Initial quantities of RCP, drop inlets, catch basins, headwalls, and junction boxes were compiled from the Skyline Inlet Basin Map. Costs were compiled from various sources such as Old Castle Concrete, ISCO Industrial, Georgia Department of Transportation (GDOT), Emory Village Construction Costs, and RS Means Building Construction Data.
Approximate construction costs are as follows:

Phase 1 - $ 863,822.97
Phase 2 - $ 225,361.24
$ 1,089,184.21 Grand Total

Refer to Table I for the approximate breakdown of probable cost elements, quantities, units, unit price, and line item amounts.

Table 1

Phase 1				
Avondale, Georgia				
Description	**Qty.**	**Units**	**Unit Price ($)**	**Amount ($)**
Roadway:				
Traffic Control	0.67	LS	26000	17420
Temporary Grassing	5	AC	1000	5000
Mulch	4	TN	600	2400
Construct and Remove Inlet Sediment Trap	33	EA	200	6600
Maintenance of Temporary silt Fence	8911	LF	2	17822
Maintenance of Inlet Sediment Trap	33	EA	2	66
Temporary Silt Fence	8911	LF	2.25	20049.75
Grading Complete (Demolition incl)	2779	CY	7	19454.12
Graded Aggregate Base	1191	CY	40	47623.6
Aggregate Surface Course	6.7	TN	40	268
Recycled Asphalt Conc. Patching, Incl. Bitumen . Matl & Lime	6.7	TN	200	1340
Recycled Asph. Conc. 12.5 MM Superpave, GP 2 Only, Incl. Bitumen & H Lime	6.7	TN	200	1340
Bitumen Tack Coat	134	GL	7	938
Mill Asph Conc. Pavement, 2" Depth	676.7	SY	3	2030
Concrete:				
Driveway Concrete, 6 IN Tk	167.5	SY	40	6700
Class B Concrete, Base or Pavement Widening	194	CY	200	38806
Reinforced Concrete Pipe:				
Storm Drain Pipe, 18 IN, H 1-10	2319	LF	40	92760
Storm Drain Pipe, 24 IN, H 1-10	1677	LF	50	83850
Storm Drain Pipe, 36 IN, H 1-10	1729	LF	70	121030
Storm Drain Pipe, 48 IN, H 1-10	368	LF	100	36800
Storm Drain Pipe, 54 IN, H 1-10	472	LF	125	59000
Storm Drain Pipe, 72 IN, H 1-10	480	LF	200	96000
Storm Drain Pipe, 60 IN, H 1-10	532	LF	130	69160
Catch Basin, GP 1	32	EA	2800	89600
Drop Inlet, GP 1	4	EA	2500	10000

Pipe Lube	15	EA	100	1500
Junction Box	1	EA	3500	3500
Headwall	1	EA	3500	3500
Grassing and Appurtenances:				
Permanent Grassing	5	AC	1000	5000
Agricultural Lime	5	TN	2	10
Liquid Lime	75	GL	2	150
Fertilizer, Mixed Grade	2.5	TN	2	5
Fertilizer, Nitrogen Content	450	LB	2	900
Striping	900	LF	2	1800
Signage	40	SF	35	1400
				$ 863,822.97

Phase 2				
Description	**Qty.**	**Units**	**Unit Price ($)**	**Amount ($)**
Roadway:				
Traffic Control	0.33	LS	26000	8580
Temporary Grassing	2	AC	1000	2000
Mulch	2	TN	600	1200
Construct and Remove Inlet Sediment Trap	7	EA	200	1400
Maintenance of Temporary silt Fence	4389	LF	2	8778
Maintenance of Inlet Sediment Trap	7	EA	5	35
Temporary Silt Fence	4389	LF	2.25	9875.25
Grading Complete (Demolition incl)	1369	CY	7	9581.88
Graded Aggregate Base	586.4	CY	40	23456.4
Aggregate Surface Course	3.3	TN	40	132
Recycled Asphalt Conc. Patching, Incl. Bitumen . Matl & Lime	3.3	TN	200	660
Recycled Asph. Conc. 12.5 MM Superpave, GP 2 Only, Incl. Bitumen & H Lime	3.3	TN	200	660
Bitumen Tack Coat	66	GL	7	462
Mill Asph Conc. Pavement, 2" Depth	333.3	SY	3	1000
Concrete:				
Driveway Concrete, 6 IN Tk	82.5	SY	40	3300
Class B Concrete, Base or Pavement Widening	74.07	CY	200	14815

Reinforced Concrete Pipe:				
Storm Drain Pipe, 18 IN, H 1-10	297	LF	40	11880
Storm Drain Pipe, 24 IN, H 1-10	819	LF	50	40950
Storm Drain Pipe, 36 IN, H 1-10	357	LF	70	24990
Storm Drain Pipe, 54 IN, H 1-10	286	LF	125	35750
Catch Basin, GP 1	6	EA	2800	16800
Pipe Lube	15	EA	100	1500
Headwall	1	EA	3500	3500
Grassing and Appurtenances:				
Permanent Grassing	2	AC	1000	2000
Agricultural Lime	2	TN	2	4
Liquid Lime	25	GL	2	50
Fertilizer, Mixed Grade	1	TN	2	2
Fertilizer, Nitrogen Content	50	LB	2	100
Striping	600	LF	2	1200
Signage	20	SF	35	700

$ **225,361.24**

Grand Total (Phase 1 and 2)				**$ 1,089,184.21**

VIII. Hydraulic and Hydrologic Support Information

The following pages are technical support for the analysis provided herein.

Channel Report

18 in. CMP Capacity

Circular

Diameter (ft)	= 1.50
Invert Elev (ft)	= 100.00
Slope (%)	= 1.00
N-Value	= 0.024

Calculations

Compute by:	Q vs Depth
No. Increments	= 10

Highlighted

Depth (ft)	= 1.50
Q (cfs)	= 5.688
Area (sqft)	= 1.77
Velocity (ft/s)	= 3.22
Wetted Perim (ft)	= 4.71
Crit Depth, Yc (ft)	= 0.95
Top Width (ft)	= 0.00
EGL (ft)	= 1.66

Section

Elev (ft)

Reach (ft)
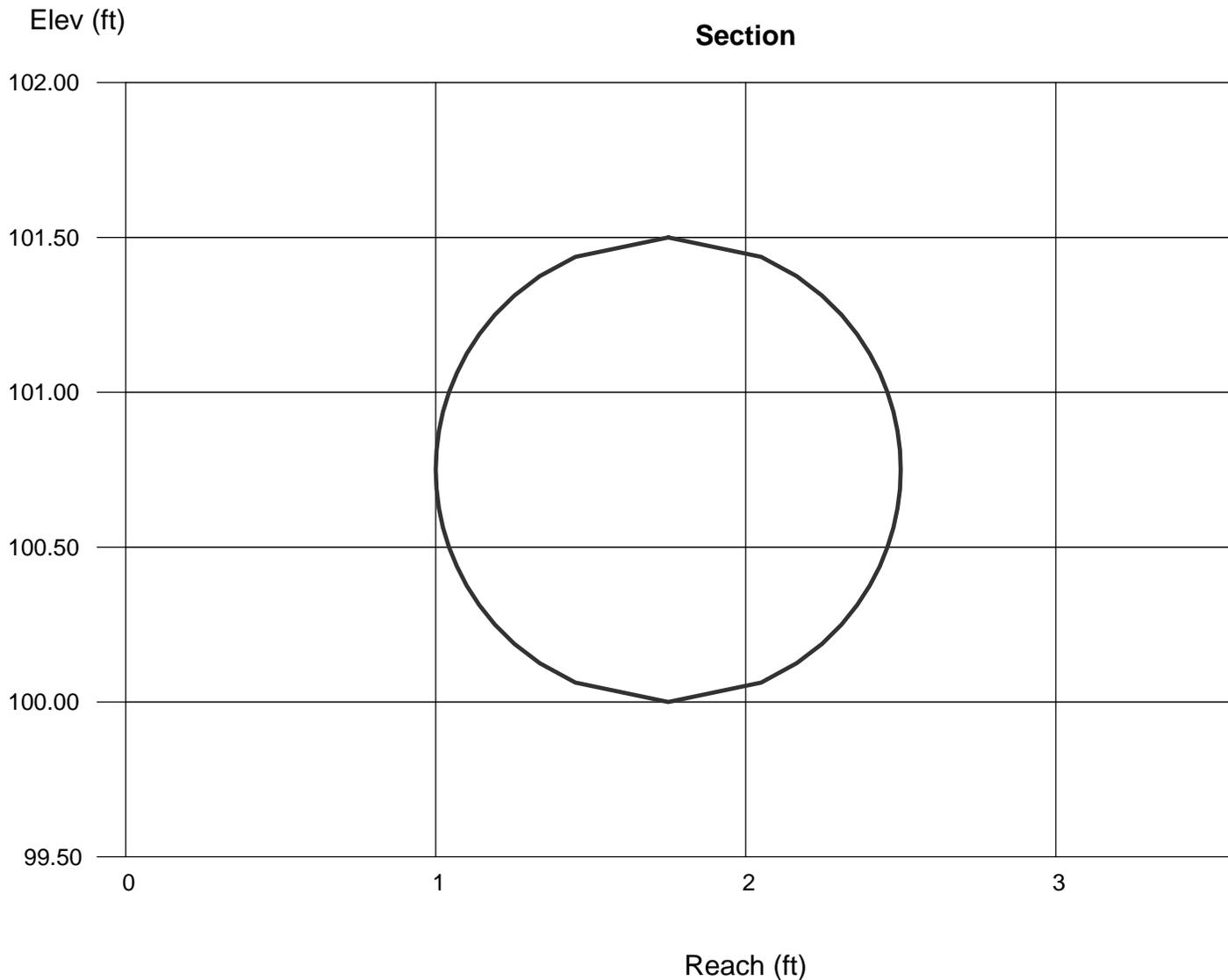
Channel Report

36 in. CMP Capacity

Circular

Diameter (ft)	= 3.00
Invert Elev (ft)	= 100.00
Slope (%)	= 3.00
N-Value	= 0.024

Calculations

Compute by:	Q vs Depth
No. Increments	= 10

Highlighted

Depth (ft)	= 3.00
Q (cfs)	= 62.57
Area (sqft)	= 7.07
Velocity (ft/s)	= 8.85
Wetted Perim (ft)	= 9.42
Crit Depth, Yc (ft)	= 2.62
Top Width (ft)	= 0.00
EGL (ft)	= 4.22

Elev (ft)   **Section**   Depth (ft)

Reach (ft)
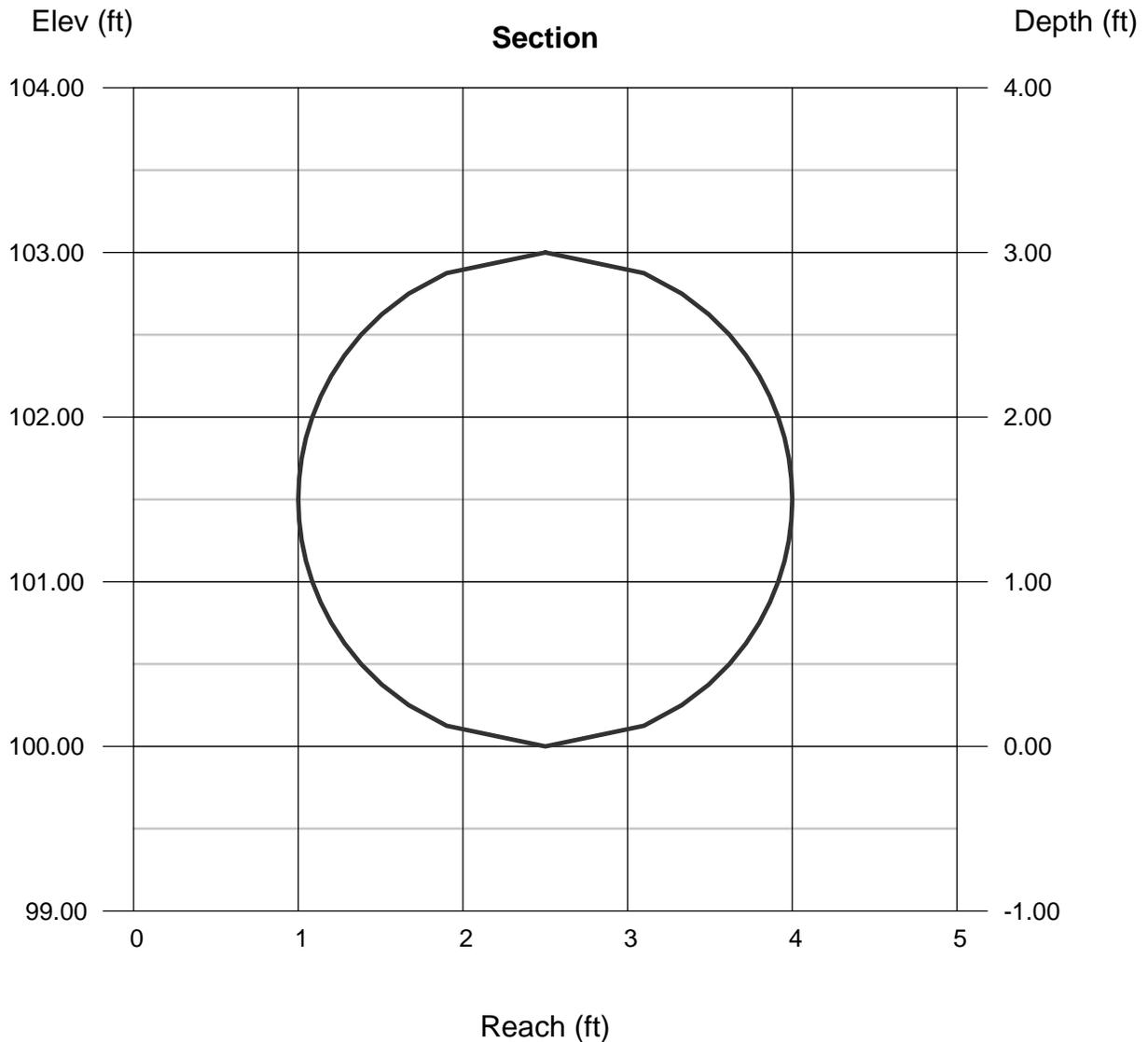
Hydrograph Summary Report

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	240.04	2	736	1,169,810	------	------	------	Study Pt. 1
2	SCS Runoff	180.11	2	722	514,057	------	------	------	Study Pt. 2

08-17-16.gpw   Return Period: 25 Year   Wednesday, Aug 17, 2016

Hydrograph Report

Hyd. No. 1

Study Pt. 1

Hydrograph type	= SCS Runoff		Peak discharge	= 240.04 cfs
Storm frequency	= 25 yrs		Time to peak	= 736 min
Time interval	= 2 min		Hyd. volume	= 1,169,810 cuft
Drainage area	= 71.000 ac		Curve number	= 83
Basin Slope	= 0.0 %		Hydraulic length	= 0 ft
Tc method	= TR55		Time of conc. (Tc)	= 37.80 min
Total precip.	= 6.48 in		Distribution	= Type II
Storm duration	= 24 hrs		Shape factor	= 484

Study Pt. 1

Hyd. No. 1 -- 25 Year

Q (cfs)

Q (cfs)

Time (min)
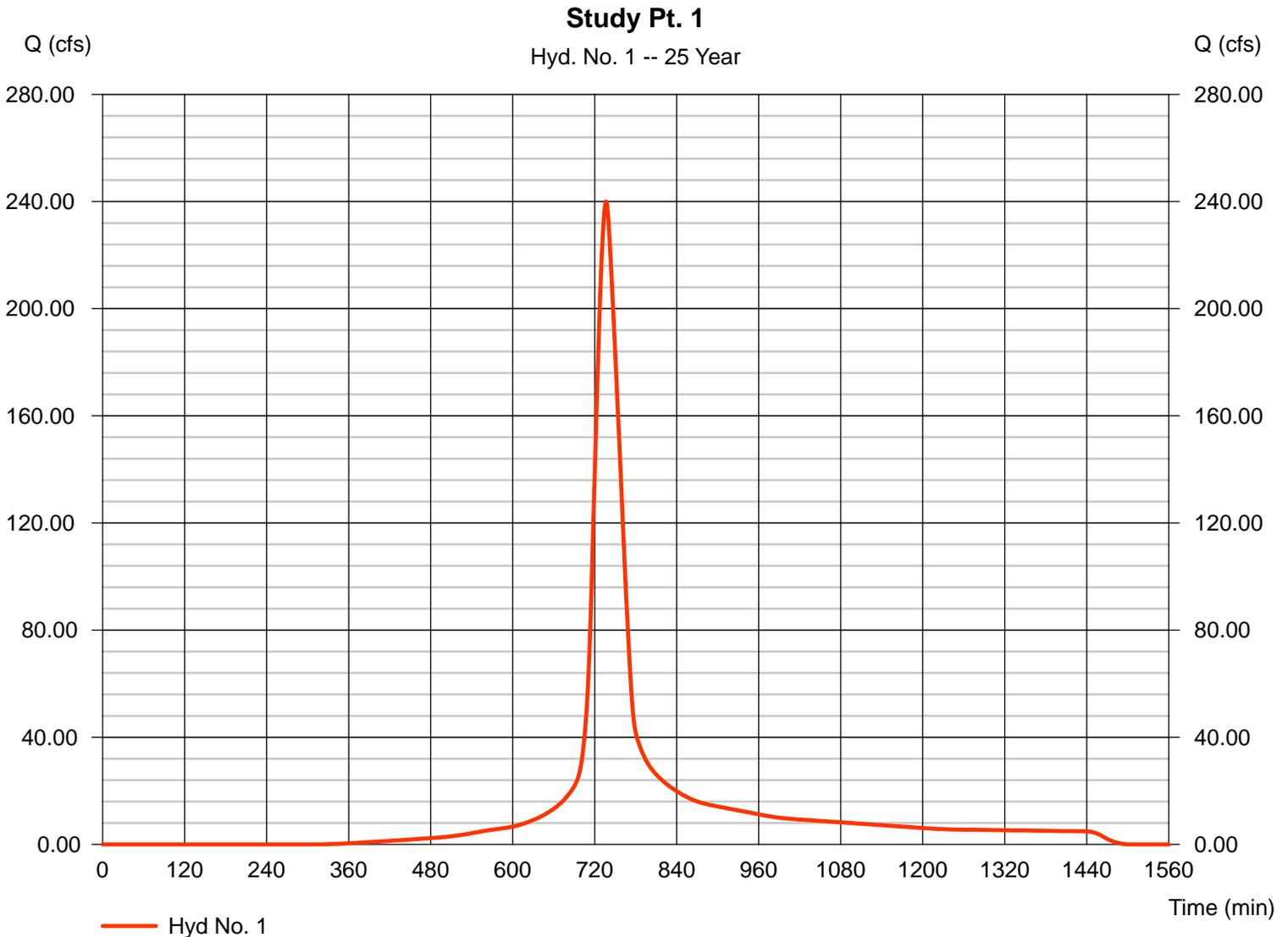
Hyd No. 1

TR55 Tc Worksheet

Hyd. No. 1

Study Pt. 1

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.150	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 4.08	0.00	0.00	
Land slope (%)	= 1.00	0.00	0.00	
Travel Time (min)	**= 11.45 +**	**0.00 +**	**0.00 =**	**11.45**
Shallow Concentrated Flow				
Flow length (ft)	= 255.00	3745.00	0.00	
Watercourse slope (%)	= 4.00	1.50	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 3.23	2.49	0.00	
Travel Time (min)	**= 1.32 +**	**25.07 +**	**0.00 =**	**26.39**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00 +**	**0.00 +**	**0.00 =**	**0.00**

Total Travel Time, Tc .... **37.80 min**

Hydrograph Report

Wednesday, Aug 17, 2016

Hyd. No. 2

Study Pt. 2

Hydrograph type	= SCS Runoff	Peak discharge	= 180.11 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 514,057 cuft
Drainage area	= 32.000 ac	Curve number	= 83
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.60 min
Total precip.	= 6.48 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Study Pt. 2
Hyd. No. 2 -- 25 Year
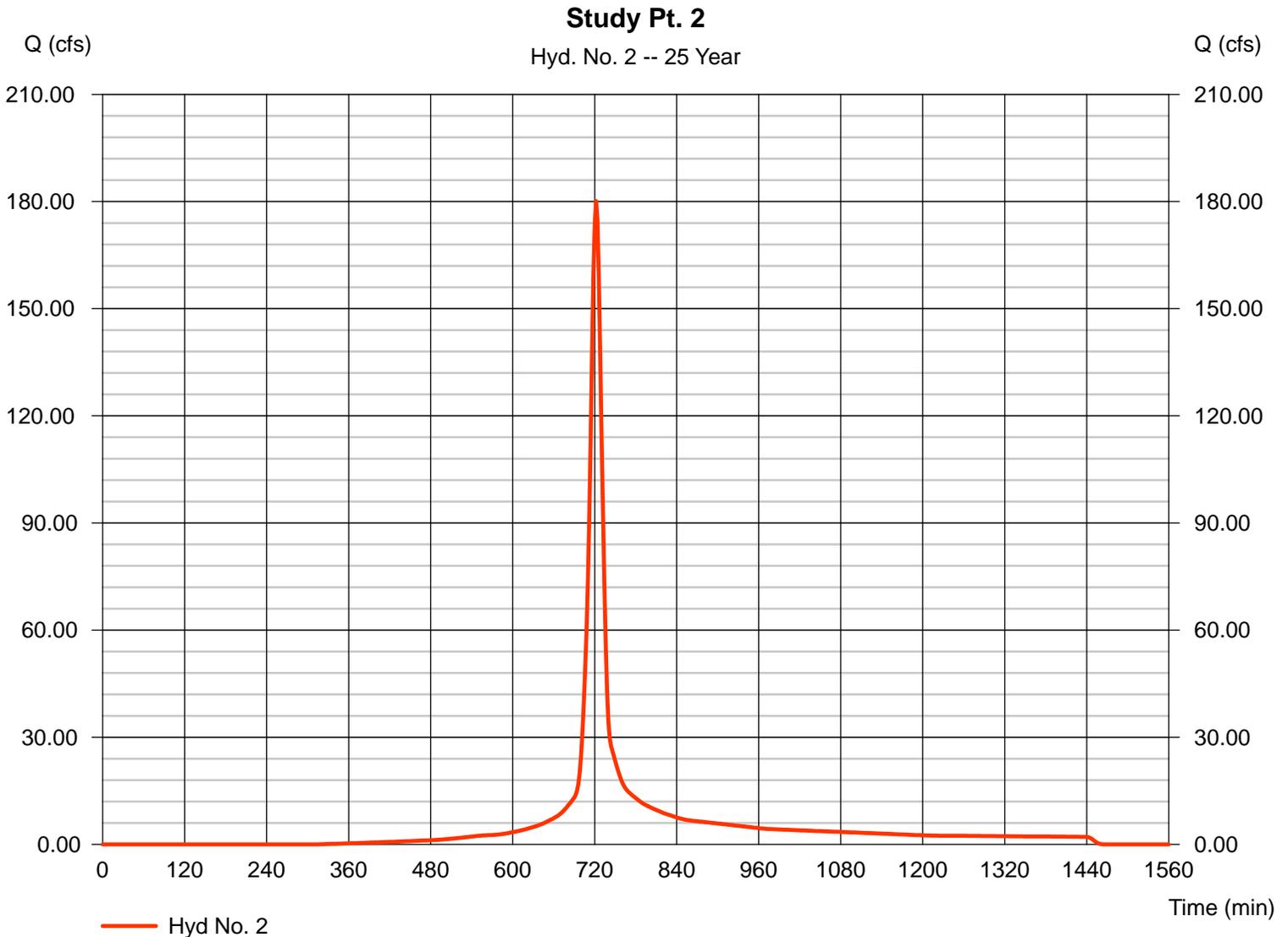
Hyd No. 2

TR55 Tc Worksheet

Hyd. No. 2

Study Pt. 2

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.150	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 4.08	0.00	0.00	
Land slope (%)	= 4.00	0.00	0.00	
Travel Time (min)	**= 6.58** +	**0.00** +	**0.00** =	**6.58**
Shallow Concentrated Flow				
Flow length (ft)	= 600.00	1140.00	0.00	
Watercourse slope (%)	= 3.00	3.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 2.79	3.52	0.00	
Travel Time (min)	**= 3.58** +	**5.40** +	**0.00** =	**8.97**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00** +	**0.00** +	**0.00** =	**0.00**

Total Travel Time, Tc ....   **15.60 min**

CITY OF
AVONDALE ESTATES
CLARENDON/BERKELEY
DRAINAGE STUDY AREA
2/22/2016

Google My Maps
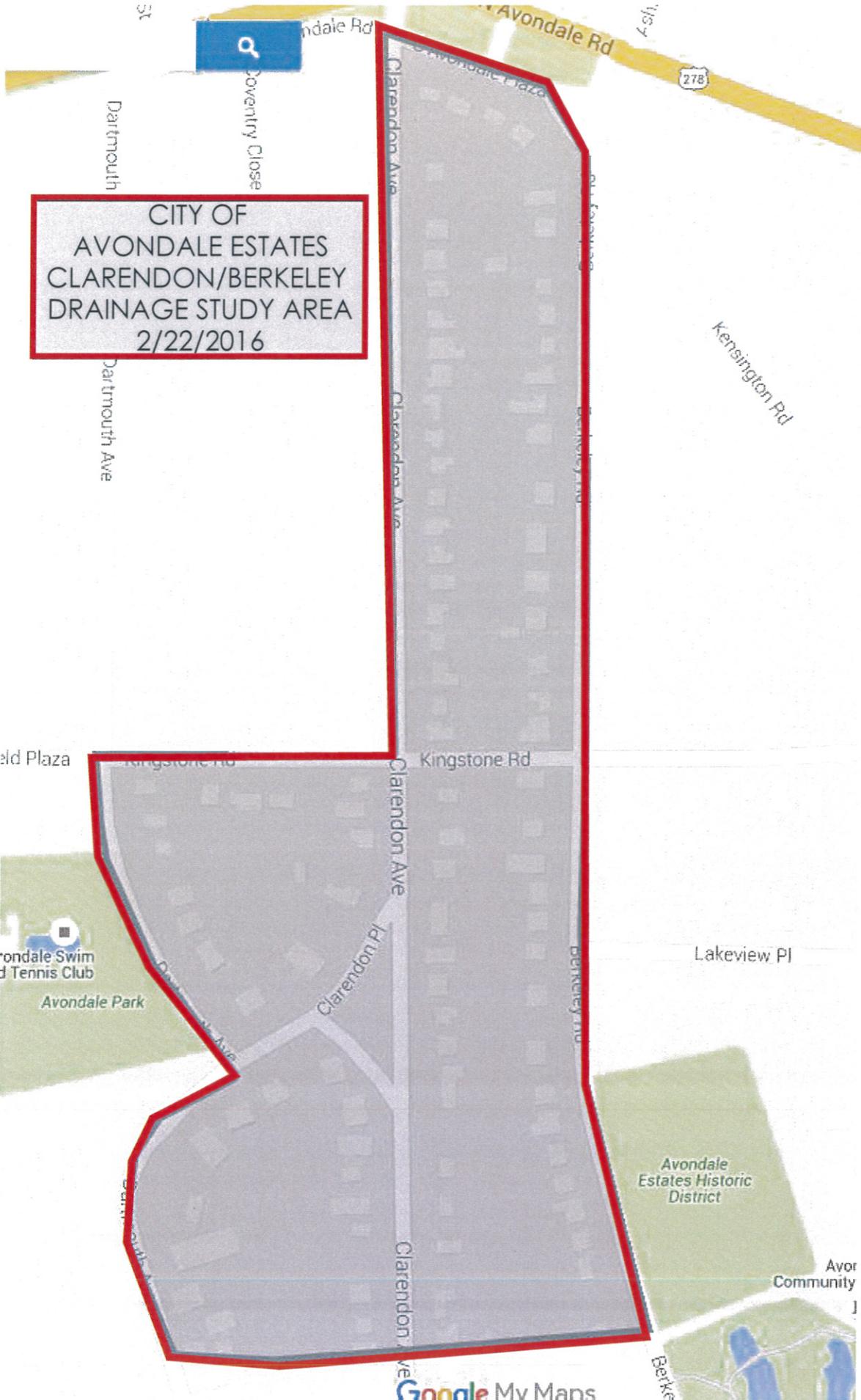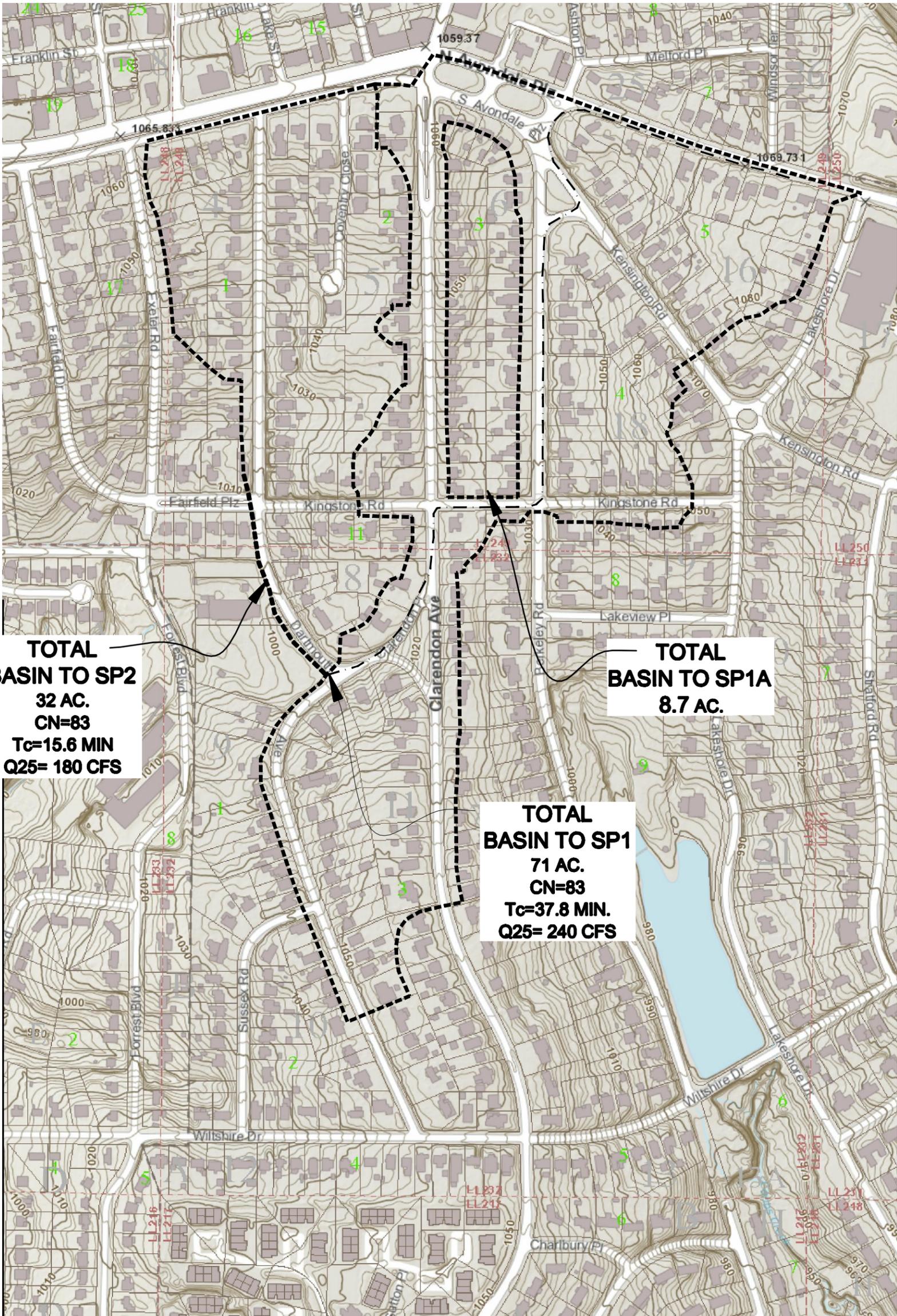
TOTAL BASIN TO SP2
32 AC.
CN=83
Tc=15.6 MIN
Q25= 180 CFS

TOTAL BASIN TO SP1A
8.7 AC.

TOTAL BASIN TO SP1
71 AC.
CN=83
Tc=37.8 MIN.
Q25= 240 CFS

AVONDALE ESTATES
EXHIBIT "B"
EXISTING DRAINAGE
BASIN MAP

GRAPHIC SCALE
400   0   200   400
(IN FEET)
1 inch = 400 ft.

SKYLINE
ENGINEERING & CONSTRUCTION

PROPOSED STORM SEWERS - PHASE 1
PIPE SCHEDULE

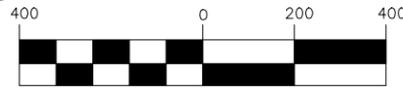| Structure Name	Rim Elev. (ft)	Invert In Elev. (ft)	Invert Out Elev. (ft)	Structure Height (ft)	Pipe Segment	Pipe Length (ft)	Pipe Material	Pipe Slope
A1 HW	995.08	988.00		6.71	A1 TO A2	279	72"∅ RCP	1.00%
A2 JB	998.88	991.00	990.79	8.58	A2 TO A3	201	72"∅ RCP	1.00%
A3 CB	1004.27	994.10 993.10 996.85 994.78	993.01	11.75	A3 TO A4 A3 TO A3.1 A3 TO A3a A3 TO A3b	107 221 19 68	60"∅ RCP 36"∅ RCP 24"∅ RCP 24"∅ RCP	1.00% 3.00% 1.00% 8.00%
A3.1 CB	1011.12	999.80 1002.00	999.72	13.40	A3.1 TO A3.2 A3.1 to A3.1A	295 30	36"∅ RCP 18"∅ RCP	3.68% 8.00%
A3.1a CB	1011.30		1004.59	8.71				
A3.2 CB	1023.04	1010.70	1010.66	14.38	A3.2 TO A3.3	433	36"∅ RCP	4.00%
A3.3 CB	1039.92	1028.50	1028.00	13.92	A3.3 TO A3.4	29	36"∅ RCP	1.50%
A3.4 CB	1039.92		1028.94	12.98				
A3a CB	1004.29		997.04	9.25				
A3b CB	1006.77		1000.25	8.52				
A4 CB	1005.98	996.00 1000.40	995.17	11.31	A4 TO A5 A4 to A4a	165 30	60"∅ RCP 24"∅ RCP	2.00% 0.86%
A4a	1005.84		1000.66	7.18				
A5 CB	1010.00	999.30 1001.30	999.29	11.21	A5 TO A6 A5 TO A5.1	260 33	60"∅ RCP 24"∅ RCP	3.00% 1.50%
A5.1 CB	1011.44	1002.00	1001.80	11.64	A5.1 TO A5.2	256	24"∅ RCP	7.00%
A5.2 CB	1030.05	1021.00	1019.90	12.15	A5.2 TO A5.3	43	24"∅ RCP	3.00%
A5.3 CB	1030.12		1022.30	9.82				
A6 CB	1019.74	1007.50	1007.10	13.15	A6 TO A7	286	54"∅ RCP	2.00%
A7 CB	1023.25	1013.30	1013.21	12.04	A7 TO A8	186	54"∅ RCP	2.00%
A8 CB	1026.00	1017.60	1017.02	9.48	A8 TO A9	24	48"∅ RCP	1.50%
A9 CB	1026.00	1019.00 1018.50	1017.96	8.54	A9 TO A10 A9 TO A 9.1	46 192	48"∅ RCP 24"∅ RCP	2.00% 1.50%
A9.1 CB	1028.04	1021.50	1021.39	8.66	A9.1 TO A9.2	36	24"∅ RCP	1.00%
A9.2 CB	1027.99		1021.86	8.13				
A10 DI	1029.56	1020.00	1019.93	11.63	A10 TO A11	298	48"∅ RCP	1.00%
A11 DI	1032.76	1023.00 1023.00	1022.98	11.78	A11 TO A12 A11 TO A11.1	262 202	36"∅ RCP 36"∅ RCP	1.50% 1.50%
A11.1 CB	1033.89	1026.10	1026.03	9.86	A11.1 TO A11.2	27	36"∅ RCP	1.50%
A11.2 CB	1033.59		1026.50	9.09				
A12 DI	1034.83	1027.00	1026.93	9.90	A12 TO A13	260	36"∅ RCP	2.23%
A13 DI	1043.18	1034.90 1032.90	1032.81	12.37	A13 TO A14 A13 TO A13.1	260 201	18"∅ RCP 24"∅ RCP	2.00% 1.00%
A13.1 CB	1039.98	1035.00	1034.91	7.07	A13.1 TO A13.2	24	24"∅ RCP	1.00%
A13.2 CB	1039.97	1035.30	1035.24	6.72	A13.2 TO A13.3	196	24"∅ RCP	1.00%
A13.3 CB	1043.42	1037.27 1038.04	1037.26	8.16	A13.3 TO A13.4 A13.3 to A13.3a	168 35	24"∅ RCP 18"∅ RCP	1.00% 1.00%
A13.3a	1043.64		1038.39	7.25				
A13.4 CB	1047.55	1039.10 1041.00	1038.95	10.59	A13.4 TO A13.5 A13.4 TO A14a	284 363	24"∅ RCP 18"∅ RCP	3.00% 2.05%
A13.4a CB	1057.91	1048.55	1048.45	11.46	A13.4a TO A13.4b	45	18"∅ RCP	1.50%
A13.4b CB	1057.76		1049.23	10.53				
A13.5 CB	1049.74	1042.00	1041.94	9.80	A13.5 TO A13.6	127	24"∅ RCP	2.00%
A13.6 CB	1052.93	1044.30 1044.77	1043.27	11.66	A13.6 TO A13.7 A13.6 to A13.6a	109 43	18"∅ RCP 18"∅ RCP	2.00% 1.00%
A13.6a	1048.40		1045.19	5.21				
A13.7 CB	1056.46	1046.50 1046.98	1046.48	11.98	A13.7 TO A13.8 A13.7 to A13.7a	404 25	24"∅ RCP 24"∅ RCP	3.00% 1.00%
A13.7a	1050.98		1047.23	5.75				
A13.8 CB	1064.62	1054.60	1054.58	12.04	A13.8 TO A13.9	26	18"∅ RCP	2.00%
A13.9 CB	1064.87		1055.13	11.74				
A14 DI	1047.79		1040.09	9.69				

PROPOSED STROM SEWERS - PHASE 2
PIPE SCHEDULE

Structure Name	Rim Elev. (ft)	Invert In Elev. (ft)	Invert Out Elev. (ft)	Structure Height (ft)	Pipe Segment	Pipe Length (ft)	Pipe Material	Pipe Slope
B1 HW	995.92	991.00		???	B1 TO B2	286	54"∅ RCP	0.50%
B2 CB	998.86	992.50	992.43	8.42	B2 TO B3	333	36"∅ RCP	1.50%
B3 CB	1008.21	998.10	997.50	12.71	B3 TO B4	24	36"∅ RCP	1.00%
B4 CB	1008.35	998.40	998.34	12.01	B4 TO B5	457	24"∅ RCP	2.00%
B5 CB	1018.29	1007.60 1012.70	1007.54	12.75	B5 TO B6 B5 to B5a	362 36	24"∅ RCP 18"∅ RCP	3.00% 3.00%
B5a	1018.49		1013.78	6.71				
B6 CB	1030.87	1018.50 1018.50	1018.47	14.40	B6 TO B7 B6 to B6a	168 28	18"∅ RCP 18"∅ RCP	3.00% 1.00%
B6a	1021.98		1018.78	5.21				
B7 DI	1036.62	1023.60	1023.53	15.09	B7 TO B8	65	18"∅ RCP	4.00%
B8 CB	1039.99		1026.22	15.77				

EXHIBIT "C"

PRELIMINARY
DRAINAGE PLAN

DRAINAGE ANALYSIS
CITY OF AVONDALE ESTATES
DEPARTMENT OF PUBLIC WORKS

21 NORTH AVONDALE PLAZA
AVONDALE ESTATES GA 30002

NOT FOR CONSTRUCTION

REVISIONS   BY

CITY OF AVONDALE ESTATES GA

DATE: 08-18-2016
SCALE: AS NOTED
JOB: C-1603-05
DRAWING NUMBER
1 OF 6
SHEET
P1.0