

HYDROLOGY & WATER QUALITY STUDY

FOR

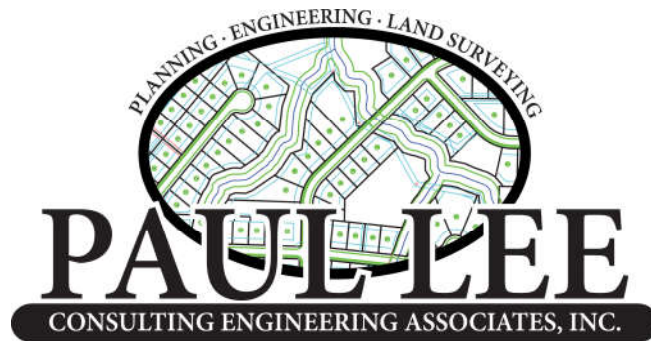
THOMAS WOODS SUBDIVISION

LAND LOTS 335 - 17TH DISTRICT – 2ND SECTION

COBB COUNTY, GEORGIA

CITY OF SMYRNA

PREPARED BY



44 Darby's Crossing Drive, Suite 200
HIRAM, GEORGIA 30141
Ph. (770) 435-2576



August 16, 2018

TABLE OF CONTENTS

COBB COUNTY EROSION CONTROL STATEMENT	3
SITE ANALYSIS	4-5
PRE-DEVELOPMENT - BASIN A	6
POST-DEVELOPMENT - BASIN A	7
ALLOWABLE FLOW	8
WATER QUALITY & CHANNEL PROTECTION	9
POND SUMMARY	10
WATER QUALITY AND CHANNEL PROTECTION CALCULATIONS	11
APPENDIX	12

GENERAL FIGURES:

Pre-Development Map
Post-Development Map
Water Quality Device
Detention Control Device
Level Spreader Details

APPENDIX:

Hydrograph 1, Pre-Development Basin A
Hydrograph 2, Post-Development Basin A
Hydrograph 3, Post-Bypass
Hydrograph 4, Routing
Hydrograph 5, Total Outflow
Pond Report

SITE ANALYSIS

SITE LOCATION

The site to be developed consists of 1.136 acres located in Land Lot 335 of the 17th District, 2nd Section, Cobb County, Georgia and is located on Thomas Lane. The actual disturbed area of land is 0.843 acres.

PRE DEVELOPMENT

The pre-developed surface condition is a residential lot with grass and woods. There is one distinct drainage location that will be analyzed by this study and will be designated as follows: Study Point "A" for Basin A.

Basin A consists of a total drainage area of 1.136 acres as shown on the pre-development map. This drainage area drains onto adjacent property located at the North East corner of the property. (see Pre-Development Map).

POST DEVELOPMENT

After development, Basin "A" will have a total of 1.136 acres. All 1.136 acres will be controlled by a 7" rectangular weir. All outflow will be directed by an 18" corrugated metal pipe (CMP) to a level spreader that lets the runoff flow offsite at Study Point "A" as sheet flow (see Post Development Map).

SITE ANALYSIS (continued)

DOWNSTREAM ANALYSIS

See Hydrograph Reports #5 for downstream impact comparison to pre-development of the 1.136 acre site and Summary of Impact, page 13.

FLOODPLAIN

The property is not in an area having flood hazards as per F.I.R.M. Map No 13067C0206 H dated 3/4/2013.

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

BASIN A

DRAINAGE AREA: 1.136 Acres

RUNOFF CURVE NUMBER (CN): 60.7

$$CN = \frac{(0.985 \text{ Ac})(55) + (0.151 \text{ Ac})(98)}{1.136} = 60.7$$

TIME OF CONCENTRATION, T_c = 10 minutes (See TR-55 printout)

RUNOFFS (cfs) See Hydrograph Report #1

<u>1 YR</u>	<u>2 YR</u>	<u>5 YR</u>	<u>10 YR</u>	<u>25 YR</u>	<u>50 YR</u>	<u>100 YR</u>
0.602	1.19	1.88	2.63	3.71	4.56	5.44

POST DEVELOPMENT

BASIN A – BYPASSING POND

DRAINAGE AREA: 0.120 Acres on West Side of Property
0.042 Acres East of Detention Pond
0.162 Acres Total Bypass

RUNOFF CURVE NUMBER (CN):

$$CN = 70$$

TIME OF CONCENTRATION, T_c = 10 minutes (County minimum)

RUNOFFS (cfs) See Hydrograph Report #6

<u>1 YR</u>	<u>2 YR</u>	<u>5 YR</u>	<u>10 YR</u>	<u>25 YR</u>	<u>50 YR</u>	<u>100 YR</u>
0.204	0.316	0.436	0.564	0.745	0.885	1.03

BASIN A – INTO POND

DRAINAGE AREA: 0.974 Acres

RUNOFF CURVE NUMBER (CN): 70

$$CN = \frac{(0.738 \text{ Ac})(55) + (0.393 \text{ Ac})(98)}{1.136} = 70$$

* 35% Max Impervious

TIME OF CONCENTRATION, T_c = 5 minutes (See TR-55 printout)

RUNOFFS (cfs) See Hydrograph Report #4

<u>1 YR</u>	<u>2 YR</u>	<u>5 YR</u>	<u>10 YR</u>	<u>25 YR</u>	<u>50 YR</u>	<u>100 YR</u>
-------------	-------------	-------------	--------------	--------------	--------------	---------------

1.51	2.29	3.13	4.01	5.24	6.20	7.18
------	------	------	------	------	------	------

ALLOWABLE FLOW SUMMARY

BASIN A – Summary Before Detention

Runoff Flows (cfs)

	<u>1 YR</u>	<u>2 YR</u>	<u>5 YR</u>	<u>10 YR</u>	<u>25 YR</u>	<u>50 YR</u>	<u>100 YR</u>
Q pre	0.602	1.19	1.88	2.63	3.71	4.56	5.44
Q post	1.51	2.29	3.13	4.01	5.24	6.20	7.18

Q post > Q pre, therefore **DETENTION IS REQUIRED FOR BASIN A**

BASIN A – Allowable Discharge From Pond

Runoff Flows (cfs)

	<u>1 YR</u>	<u>2 YR</u>	<u>5 YR</u>	<u>10 YR</u>	<u>25 YR</u>	<u>50 YR</u>	<u>100 YR</u>
Q pre	0.602	1.19	1.88	2.63	3.71	4.56	5.44
Q bypass	0.204	0.316	0.436	0.564	0.745	0.885	1.03
Q allowed	0.398	0.874	1.44	2.07	2.97	3.68	4.41

Q pre – Q bypass = Q allowed

WATER QUALITY & CHANNEL PROTECTION

$$\text{REQUIRED } WQ_v = \frac{(1.2)[0.05 + 0.009(35)](1.136)(43.560)}{12} = 1,806 \text{ cf}$$

$$WQ_v \text{ PROVIDED} = 1856 \text{ cf At elevation } 985.50$$

ONE-YEAR CHANNEL PROTECTION

$$\text{TOTAL VOLUME PROVIDED} = 1,514 \text{ @ } 987.00 \text{ (2,123 - 928 cf = 1,195 cf, required)}$$

Basin B: Pre-Development, 1 Year Volume:	2,123 cf (See Hydrograph #1)
½ Water Quality Volume:	928 cf (1,856/2)

POND SUMMARY

Frequency	<u>Allowable Flow (cfs)</u>	<u>Post- Development Flow (cfs)</u>	<u>POND Elevation (ft)</u>	<u>POND Storage (cu.ft.)</u>	<u>Routed Outflow (cfs)</u>
1	0.398	1.51	987.39	2,141	.033
2	0.874	2.29	987.53	2,363	0.128
5	1.44	3.13	987.78	2,765	0.365
10	2.07	4.01	988.17	3,387	0.886
25	2.97	5.24	988.73	4,284	1.82
50	3.68	6.20	989.12	4,911	2.61
100	4.41	7.18	989.45	5,532	3.48

***Detention Satisfied**

SUMMARY OF IMPACT ON DOWNSTREAM PROPERTY AT STUDY POINT A

Runoff Flows (cfs)

	<u>1 YR</u>	<u>2 YR</u>	<u>5 YR</u>	<u>10 YR</u>	<u>25 YR</u>	<u>50 YR</u>	<u>100 YR</u>
Q pre Hydrograph 1	0.602	1.19	1.88	2.63	3.71	4.56	5.44
Q post + bypass Hydrograph 5	0.204	0.316	0.681	1.39	2.52	3.48	4.49
Reduction TOTAL	66%	73%	63%	47%	32%	23%	17%

**Channel Protection
ORIFICE CALCULATIONS**

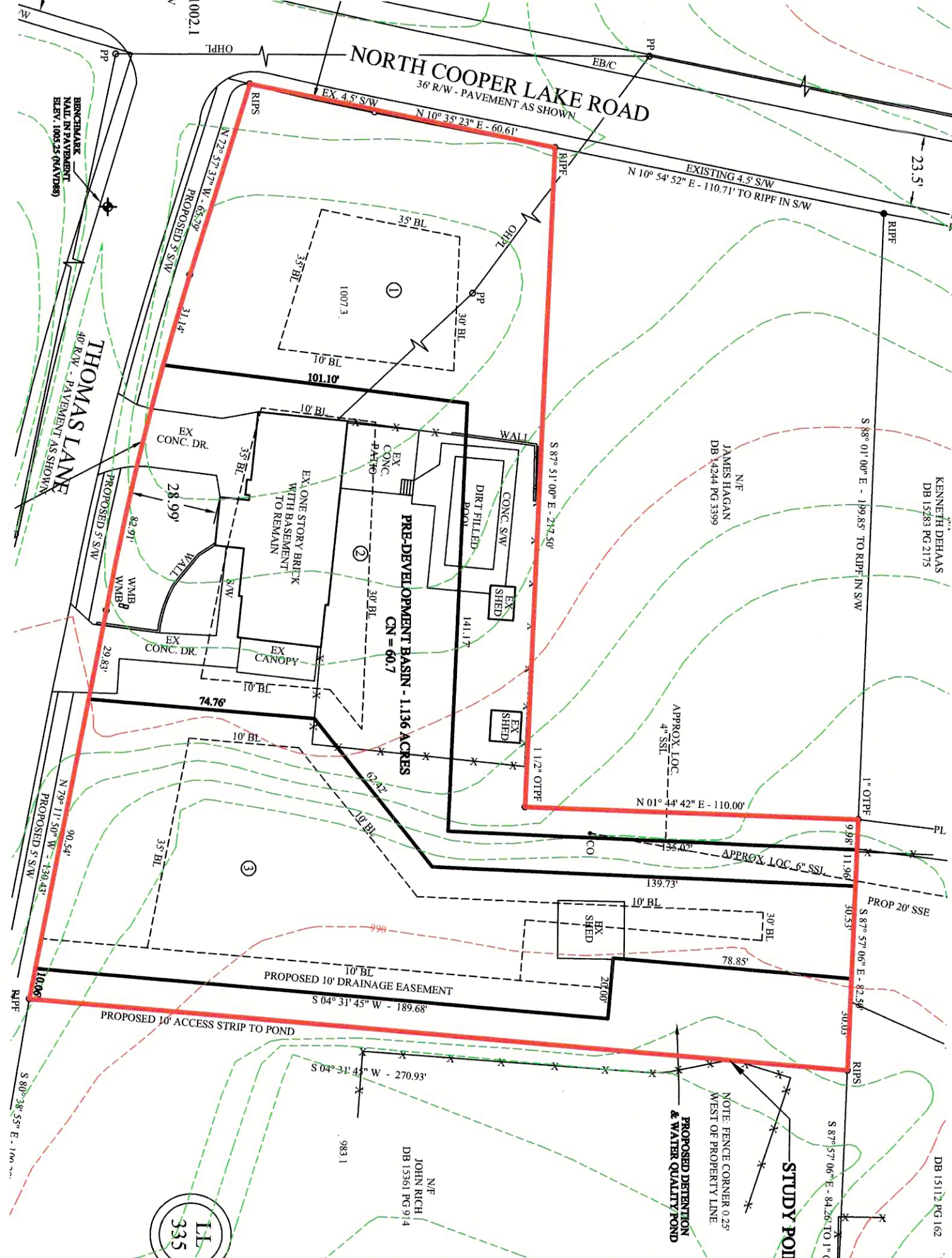
ORIFICE SIZE (IN.)	2/3
ORIFICE AREA (S.F.)	0.002424068
POND HEIGHT (FT.)	0.8
POND VOLUME (C.F.)	1135
Q FLOW (CFS)	0.0104
C.F. HOUR	37.44

HOURS TO DRAIN	30.32
-----------------------	--------------

APPENDIX

NORTH COOPER LAKE ROAD

36' R/W - PAVEMENT AS SHOWN



THOMAS LANE
40' R/W - PAVEMENT AS SHOWN

PRE-DEVELOPMENT BASIN - 1.136 ACRES
CN = 60.7

PROPOSED 10' DRAINAGE EASEMENT
S 04° 31' 45" W - 189.68'

PROPOSED 10' ACCESS STRIP TO POND

PROPOSED DETENTION & WATER QUALITY POND

STUDY POINT

NOTE: FENCE CORNER 0.25' WEST OF PROPERTY LINE.

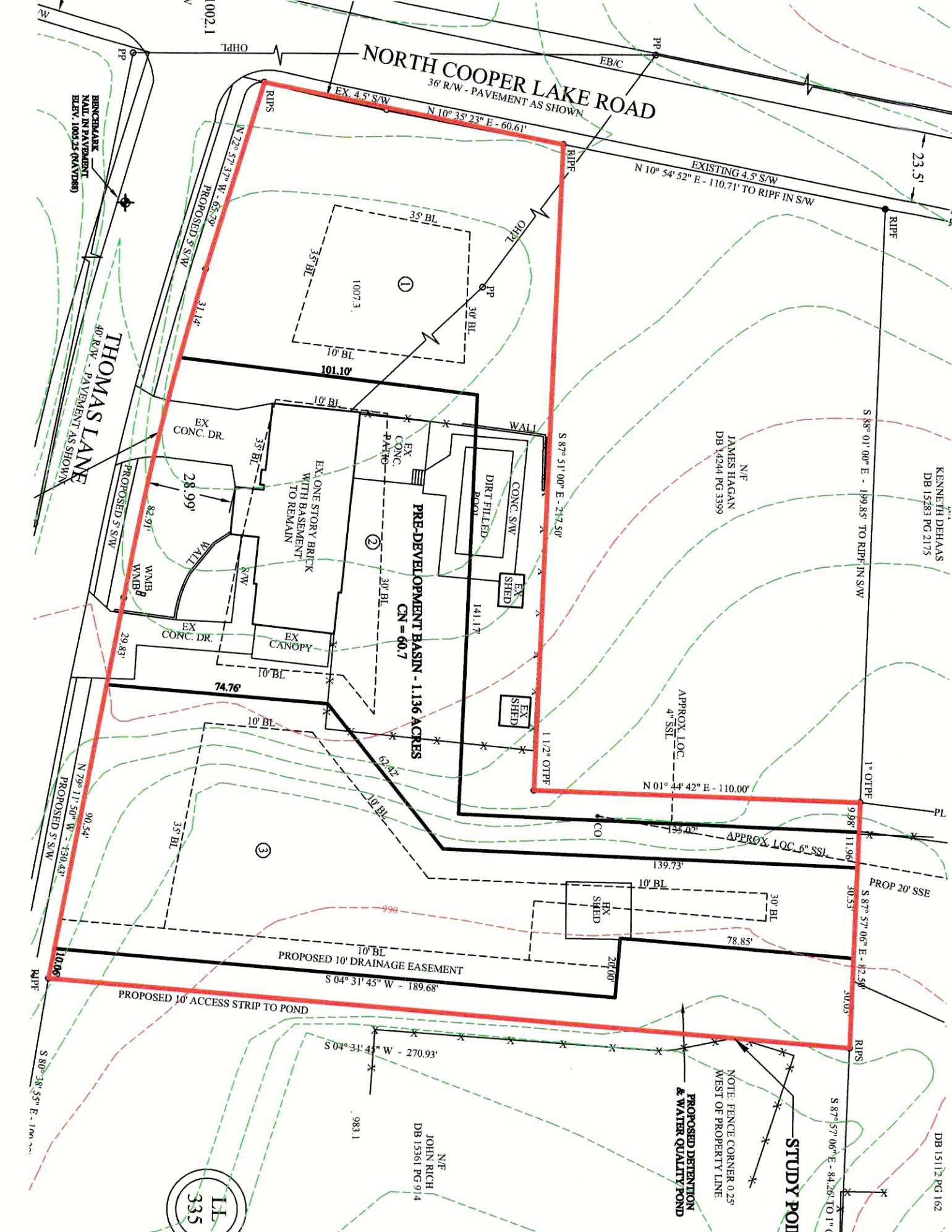
335

N/E JOHN RICH
DB 15361 PG 9/4

N/E JAMES HAGAN
DB 14244 PG 3399

N/E KENNETH DEHAAS
DB 15283 PG 2175

DB 15112 PG 162



NORTH COOPER LAKE ROAD

36' R/W - PAVEMENT AS SHOWN

EXISTING 4.5' S/W
N 10° 54' 52" E - 110.71' TO RIPP IN S/W

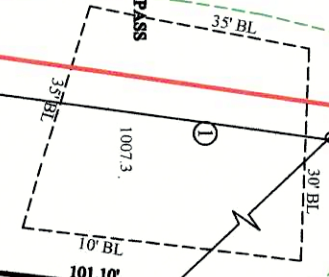
BENCHMARK
NAIL IN PAVEMENT
ELEV. 1005.25 (64VD80)

THOMAS LANE
40' R/W - PAVEMENT AS SHOWN

N 76° 25' 21" W
ARC - 144.05 CHORD - 113.99'

EX. 4.5' S/W
N 10° 35' 23" E - 60.61'

0.120 ACRES BYPASS
CN = 70



N/E
JAMES HAGAN
DB 14244 PG 3399

N/E
KENNETH DEHAAS
DB 15283 PG 2175

EX. ONE STORY BRICK
WITH BASEMENT
TO REMAIN

28.99'

82.91'

EX. CONC. DR.

EX. CANOPY

74.76'

APPROX. LOC.
4" SSL

N 01° 44' 42" E - 110.00'

APPROX. LOC. 6" SSL

0.974 ACRES INTO POND
BASIN A
CN = 70

PROPOSED 10' DRAINAGE EASEMENT
6.84' 31° 45' W - 189.60'

PROPOSED 10' ACCESS STRIP TO POND

0.042 ACRES BYPASS
CN = 70

PROPOSED DETENTION
& WATER QUALITY POND
BOTTOM ELEVATION: 986.00
100 YR STORAGE: 5.532
100 YR ELEVATION: 989.46
TOP OF WALL: 991.00

STUDY POINT
NOTE: FENCE CORNER 0.25'
WEST OF PROPERTY LINE.

LL
335

PKASHANTI PARIKH
DB 15112 PG 162

N/E
JOHN RICH
DB 15561 PG 914

S 87° 57' 06" E - 84.26' TO 1" OT

S 87° 57' 06" E - 82.56'

S 87° 57' 06" E - 82.56'

1" OT/PF

S 88° 01' 00" E - 199.85' TO RIPP IN S/W

S 87° 51' 00" E - 212.50'

S 87° 51' 00" E - 212.50'

S 87° 51' 00" E - 212.50'

S 87° 51' 00" E - 212.50'

S 87° 51' 00" E - 212.50'

S 87° 51' 00" E - 212.50'

23.5'

23.5'

23.5'

23.5'

23.5'

23.5'

23.5'

23.5'

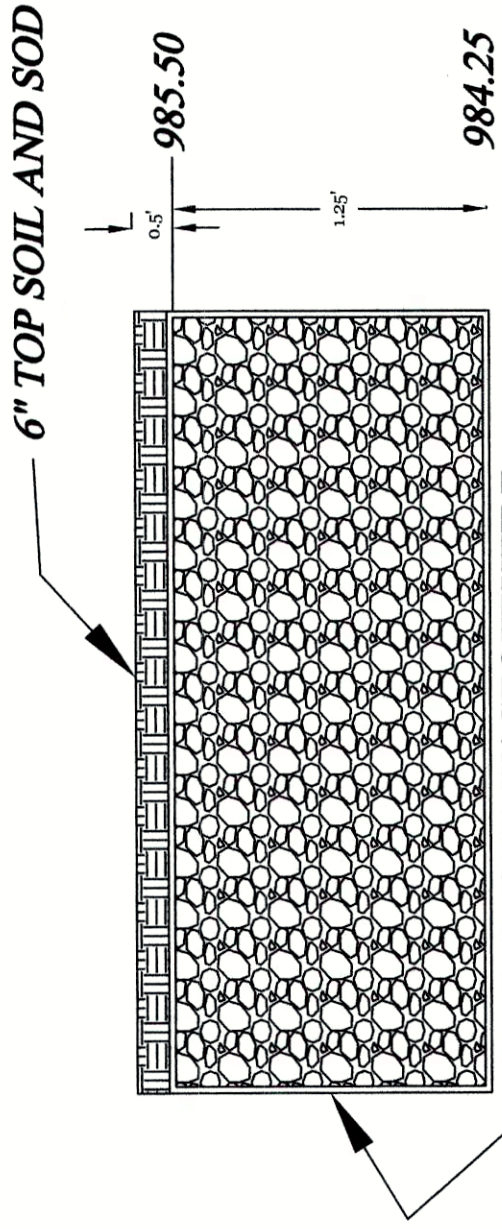
23.5'

23.5'

23.5'

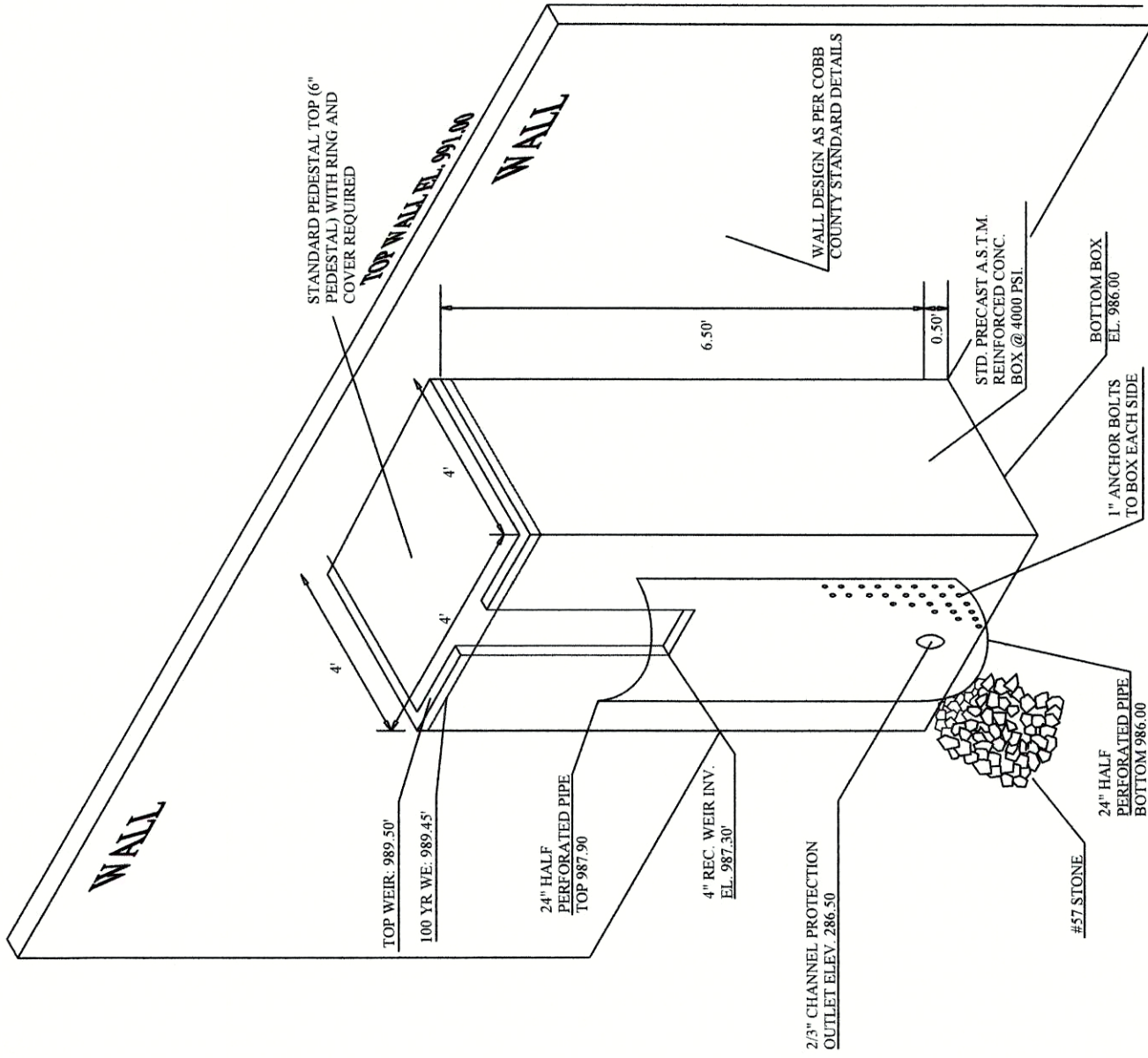
23.5'

NOTE: ELEVATIONS PROVIDED ARE FOR THE LOWEST POINT IN THE POND. WATER QUALITY FILTER SYSTEM TO FOLLOW THE 0.00% SLOPE OF THE POND BOTTOM. WQFS TO BE AS SHOWN.



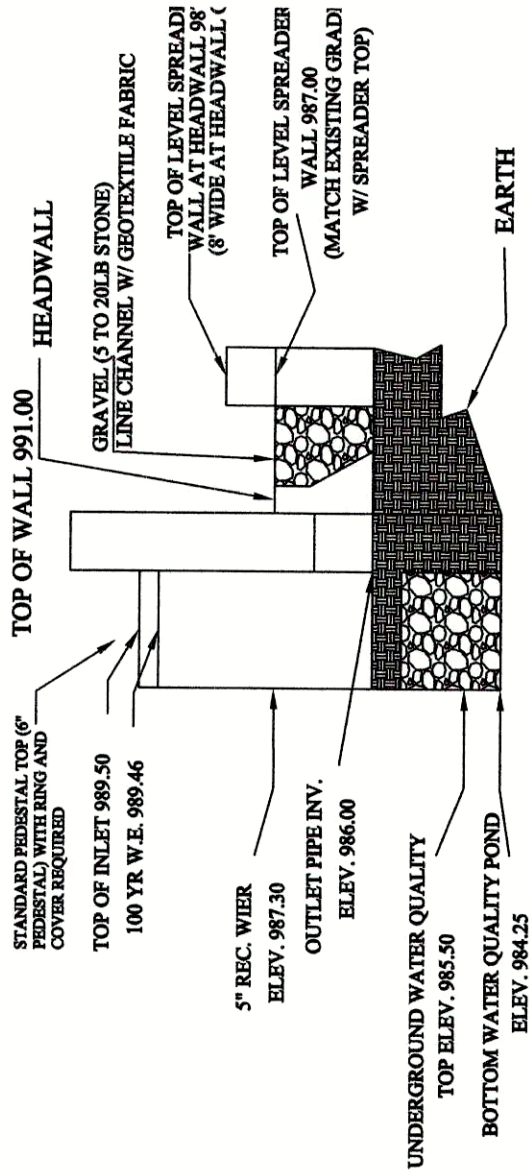
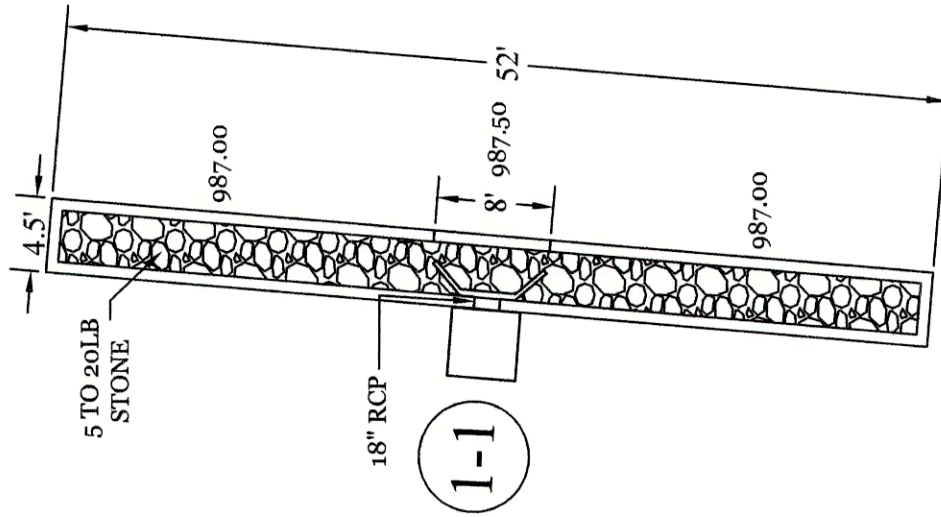
**WRAP STONE W/ GEOTEXTILE
FABRIC ALONG SIDES, BOTTOM & TOP**

**ENCASEMENT DETAIL
NTS**



1-1 OCS DETAIL
NTS

OUTFALL AND LEVEL SPREADER DETAIL (PLAN VIEW) NTS



OUTFALL AND LEVEL SPREADER DETAIL (PROFILE) NTS