The Villages®

APPLICATION FOR
SUMTER COUNTY
PERMIT

THE VILLAGES OF SUMTER
UNIT 174 POSTAL PARK

STORMWATER MANAGEMENT
DATA

APRIL 2010

FARNER BARLEY
AND ASSOCIATES, INC.
▲ ENGINEERS
▲ SURVEYORS
▲ PLANNERS
4450 NE 83rd Road ○ Wildwood, Florida 34785 ○ (352) 748-3126

THE VILLAGES OF SUMTER
UNIT 174 POSTAL PARK

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THE VILLAGES OF SUMTER
UNIT 174 POSTAL PARK

SCOPE OF PROJECT:

The proposed Villages Unit 174 Postal Park is 0.27 acre postal park within the Unit 174 subdivision. The project area lies within previously permitted post-drainage-basin SS-174 (ERP no. 44020198.204). The future developed land use types for this project are: Postal Park, and open space.

BASIS OF ANALYSIS:

A. RUNOFF CURVE NUMBERS

Soil Conservation Service (SCS) runoff Curve Numbers (CN), were developed considering soil types and land use. The soil types for this project are largely composed of Candler, Millhopper, and Adamsville fine sand. The existing land cover includes pasture, wetlands, and some lightly forested areas. Pre-developed curve numbers were assigned to each sub basin based upon the sub basin's land cover and hydrologic soil type. The post-developed curve numbers are based on the proposed land uses within each drainage basin and take into account any directly connected impervious areas (DCIA). Tables of post-development curve numbers used in the analysis are listed within the report. A soils map for the project area is provided in the report.

B. RAINFALL INTENSITY AMOUNTS

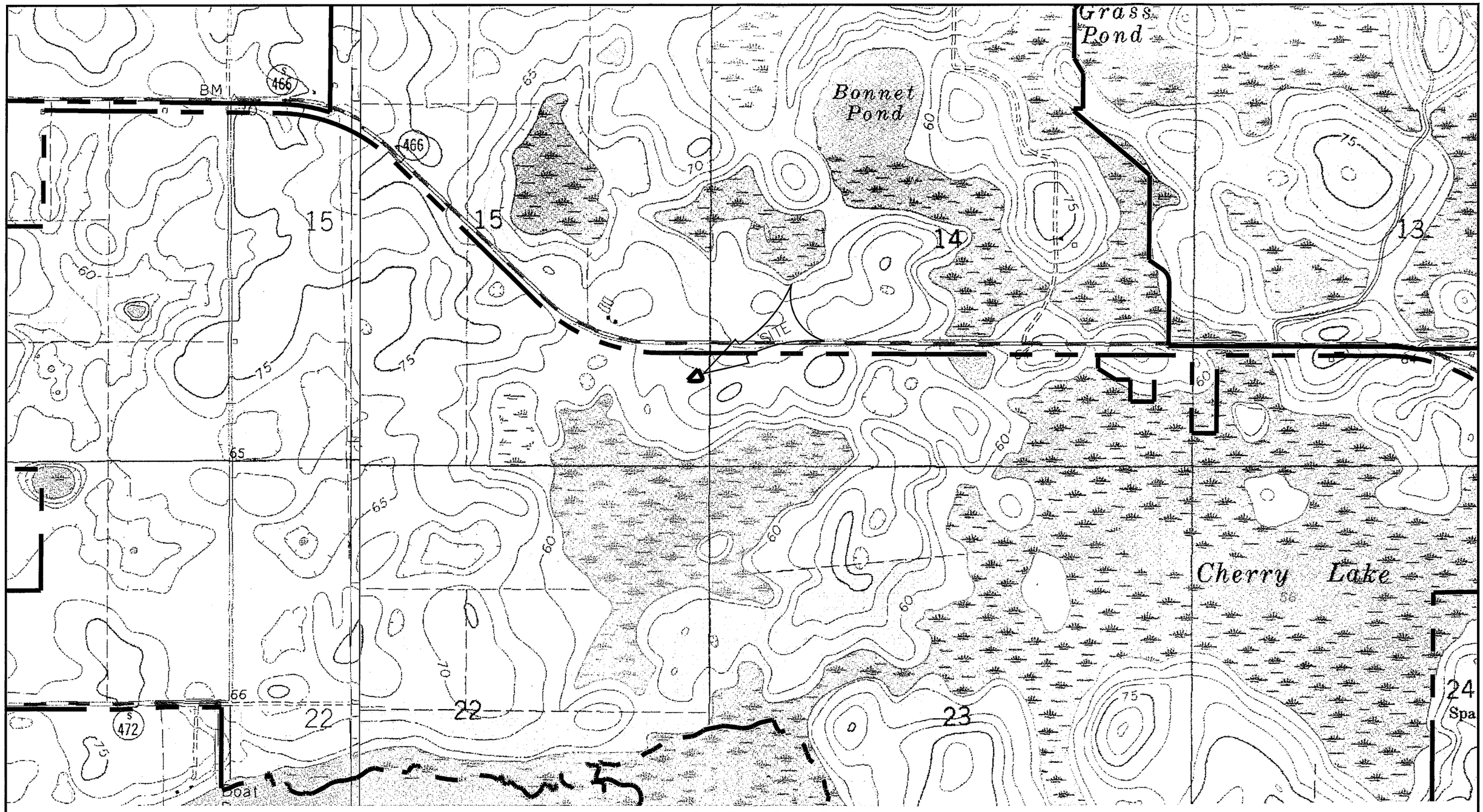
The 100-year / 24-hour rainfall intensity amount of 10.0-inches, which was interpolated from the 24-hour / 100-year return period map Figure D-7 in the SWFWMD Environmental Resource Permitting Information Manual, was used to design the sediment sump area.

C. DESIGN CRITERIA

In the post developed conditions the ponds are designed to retain the 100 year-24 hour storm event runoff volume. Runoff volumes in this stormwater management plan use the procedure outlined in the United States Department of Agriculture Soil Conservation Services - Urban Hydrology for Small Watersheds - SCS Technical Release 55 and the stormwater modeling program (A.D.I.C.P.R.).

D. POST-DEVELOPMENT HYDROLOGY

In the post-developed condition there will be a total of 1 drainage basin. A sediment sump has been designed for basin SS-174 for pre-treatment before discharging to Lake Sumter. Runoff calculations and sediment sump calculations for SS-174 are included within this report.



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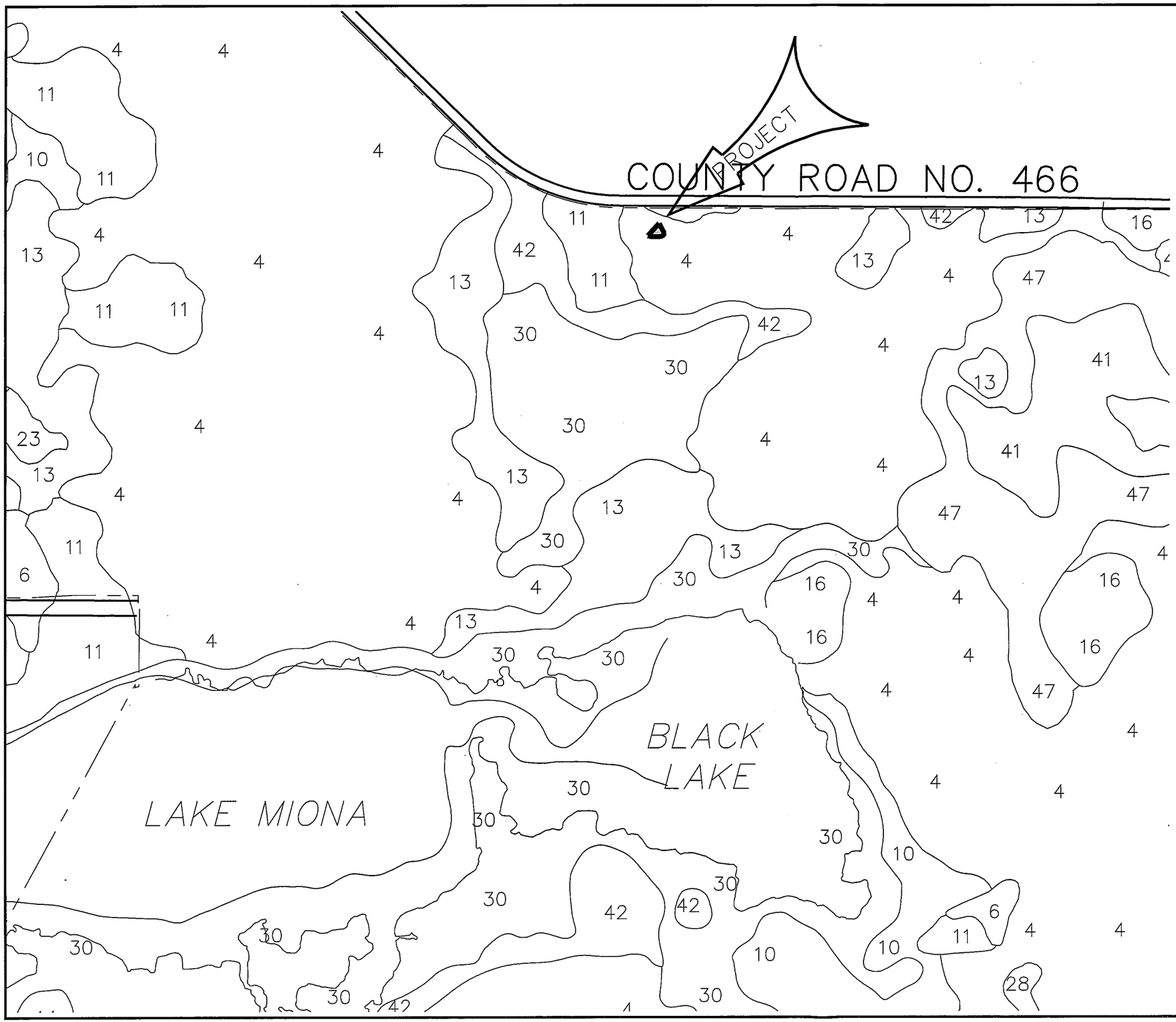
N

SCALE 1" = 1000'

UNIT 174 POSTAL PARK
U.S.G.S. QUAD MAP

SECTIONS 14, 15
TOWNSHIP 18 S.
RANGE 23 E.



SCALE 1" = 1000'

LEGEND

Symbol	Soil Name	Acres	%	SCS Hyd. Group
1	Arredondo fine sand, 0 to 5% slopes	66.58	1.42%	A
4	Candler sand, 0 to 5% slopes	2336.12	49.85%	A
5	Candler sand, 5 to 8% slopes	63.11	1.35%	A
6	Kendrick fine sand, 0 to 5% slopes	66.60	1.42%	A
7	Sparr–Seffner–Ona Loamy fine sand, 0 to 5% slopes	3.05	0.07%	C
8	Lake fine sand, 0 to 5% slopes	124.88	2.67%	A
9	Paisley fine sand, bouldery subsurface	2.13	0.05%	D
10	Sparr fine sand, 0 to 5% slopes	148.33	3.17%	C
11	Millhopper sand, 0 to 5% slopes	167.76	3.58%	A
13	Tavares fine sand, 0 to 5% slopes	209.38	4.48%	A
14	Lake fine sand, 5 to 8% slopes	5.04	0.11%	A
16	Apopka fine sand, 0 to 5% slopes	198.79	4.25%	A
18	Okeelanta muck	0	0%	B/D
19	Apopka fine sand, 5 to 8% slopes	153.07	3.27%	A
21	EauGallie fine sand, bouldery subsurface	0	0%	B/D
22	Smyrna fine sand	0	0%	B/D
23	Ona fine sand	4.87	0.10%	D
27	Sumterville fine sand, bouldery subsurface, 0 to 5% slopes	57.26	1.22%	C
28	Seffner fine sand	4.44	0.09%	C
30	Placid fine sand, depressional	524.50	11.21%	D
31	Myakka sand	0	0%	B/D
32	Pompano fine sand	0	0%	B/D
33	Sparr fine sand, bouldery subsurface, 0 to 5% slopes	2.35	0.05%	C
36	Floridana mucky fine sand, depressional	0	0%	D
39	Mabel fine sand, bouldery subsurface, 0 to 5 percent slopes	0	0%	C
41	Everglades muck, frequently flooded	65.26	1.40%	D
42	Adamsville fine sand	88.37	1.91%	C
43	Basinger fine sand, depressional	0	0%	D
44	Oldsmar fine sand, bouldery subsurface	13.52	0.29%	B/D
46	Ft. Green fine sand, bouldery subsurface	0	0%	D
47	Okeelanta muck, frequently flooded	199.89	4.27%	D
48	Malabar fine sand, frequently flooded	0	0%	D
49	Terra Ceia muck, frequently flooded	0	0%	D
50	Immokalee sand	0	0%	B/D
52	Candler sand, 8 to 12 percent slopes	0	0%	A
57	Gator muck, frequently flooded	0	0%	D
60	Delray fine sand, depressional	6.34	0.14%	D
61	EauGallie fine sand	0	0%	B/D
67	Vero fine sand	0	0%	B/D
–	Cherry Lake, (Waters edge)	14.36	0.31%	
–	Lake Miona	150.25	3.21%	
	TOTALS	4677.22	100.00%	

Note: Soil Data obtained from United States Department of Agriculture Soil Conservation Service

UNIT 174 POSTAL PARK
SCS SOILS MAP

SECTION 14,15
TOWNSHIP 18 S.
RANGE 23 E.

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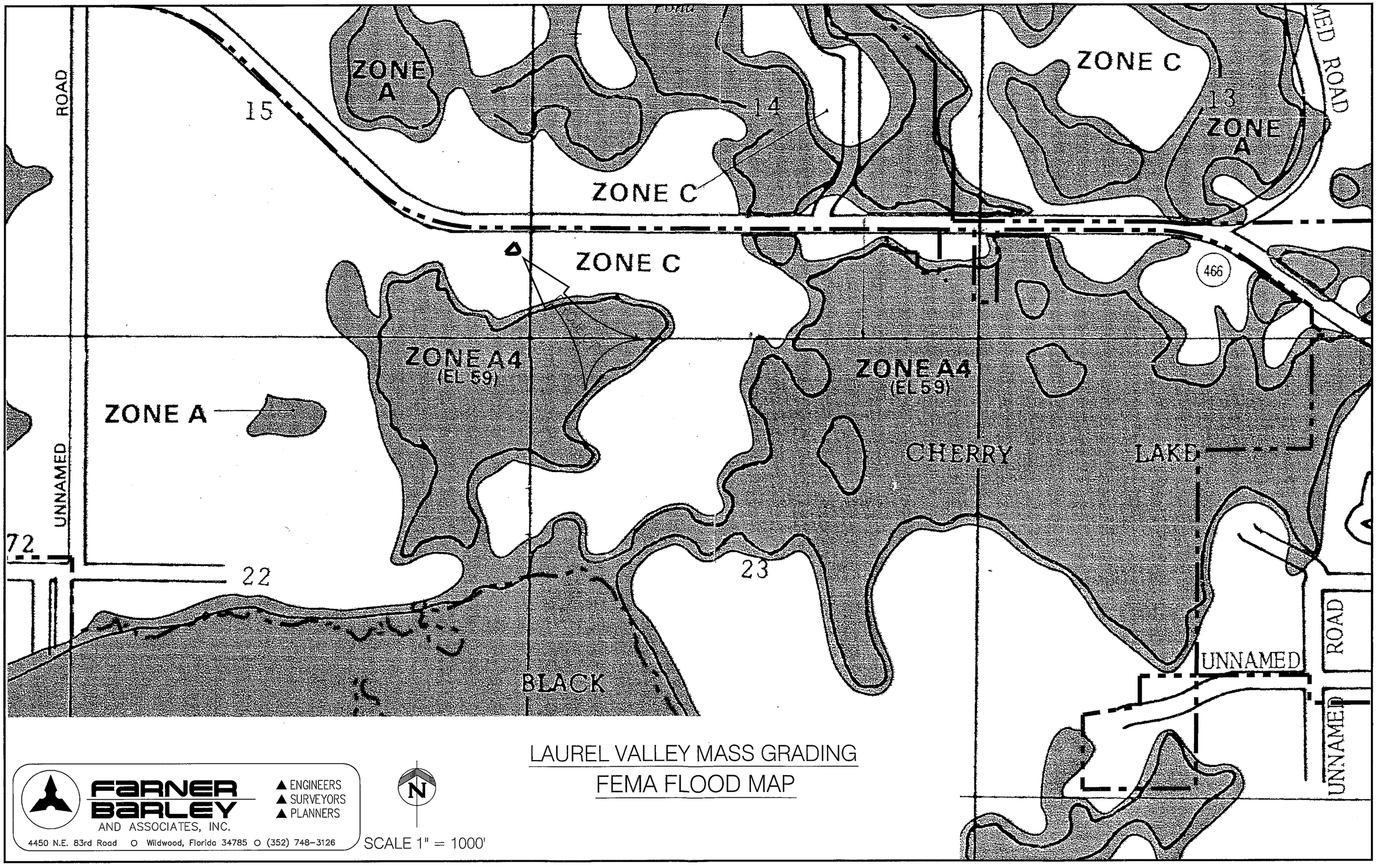

LAUREL VALLEY MASS GRADING

FEMA FLOOD MAP

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SCALE 1" = 1000'

SS-174
DRAINAGE BASIN
POST DEVELOPED
CURVE NUMBER CALCULATIONS

Total Area:	25.48	AC
Total DCIA Area:	8.31	AC
Percent (%) DCIA of Area:	32.61%	
Total Weighted CN Area:	17.17	AC
Weigthed Curve Number:	64.39	

Land Use Description	Area		% DCIA, % Impervious & % Pervious					
ON-SITE Type "A" soil - Residential	22.20	AC	35%	DCIA	30%	Impervious	35%	Pervious
ON-SITE Type "C" soil - Residential	1.08	AC	35%	DCIA	30%	Impervious	35%	Pervious
OFF-SITE Type "A" soil - Golf Course	1.82	AC	100%	Pervious				
OFF-SITE Type "C" soil - Golf Course	0.22	AC	100%	Pervious				
Pond	0.16	AC	100%	DCIA				
TOTAL AREA ------->	25.48	AC						

	% LAND USED	DCIA AREA (AC)	C.N.
ON-SITE Type "A" soil - Residential	35%	7.77	98
ON-SITE Type "C" soil - Residential	35%	0.38	98
Pond	100%	0.16	98
TOTAL --->		8.31	

Percent (%) DCIA of Area =	32.61%

WEIGHTED C.N.

	% LAND USED	AREA (AC)	% AREA	C.N.	%XC.N.
ON-SITE Type "A" soil - Residential	30%	6.66	38.8%	98	38.01
ON-SITE Type "A" soil - Residential	35%	7.77	45.2%	39	17.65
ON-SITE Type "C" soil - Residential	30%	0.32	1.9%	98	1.85
ON-SITE Type "C" soil - Residential	35%	0.38	2.2%	74	1.63
OFF-SITE Type "A" soil - Golf Course	100%	1.82	10.6%	39	4.13
OFF-SITE Type "C" soil - Golf Course	100%	0.22	1.3%	88	1.13
TOTAL ---------->		17.17	100%		64.39

SS-174
POST DEVELOPED
100-YEAR, 24-HOUR
STORM RUNOFF CALCULATIONS

Total Runoff Volume =	**14.77**	**ac-ft**
Rainfall Intensity =	**10.00**	**inches**
Total DCIA Area =	**8.31**	**AC**
Total Weighted CN Area:	**17.17**	**AC**
Weigthed Curve Number:	**64.39**	

DCIA Runoff Volume in Acre-Feet

V = 8.31 x 10.00 1/12 inches/ft

V = 6.92 acre-feet

Based on SCS Runoff Curve Number Method

Runoff in Inches

$$S = \frac{1{,}000}{64.39} - 10 \qquad S = 5.53$$

$$Q = \left[\frac{10.00 - 0.2 \times 5.53}{10.00 + 0.8 \times 5.53} \right]^2$$

Q = 5.48 inches

Runoff Volume in Acre-feet

V = 17.17 x 5.48 1/12 inches/ft

V = 7.85 acre-feet

DCIA Runoff Volume =	6.92	acre-feet
Runoff Volume =	7.85	acre-feet
Total Runoff Volume ac-ft =	**14.77**	**acre-feet**

SS-174
POST DEVELOPED
DEPRESSIONAL AREA
AREA & STAGE-STORAGE VOLUME

Stage (ft)	Area (ac)	Stor. Vol. (ac-ft)	
48.00	0.04	0.17	BTM
49.00	0.06	0.12	
49.50	0.07	0.00	DLW
50.00	0.09	0.04	
51.00	0.11	0.14	
52.00	0.14	0.27	
53.00	0.16	0.42	
54.00	0.19	0.59	
55.00	0.22	0.80	
56.00	0.24	1.03	
57.00	0.28	1.29	TOB

SEDIMENT SUMP SIZING

PROJECT: UNIT 174

DATE: Feb-10

SEDIMENT SUMP: SS174

treatment volume = 1" runoff over basin

TREATMENT VOLUME

Volume	84776	ft^3
Volume	1.95	acre-ft

INPUT REQUIRED:

SUMP DATA

1. WIDTH (average)	Wa =	50.00	feet
2. DEPTH (average)	Dave =	5.00	feet
3. DEPTH (max)	Dmax =	5.00	feet

BASIN AREA

4. AREA COMMERCIAL	A1 =	0.00	ft^2
5. AREA RESIDENTIAL	A2 =	1008414.00	ft^2
6. AREA GOLF/OPEN SPACE	A3 =	8894.00	ft^2

C FACTORS

COMMERTIAL	C= 0.8
RESIDENTIAL	C= 0.6
GOLF/OPEN SPACE	C= 0.3

RAINFALL:

25YR STORM 8.4 inches

METHODOLOGY:

INFORMATION TAKEN FROM S.W.F.W.M.D. TECHNICAL PROCEDURE NUMBER TP/SWP-23

FLOW Q=CIA

CROSS SECTIONAL AREA: Ca=Wa*Dave

FLOW THROUGH VELOCITY: Vf=Qt/Ca

LENGTH REQUIRED: Lr=(Dmax*Vf)/settling velocity

SETTLING VELOCITY = 0.023 ft/sec

SCOUR VELOCITY = 0.528 ft/sec

FLOWS:

Q1= 0 Q2= 116.676 Q3= 0.51452893

Qt= 117.19053 cfs

CROSS SECTIONAL AREA:

Ca= 250 ft^2

FLOW THROUGH VELOCITY:

Vf= 0.4687621 ft/sec

LENGTH REQUIRED:

Lr= 101.90481 feet

LENGTH PROVIDED:

Lp= 116 feet

600 300 0 600 1200 2400

SCALE IN FEET
1" = 600'

N

PROJECT

B-2E

SS-174

CH-4

CR-466

MIONA
PRAIRIE
PRESERVE

POND NO. B-2D

UNIT 79 DESIGNER

COURTYARD

POND NO. B-2C

UNIT 174 CLASSIC

POND NO. B-2

POND NO. B-2A

POND NO. B-2B

POND NO. B-2B

POND NO. B-2G

POND NO. B-10

POND NO. CH-4

POND NO. CH-5

POND NO. CH-3

DATE	REVISIONS	BY

FARNER BARLEY AND ASSOCIATES, INC.
▲ ENGINEERS ▲ SURVEYORS ▲ PLANNERS
Certificate of Authorization Number: 4709
4450 N.E. 83rd Road ○ Wildwood, Florida 34785 ○ (352) 748-3126

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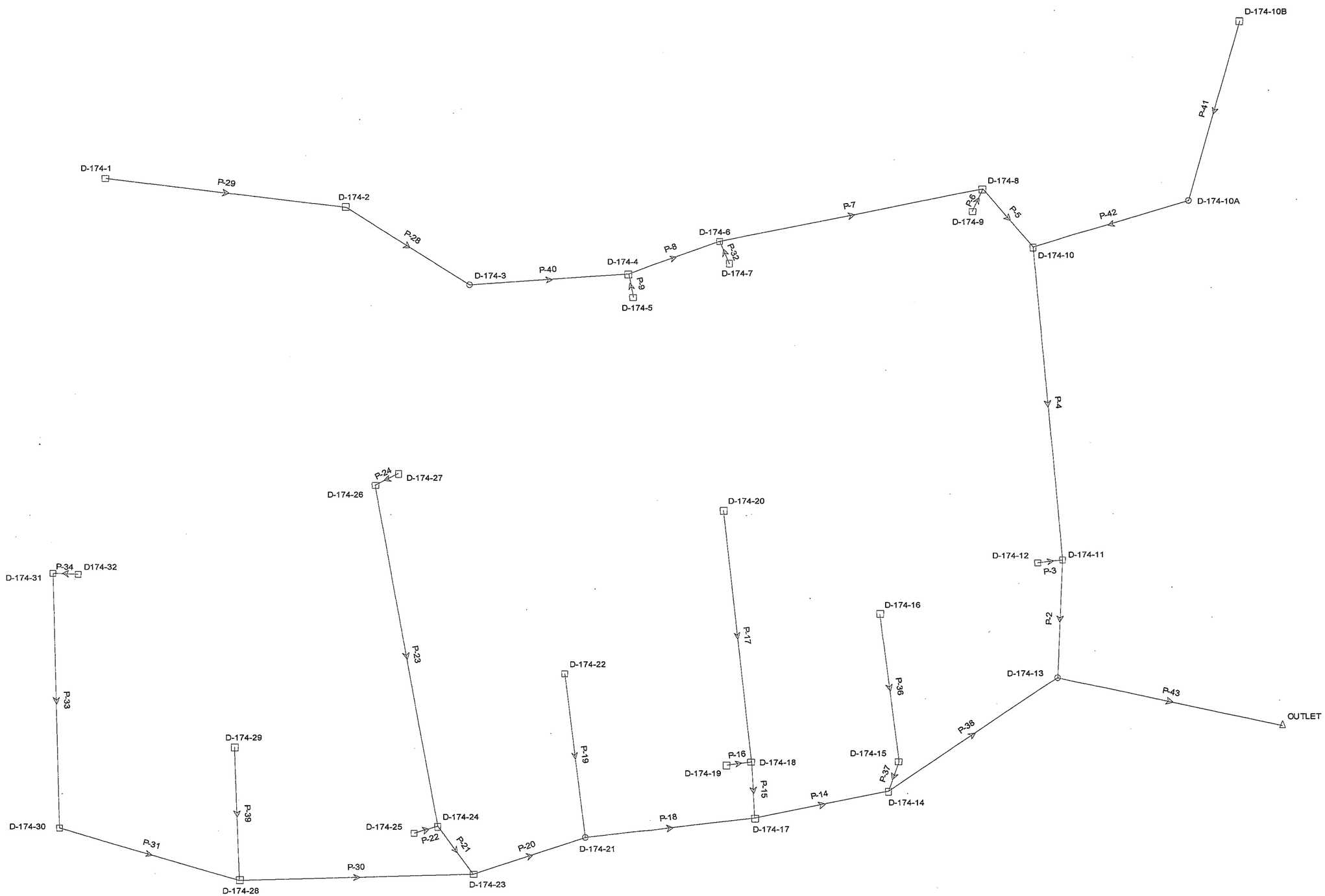
VILLAGES OF SUMTER
UNIT 174 POSTAL PARK

POST-DEVELOPED
DRAINAGE MAP

DATE 4-27-10
DRAWN BY BJT
CHKD BY JAH
FILE NAME
JOB NO.

SHT. 1 OF 1

Scenario: Base



Title: UNIT 174
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Farner Barley and Associates
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Project Engineer: Jeffrey A. Head
StormCAD v5.5 [5.5003]
Page 1 of 1

Scenario: Base

Pipe Report

Label	Upstream Node	Downstream Node	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	System Intensity (in/hr)	Total System Flow (cfs)	Length (ft)	Constructed Slope (%)	Section Size	Mannings n	Full Capacity (cfs)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Description
P-2	D-174-11	D-174-13	0.50	0.55	0.28	5.11	7.02	36.18	109.00	0.20	36 inch	0.012	32.46	54.35	54.13	63.78	61.87	6.43	4.74	56.72	56.09	
P-3	D-174-12	D-174-11	0.26	0.55	0.14	0.14	8.40	1.21	23.00	0.30	18 inch	0.012	6.28	58.78	58.71	63.79	63.78	3.51	3.57	59.23	59.12	
P-4	D-174-10	D-174-11	0.76	0.55	0.42	4.69	7.13	33.75	291.00	0.20	36 inch	0.012	32.26	54.93	54.35	61.90	63.78	3.97	6.43	57.61	57.06	
P-5	D-174-8	D-174-10	1.34	0.55	0.74	2.93	7.17	21.18	71.00	0.20	30 inch	0.012	19.73	55.07	54.93	61.40	61.90	3.83	4.47	58.01	57.85	
P-6	D-174-9	D-174-8	0.53	0.55	0.29	0.29	8.40	2.47	23.00	0.30	18 inch	0.012	6.28	56.40	56.33	61.40	61.40	3.50	3.57	58.28	58.27	
P-7	D-174-6	D-174-8	0.71	0.55	0.39	1.90	7.35	14.11	248.00	0.20	24 inch	0.012	11.00	55.57	55.07	61.29	61.40	3.72	4.33	59.09	58.27	
P-8	D-174-4	D-174-6	1.02	0.55	0.56	1.40	7.46	10.51	91.00	0.20	24 inch	0.012	10.90	55.75	55.57	61.25	61.29	3.50	3.72	59.45	59.28	
P-9	D-174-5	D-174-4	0.26	0.55	0.14	0.14	8.40	1.21	23.00	0.30	18 inch	0.012	6.28	56.25	56.18	61.25	61.25	3.50	3.57	59.56	59.55	
P-32	D-174-7	D-174-6	0.21	0.55	0.12	0.12	8.40	0.98	23.00	0.30	18 inch	0.012	6.28	56.29	56.22	61.29	61.29	3.50	3.57	59.28	59.28	
P-14	D-174-17	D-174-14	0.52	0.55	0.29	6.72	7.52	50.96	126.00	0.10	42 inch	0.012	33.63	49.20	49.08	58.47	59.09	5.77	6.51	54.67	54.40	
P-15	D-174-18	D-174-17	0.83	0.55	0.46	1.58	8.22	13.08	52.00	0.19	24 inch	0.012	10.75	49.30	49.20	58.14	58.47	6.84	7.27	55.08	54.93	
P-16	D-174-19	D-174-18	1.49	0.55	0.82	0.82	8.40	6.94	23.00	0.30	18 inch	0.012	6.28	51.50	51.43	58.14	58.14	5.14	5.21	55.33	55.24	
P-17	D-174-20	D-174-18	0.55	0.55	0.30	0.30	8.40	2.56	234.00	0.98	18 inch	0.012	11.28	54.94	52.64	59.94	58.14	3.50	4.00	55.55	55.24	
P-18	D-174-21	D-174-17	N/A	N/A	N/A	4.86	7.64	37.41	158.00	0.10	36 inch	0.012	22.99	49.99	49.83	59.12	58.47	6.13	5.64	55.36	54.93	
P-19	D-174-22	D-174-21	0.65	0.55	0.36	0.36	8.40	3.03	153.00	2.92	18 inch	0.012	19.43	54.80	50.34	59.80	59.12	3.50	7.28	55.64	55.62	
P-20	D-174-23	D-174-21	1.20	0.55	0.66	4.50	7.73	35.06	109.00	0.10	36 inch	0.012	22.95	50.10	49.99	58.47	59.12	5.37	6.13	55.87	55.62	
P-21	D-174-24	D-174-23	0.81	0.55	0.45	1.67	7.79	13.13	55.00	0.20	24 inch	0.012	10.96	50.21	50.10	58.26	58.47	6.05	6.37	56.26	56.10	
P-22	D-174-25	D-174-24	1.19	0.55	0.65	0.65	8.40	5.54	23.00	0.30	18 inch	0.012	6.28	50.85	50.78	58.26	58.26	5.91	5.98	56.48	56.42	
P-23	D-174-26	D-174-24	0.75	0.55	0.41	0.57	8.27	4.77	321.00	0.64	18 inch	0.012	9.07	52.82	50.78	60.62	58.26	6.30	5.98	56.99	56.42	
P-24	D-174-27	D-174-26	0.29	0.55	0.16	0.16	8.40	1.35	25.00	0.28	18 inch	0.012	6.02	52.89	52.82	60.69	60.62	6.30	6.30	57.07	57.07	
P-30	D-174-28	D-174-23	0.44	0.55	0.24	2.17	7.89	17.23	216.00	0.56	24 inch	0.012	18.42	51.32	50.10	59.66	58.47	6.34	6.37	57.17	56.10	
P-31	D-174-30	D-174-28	0.20	0.55	0.11	1.36	8.09	11.07	174.00	0.20	24 inch	0.012	10.99	51.67	51.32	60.94	59.66	7.27	6.34	57.81	57.45	
P-33	D-174-31	D-174-30	1.22	0.55	0.67	1.25	8.37	10.53	236.00	0.61	24 inch	0.012	19.08	53.10	51.67	60.77	60.94	5.67	7.27	58.38	57.94	
P-34	D174-32	D-174-31	1.05	0.55	0.58	0.58	8.40	4.89	23.00	0.30	18 inch	0.012	6.28	53.17	53.10	60.77	60.77	6.10	6.17	58.56	58.52	
P-36	D-174-16	D-174-15	0.65	0.55	0.36	0.36	8.40	3.03	138.00	1.46	18 inch	0.012	13.77	56.20	54.18	61.80	59.18	4.10	3.50	56.86	55.35	
P-37	D-174-15	D-174-14	0.50	0.55	0.28	0.63	8.31	5.30	29.00	0.31	18 inch	0.012	6.34	54.18	54.09	59.18	59.09	3.50	3.50	55.18	54.98	
P-38	D-174-14	D-174-13	0.77	0.55	0.42	7.78	7.43	58.23	188.00	0.10	42 inch	0.012	34.65	49.08	48.89	59.09	61.87	6.51	9.48	53.94	53.40	
P-39	D-174-29	D-174-28	1.03	0.55	0.57	0.57	8.40	4.80	123.00	0.68	18 inch	0.012	9.40	55.50	54.66	60.50	59.66	3.50	3.50	57.67	57.45	
P-28	D-174-2	D-174-3	0.66	0.55	0.36	0.69	7.83	5.47	134.00	0.30	18 inch	0.012	6.22	56.95	56.55	62.70	62.12	4.25	4.07	60.27	59.96	
P-29	D-174-1	D-174-2	0.60	0.55	0.33	0.33	8.40	2.79	225.00	0.30	18 inch	0.012	6.21	57.62	56.95	62.62	62.70	3.50	4.25	60.50	60.36	
P-40	D-174-3	D-174-4	N/A	N/A	N/A	0.69	7.66	5.35	147.00	0.30	18 inch	0.012	6.23	56.55	56.11	62.12	61.25	4.07	3.64	59.88	59.55	
P-41	D-174-10	D-174-10A	1.68	0.80	1.34	1.34	8.40	11.38	173.00	0.30	18 inch	0.012	6.24	57.00	56.48	62.00	65.35	3.50	7.37	61.42	59.69	
P-42	D-174-10	D-174-10	N/A	N/A	N/A	1.34	8.29	11.23	150.00	0.30	18 inch	0.012	6.23	56.48	56.03	65.35	61.90	7.37	4.37	59.31	57.85	
P-43	D-174-13	OUTLET	N/A	N/A	N/A	12.89	6.98	90.67	217.00	0.41	48 inch	0.012	99.65	48.89	48.00	61.87	56.00	8.98	4.00	52.63	52.00	