Hydrology Report

Sanctuary Stables
4080 River Road
John's Island, South Carolina 29455

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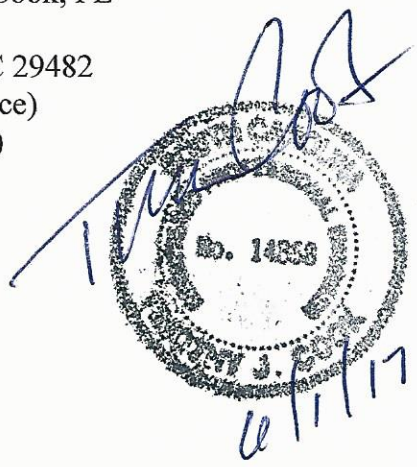

May 28, 2017

Drainage Report
Sanctuary Stables
John's Island, South Carolina 29455

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Drainage Report
Sanctuary Stables
John's Island, South Carolina 29455

Project Description

The Sanctuary Stables Equestrian project is located on a 46.93 Acre parcel of land located at 4080 River Road on John's Island. The parcel is located adjacent to 2 adjoining properties under the same ownership and access will be provided to the project through the adjoining parcels. The property is zoned AG8 and is properly zoned for the use. The project will disturb 7.0 acres which includes the parcel area and a portion of the adjacent parcels. The Location Map is provided as Figure 1 showing the project area and how it relates to the overall property boundaries.

The project consists of 4 new buildings which includes a new Manager's house, barn, tractor shed and covered arena. There will be several outdoor equestrian areas which include an open arena and several paddocks. The parking area is to be pervious with the exception of 4 impervious parking spaces. Therefore, impervious coverage has been minimized.

The adjacent parcel has an existing pond that was excavated approximately 10 years ago as a borrow pit and has a surface area of approximately 7.2 acres. The pond collects runoff-off from the project area and the surrounding area. There is an 18"discharge pipe that flows to an existing discharge ditch that ultimately flows to Abbapoola Creek.

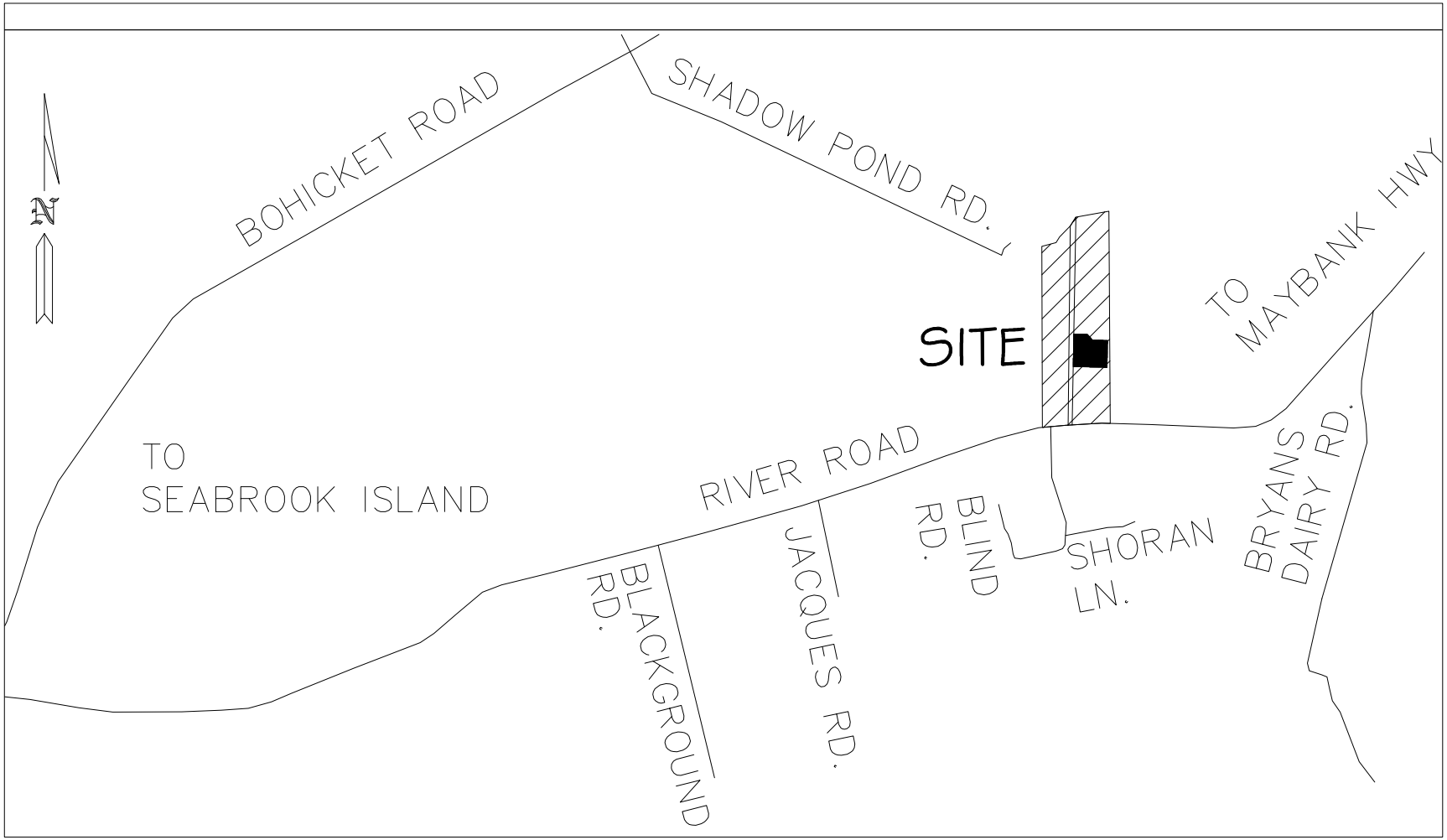
There are no wetlands associated with the project area, therefore no impacts to wetlands will be associated with the project.

There are 2 existing ditches that run through the property and drain portions of the project area. One of the ditches will be piped and the other will be re-graded.

The developed site drainage will be collected by roofdrains, grate inlets, swales and pipes. All of the developed area will drain to the existing pond. A new outlet control structure will be installed at the pond side of the 18" discharge pipe. The project will meet the pre- and post-development discharge requirements and BMP's will be implemented during construction. Permanent grassing will be placed prior to project completion.

This design report will demonstrate the ability to store and buffer the stormwater events in the existing pond as required by OCRM and allow for proper buffering of the runoff to meet the pre-development and post-development discharge, retention and storage requirements.

FIGURE 1



LOCATION MAP

Selected Model and Rainfall Data

The Hydrologic Model entitled Basin Runoff Network (BRN) was utilized to evaluate the hydrology onsite. The design Engineer has utilized this model for nearly 20 years. This program provides both hydraulic and hydrologic analysis and generates both graphic and text output to evaluate a given scenario.

The SCS-256 shape curve was utilized to arrive at the peak discharge rates for the pre- and post-development conditions to produce individual runoff hydrographs and composite hydrographs for the selected storm frequencies.

Total rainfall for the simulated storms was taken from data provided by the Charleston County as published in the Permitting Standards and Procedures Manual (10/2007). The rainfall chart is included in the Appendix and summarized below:

Storm Event	24 HR Rainfall Accumulation ("/24 HR)
2-Year	4.6"
10-Year	7.0"
25-Year	8.0"
100-Year	10.2"

Pre Development Conditions

The subject property has been utilized for agricultural purposes over the past several years and has existing fields for crops and pastures for cattle. The owner acquired the property in early 2017 and will develop a 7.0 acre portion of the property at this time. Portions of the property drain to the existing lake for continued flow to existing ditches and ultimately across River Road to Abbapoola Creek. Other areas drain to the adjacent property to the east for continued flow to existing drainage areas and flow to the Abbapoola Creek via an existing County of Charleston maintained ditch.

The existing lake has an 18" HDPE discharge pipe that connects to an existing ditch for continued flow to Abbapoola. The 18" HDPE has an IE IN of 6.01' and an IE OUT of 5.75'. Therefore, the Normal Water Surface (NWS) in the Lake is 6.01' MSL.

The elevations onsite vary from 6' to 11' MSL and the soil is typically sandy. The Pre-Development Site has been broken into 11 Subareas as presented below and illustrated in Figure 2 – Pre-Development Subareas:

Pre-Development Subarea

Subarea	Area In Square Feet	Area in Acres
1	43,309.05	0.994
2	66,576.04	1.528
3	182,552.66	4.191
4	5,930.80	0.136
5	19,821.02	0.455
6	32,039.80	0.736
7	100,287.45	2.302
8	34,110.84	0.783
9	43,809.63	1.006
10	65,819.66	1.511
Lake	331,130.41	7.602
Total	925,387.36	21.244

Predominant Soil Types and CN Factor

Soils on site are sandy and generally categorized as somewhat to poorly drained. Though the surface runoff is slow in some areas, the characteristics of the soil are good for the construction of roads and foundations. There are four soil classifications on site as indicated by Figure 3 which is based on the SCS Soils map for the property. The on-site soils are classified as follows:

~~Soil Type~~	Soil Classification	Description	**CN**	**D15**
Dawhoo-Da	D	Very Poorly Drained	80	**0.0388**
Kiawah-Ka	D	Somewhat Poorly Drained	80	**0.0445**
Seabrook-Sk	C	Somewhat Poorly Drained	74	**0.0454**
Stono-St	D	Very Poorly Drained	80	**0.0084**

The Seabrook and Stono Series dominate the site and are class C/D soils. The TR-55 Charts were reviewed to determine an appropriate CN value for the pre-development site and each specific soil class. The site is predominantly open pasture area in "good" condition, therefore the soil classes determine the resulting CN number and are presented in the Table above. If a subarea has 2 soil classes, then a Composite CN was determined for that Subarea. The Soil Map, descriptions and characteristics are provided in Appendix C and summarized above.

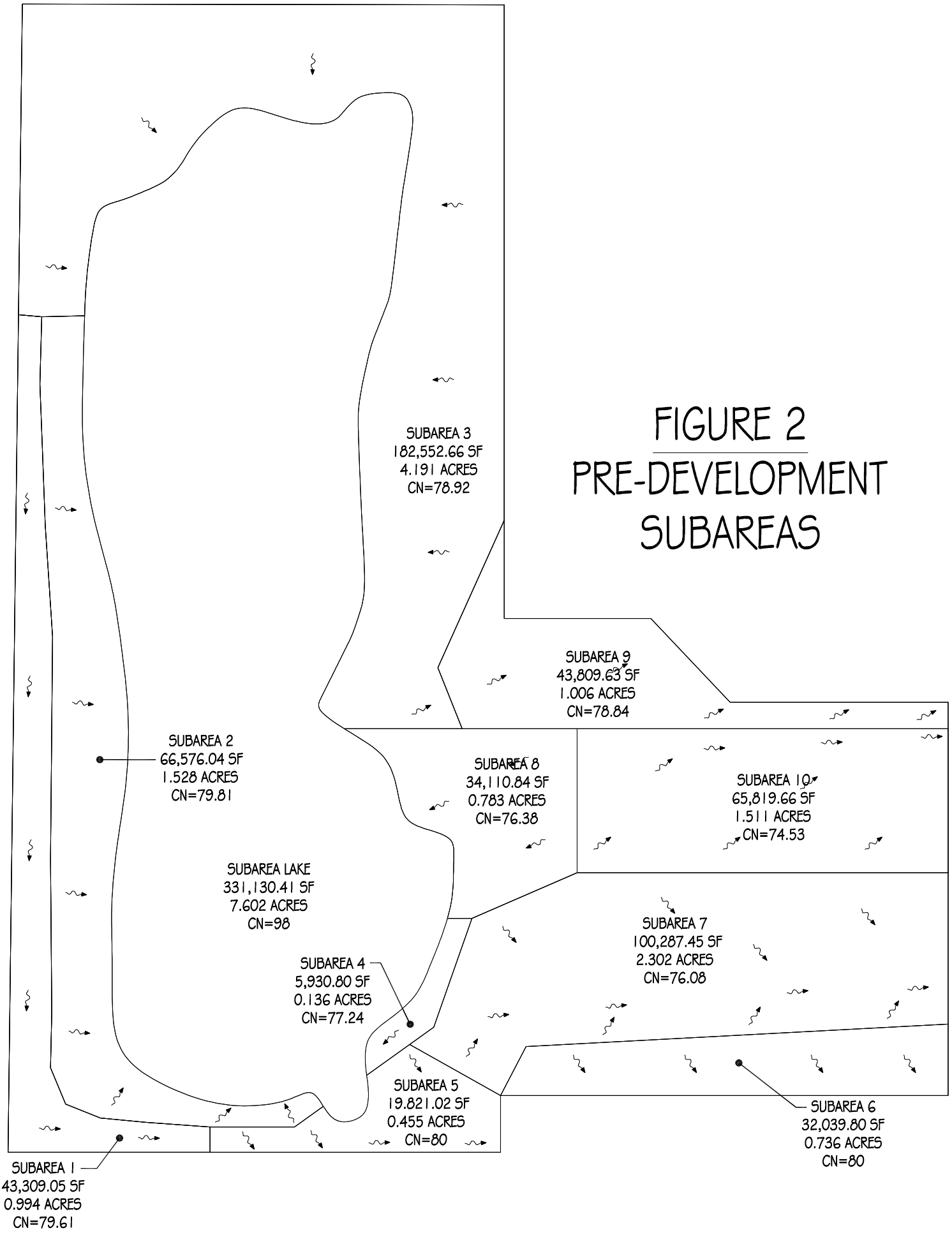


FIGURE 2
PRE-DEVELOPMENT SUBAREAS

Pre-Development Analysis and Summary

The project was analyzed to determine the peak run-off rates for the drainage basin utilizing the BRN Model and the data presented in the previous section. Simulations were run for each of the required storm events. The input data is provided in the Appendix as is the output data for each of the storm event scenarios. Hydrographs are provided for the 10 year Storm Event only.

Pre-Development Output Summary

Storm Event	24 HR Rainfall ("/24 HR)	Peak In-Flow To Lake (cfs)	Peak Outflow from Lake (cfs)	Peak Attenuation of Lake (feet)	Discharge Other (cfs)	Total Discharge Offsite (cfs)
2-Year	4.6"	33.26	1.26	6.52	5.65	6.91
10-Year	7.0"	52.99	2.61	6.78	9.98	12.51
25-Year	8.0"	61.31	3.15	6.89	11.84	14.99
100-Year	10.2"	79.67	4.96	7.14	15.99	20.95

Post Development Conditions

The project will require a considerable amount of fill in some areas of the site and the existing lake will be the source for the fill required. The drainage patterns for the post-development conditions are similar to the pre-development conditions, with the majority of run-off going to the lake and some areas flowing offsite through existing ditches and shallow concentrated flow. The post-development site has been divided into 22 subareas and are summarized below:

Post-Development Subarea

Subarea	Area In Square Feet	Area in Acres
1	43,309.05	0.994
2	63,432.47	1.456
3	169,904.66	3.900
A	14,976.00	0.344
B	14,496.00	0.333
C	32,697.30	0.751
D	8,036.14	0.184
E	34,307.50	0.788
F	21,819.32	0.501
G	18,997.55	0.436
H	20,598.11	0.473

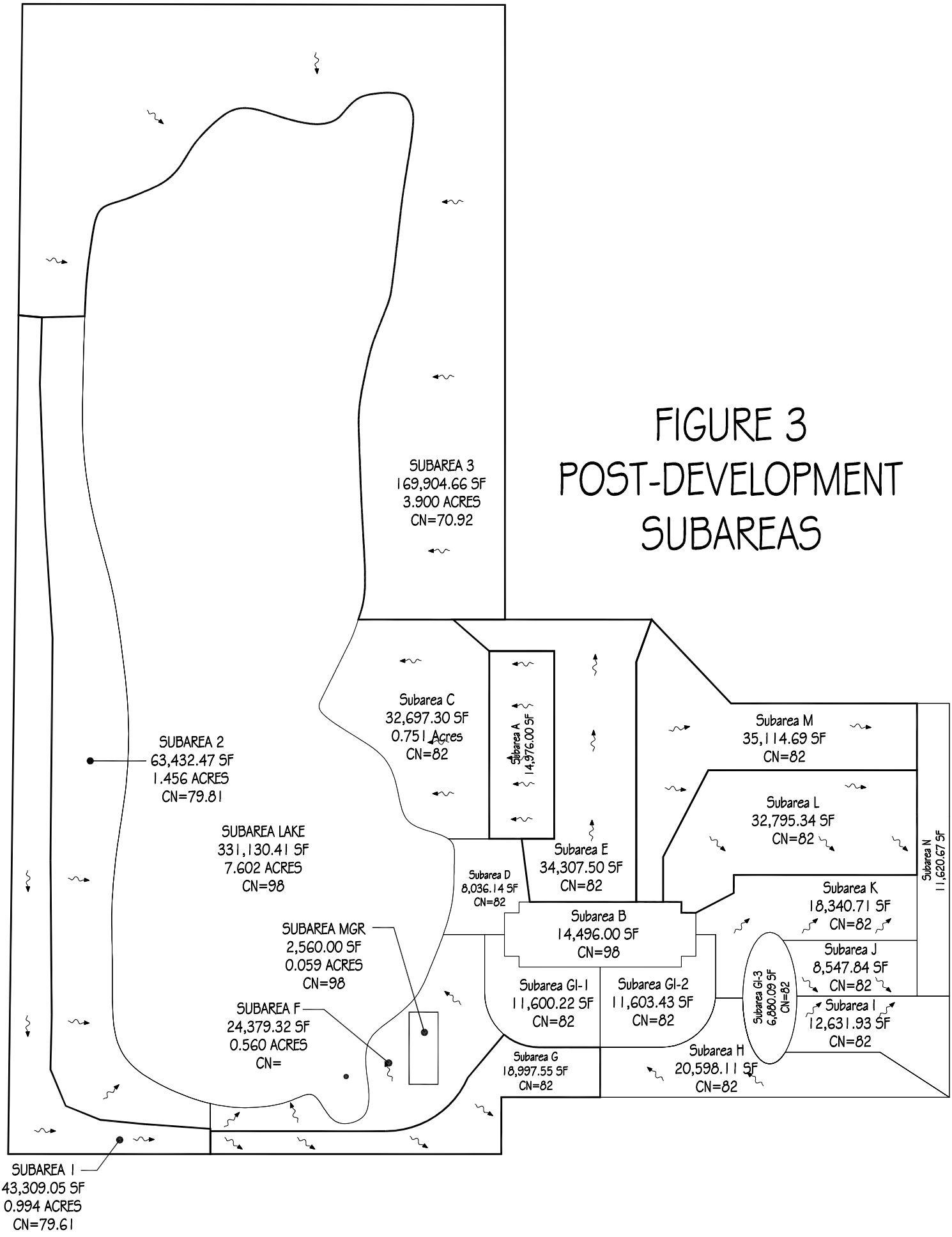


FIGURE 3
POST-DEVELOPMENT SUBAREAS

I	12,631.93	0.290
J	8,547.84	0.196
K	18,340.71	0.421
L	32,795.34	0.753
M	35,114.69	0.806
N	11,620.67	0.267
GI-1	11,600.22	0.266
GI-2	11,603.43	0.266
GI-3	6,880.09	0.158
MGR	2,560.00	0.059
Lake	331,130.41	7.602
Total	925,399.43	21.244

Detention Pond/Lake

The project is situated adjacent to the existing lake and the lake volume will be utilized to treat the run-off from the developed site. The lake is considerably oversized for the current development and will treat the run-off sufficiently prior to discharge off-site. The current NWS in the lake is 6.01' which is the invert of the existing 18" HDPE discharge pipe. A new Outlet Control Structure will be set to control the stormwater discharges. The Primary control devise will be a broadcrested weir set at elevation 7.5' and will be 3' in width. This devise will control the smaller storm events. There will also be 2 broadcrested weirs set at elevation 8.5' for larger events and they will have a width of 4' The lake NWS will be raised in the post-development condition for aesthetic reasons. The lake level will be increased by nearly 18" from elevation 6.01' to elevation 7.50'.

Pond/Lake Area and Volume

Elevation	Lake Area (SF)	Volume (CF) Pond "B"
10	331,130	0
9	316,719	323,924.5
8	302,465	309,592.0
7.5	295,396	149,465.25
		782,981.75 CF

The SCDHEC-OCRM requires for this site to treat the equivalent to the first ½" over the entire site or the first 1" over the built upon site, whichever is greater. However, in this case, the developed site will be evaluated due to the size of the overall tract. Therefore, the developed site is 7 acres and the volume required would be 7 Acres x 43,560 SF x 1" = 25,410 CF. The pond volume is greater than required and meets the SCDHEC-OCRM requirement.

Stormwater Management

The new storm water collection system will consist of road side swales, grate inlets, junction boxes, roof drains and below grade HDPE pipes. The discharge from the lake will be the same as the existing condition, but the elevation will be modified. Slope stabilization will occur immediately following completion of the tasks.

Post Development Analysis and Summary

The referenced model was utilized to evaluate the storage and buffering capability of the collection and pond system.

The Total Peak Discharge Rate is arrived by adding the Values in Column A and B. The Summary Table below indicated the in-flow, out-flow and height in the pond during the 4 storm events:

Post-Development Summary Table

Storm Event	24 HR Rainfall ("/24 HR)	Peak In-Flow To Lake (cfs)	Peak Outflow from Lake (cfs) A	Peak Attenuation of Lake (feet)	Discharge Other (cfs) B	Total Discharge Offsite (cfs) C
2-Year	4.6"	38.57	3.15	7.97	3.15	6.3
10-Year	7.0"	61.54	5.96	8.23	5.36	11.32
25-Year	8.0"	70.94	7.22	8.34	6.30	13.52
100-Year	10.2"	91.95	10.69	8.56	8.36	19.05

The Pre- and Post Development Discharged rates are summarized in the Table below:

Pre- and Post-Development Peak Runoff Comparison

Storm Event	24 HR Rainfall Accumulation ("/24 HR)	**Pre-Development** Total Peak Discharge Rate (cfs)	**Post-Development** Total Peak Discharge Rate (cfs)
2-Year	4.3"	6.91	6.3
10-Year	6.6"	12.51	11.32
25-Year	8.0"	14.99	13.52
100-Year	10.4"	20.95	19.05

The post-development rates are able to remain below the pre-development discharge rates for the all of the events analyzed.

The 100 year storm event has been analyzed to ensure that at least 6" of freeboard from the water surface elevation to the top of pond is provided. In this case, the top of pond is

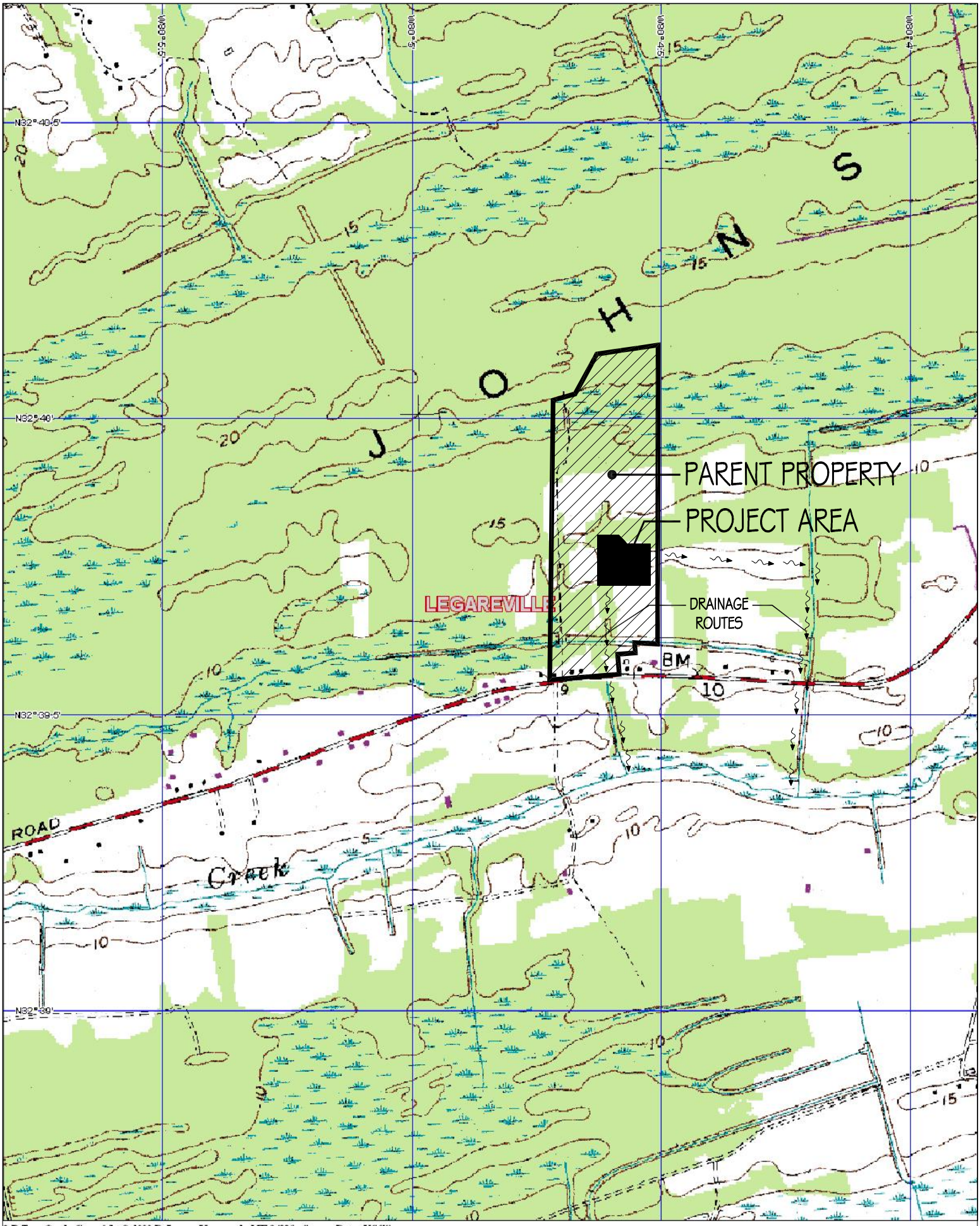
at 10.0’ at the road crossing and the water surface elevation during the 100 year storm event reaches 8.36’ leaving more than 18” of freeboard.

Erosion Control Measures

The permanent Erosion Control Plan and Measures include the use of grassed embankments, grassed swales, culverts, riprap and a detention pond. Erosion control during construction will consist of swales, silt fence and check dams(as required) in accordance with the Stormwater Pollution Prevention Plan included with the construction plans. Following construction, as-built drawings shall be provided by the developer and submitted the Charleston County to ensure the project was constructed in accordance with the approved plans and specifications. Best Management Practices shall be implemented during construction and weekly inspections shall be provided by a third party during construction as indicated on the plans. This responsibility shall be placed on the developer or builders representative.

Appendix A

USGS Map with Site Indicated



450 ft Scale: 1 : 16,000 Detail: 13-6 Datum: WGS84

Appendix B

TR-55 Curve Numbers

Table 2-2a Runoff curve numbers for urban areas [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type and hydrologic condition	Average percent impervious area [2/]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3/]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4/]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5/]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

1 Average runoff condition, and $I_a = 0.2S$.

2 The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

3 CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

4 Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

5 Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands [1/]

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment [2/]	Hydrologic condition [3/]	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T+ CR	Poor	65	73	79	81
		Good	61	70	77	80
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T+ CR	Poor	60	71	78	81
		Good	58	69	77	80
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

[1] Average runoff condition, and I_a=0.2S

[2] Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

[3] Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good ≥ 20%), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c Runoff curve numbers for other agricultural lands [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2/]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3/]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4/]	48	65	73
Woods—grass combination (orchard or tree farm). [5/]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6/]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4/]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

1 Average runoff condition, and $I_a = 0.2S$.

2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.

3 *Poor*: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

4 Actual curve number is less than 30; use CN = 30 for runoff computations.

5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Table 2-2d Runoff curve numbers for arid and semiarid rangelands [1/]

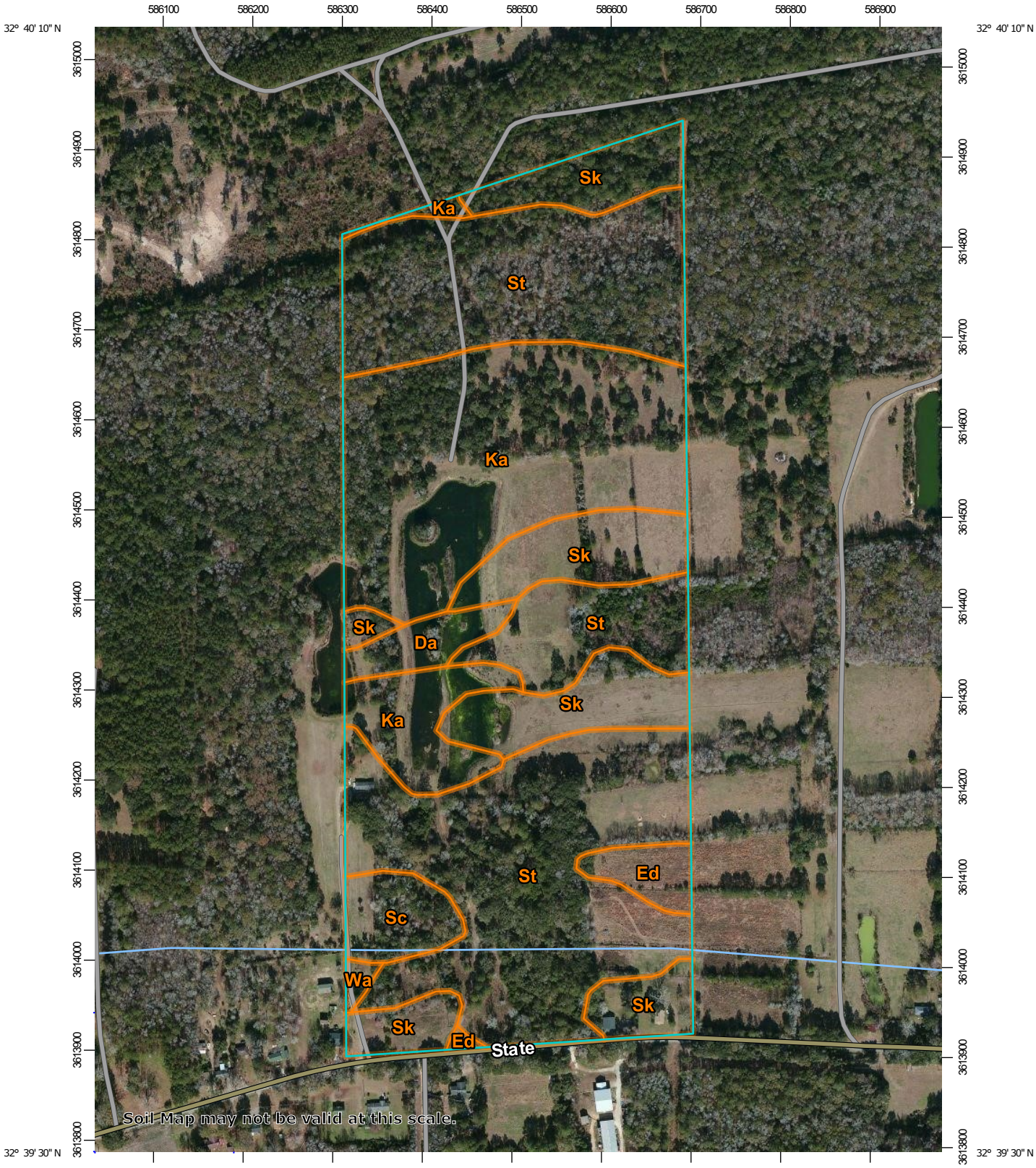
Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition [2/]	A [3/]	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

1 Average runoff condition, and I_a, = 0.2S. For range in humid regions, use table 2-2c.
2 Poor: <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: > 70% ground cover.
3 Curve numbers for group A have been developed only for desert shrub.

Appendix C

SCS Map and Soils Description

Soil Map—Charleston County Area, South Carolina
(Sanctuary Stables)



Map Scale: 1:6,100 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Charleston County Area, South Carolina
Survey Area Data: Version 13, Sep 26, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 8, 2011—Jan 15, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Charleston County Area, South Carolina (SC690)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Da	Dawhoo and rutlege loamy fine sand	2.1	2.2%
Ed	Edisto loamy fine sand	1.8	1.9%
Ka	Kiawah loamy fine sand	25.7	28.0%
Sc	Santee clay loam	2.7	3.0%
Sk	Seabrook loamy fine sand	16.3	17.8%
St	Stono fine sandy loam	43.0	46.8%
Wa	Wadmalaw fine sandy loam	0.3	0.4%
Totals for Area of Interest		**91.9**	**100.0%**

Charleston County Area, South Carolina

Da—Dawhoo and rutlege loamy fine sand

Map Unit Setting

National map unit symbol: 4mwh
Elevation: 0 to 70 feet
Mean annual precipitation: 42 to 52 inches
Mean annual air temperature: 51 to 75 degrees F
Frost-free period: 220 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Rutlege and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rutlege

Setting

Landform: Depressions, flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Sandy fluviomarine deposits

Typical profile

A - 0 to 30 inches: loamy fine sand
Cg - 30 to 60 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water storage in profile: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D

Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Charleston County Area, South Carolina
Survey Area Data: Version 13, Sep 26, 2016

Charleston County Area, South Carolina

Ka—Kiawah loamy fine sand

Map Unit Setting

National map unit symbol: 4mwp
Elevation: 0 to 70 feet
Mean annual precipitation: 42 to 52 inches
Mean annual air temperature: 51 to 75 degrees F
Frost-free period: 220 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Kiawah and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kiawah

Setting

Landform: Marine terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy marine deposits

Typical profile

Ap - 0 to 8 inches: loamy fine sand
E - 8 to 15 inches: loamy fine sand
Bt - 15 to 48 inches: loamy fine sand
C - 48 to 72 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Hydric soil rating: No

Minor Components

Rutlege

Percent of map unit: 3 percent
Landform: Depressions, flood plains
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Charleston County Area, South Carolina
Survey Area Data: Version 13, Sep 26, 2016

Charleston County Area, South Carolina

Sk—Seabrook loamy fine sand

Map Unit Setting

National map unit symbol: 4mxd
Elevation: 0 to 70 feet
Mean annual precipitation: 42 to 52 inches
Mean annual air temperature: 51 to 75 degrees F
Frost-free period: 220 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Ridgeland and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ridgeland

Setting

Landform: Marine terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 9 inches: loamy fine sand
C - 9 to 60 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Rutlege

Percent of map unit: 3 percent

Landform: Depressions, flood plains
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Charleston County Area, South Carolina
Survey Area Data: Version 13, Sep 26, 2016

Charleston County Area, South Carolina

St—Stono fine sandy loam

Map Unit Setting

National map unit symbol: 4mxg
Elevation: 0 to 70 feet
Mean annual precipitation: 42 to 52 inches
Mean annual air temperature: 51 to 75 degrees F
Frost-free period: 220 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Nakina and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nakina

Setting

Landform: Depressions, marine terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Loamy marine deposits

Typical profile

Ap - 0 to 9 inches: fine sandy loam
E - 9 to 17 inches: fine sandy loam
Btg - 17 to 37 inches: sandy clay loam
Cg - 37 to 60 inches: loamy fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D

Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Charleston County Area, South Carolina
Survey Area Data: Version 13, Sep 26, 2016

			Particle Sizes (mm)							
Depth	**D15(mm)**	**K**	**1.4**	**1.0**	**0.063**	**0.044**	**0.038**	**0.004**	**0.003**	**0.001**
SOIL: CREEDMOOR (C)										
0 - 8	0.0112	0.28	100.0	87.3	58.4	28.0	27.8	4.2	2.6	0.0
8 - 19	0.0059	0.32	100.0	85.8	53.2	46.5	46.5	8.3	5.4	0.0
19 - 56	0.0045	0.32	100.0	84.4	48.8	46.3	46.0	13.3	9.3	0.0
56 – 77	0.0064	0.37	100.0	89.0	63.9	49.3	48.1	6.2	3.9	0.0
SOIL: CREVASSE (A)										
0 - 10	0.0302	0.17	100.0	89.8	66.6	16.4	16.4	2.6	1.7	0.0
10 - 60	0.0455	0.15	100.0	93.0	76.8	8.8	8.8	1.5	1.0	0.0
SOIL: DALEVILLE (D)										
0 - 16	0.0066	0.32	100.0	92.5	75.3	54.0	50.7	4.7	2.9	0.0
16 - 70	0.0055	0.37	100.0	88.6	62.4	55.6	55.2	8.5	5.4	0.0
SOIL: DAVIDSON (B)										
0 - 7	0.0043	0.28	100.0	81.0	37.6	36.1	36.1	14.3	10.2	0.0
7 - 12	0.0058	0.32	100.0	84.1	47.8	42.2	42.2	9.7	6.5	0.0
12 - 53	0.0039	0.24	100.0	79.8	33.7	32.5	32.5	15.5	11.2	0.0
53 - 72	0.0054	0.28	100.0	81.4	39.0	36.0	36.0	11.8	8.3	0.0
SOIL: DAWHOO (B/D)										
0 - 30	0.0388	0.10	100.0	95.4	85.0	16.1	14.8	1.1	0.7	0.0
30 - 60	0.0441	0.15	100.0	92.9	76.6	14.5	14.1	1.7	1.1	0.0
SOIL: DELOSS (B/D)										
0 – 18	0.0094	0.24	100.0	89.6	65.7	34.5	33.3	3.9	2.4	0.0
18 - 56	0.0074	0.24	100.0	83.4	45.5	34.6	34.6	7.7	5.2	0.0
SOIL: DOTHAN (B)										
0 - 13	0.0175	0.24	100.0	86.1	54.3	20.7	20.7	4.1	2.7	0.0
13 - 33	0.0271	0.28	100.0	79.0	31.1	16.4	16.4	7.2	5.2	0.0
33 - 60	0.0149	0.10	100.0	79.2	31.6	20.0	20.0	7.9	5.7	0.0
SOIL: DOTHANGR (B)										
0 – 13	0.0175	0.20	100.0	86.1	54.3	20.7	20.7	4.1	2.7	0.0
13 - 33	0.0446	0.28	100.0	78.6	29.5	14.4	14.4	7.1	5.2	0.0
33 - 60	0.0135	0.28	100.0	79.4	32.4	21.0	21.0	7.9	5.7	0.0

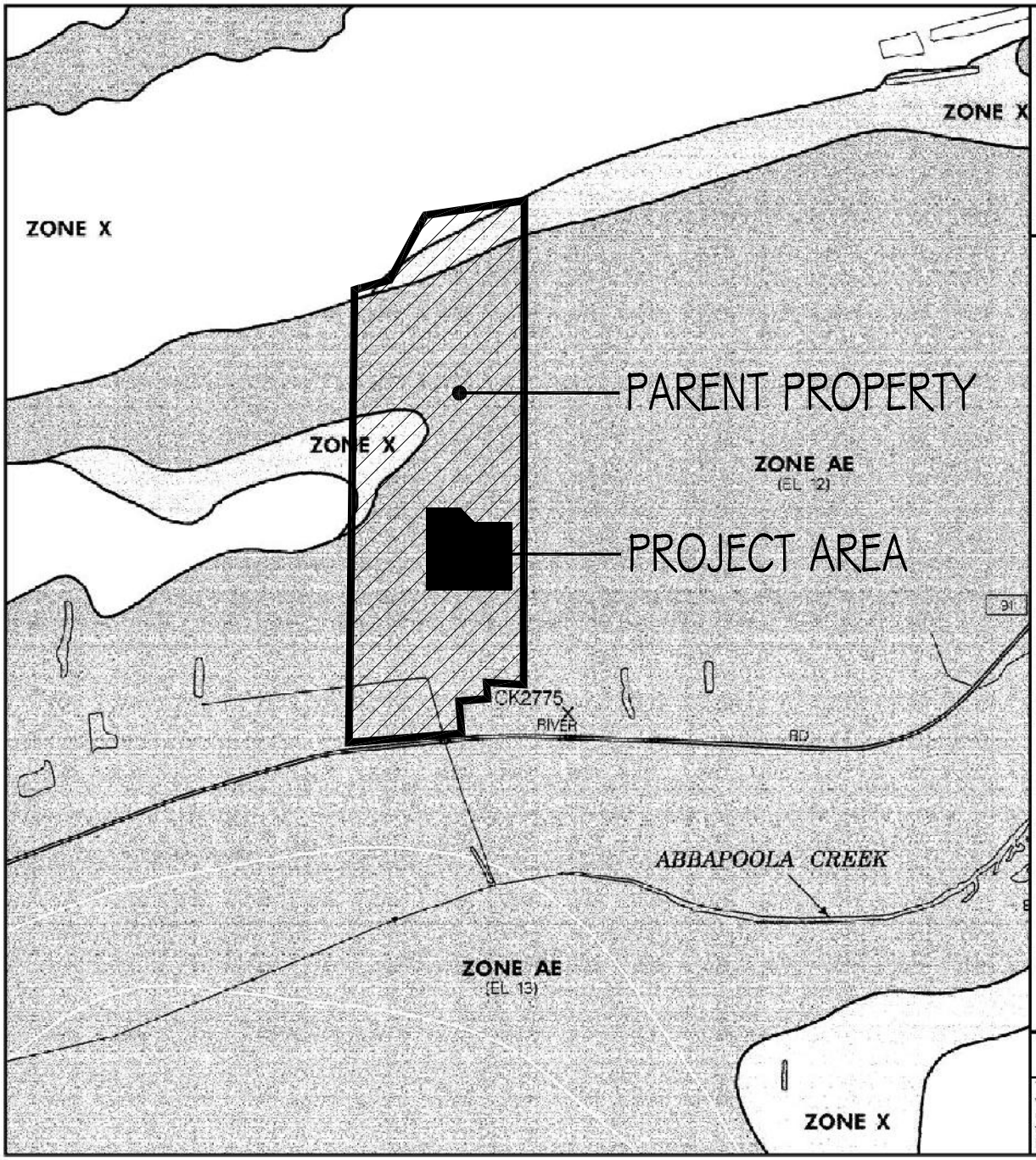
			Particle Sizes (mm)							
Depth	**D15(mm)**	**K**	**1.4**	**1.0**	**0.063**	**0.044**	**0.038**	**0.004**	**0.003**	**0.001**
SOIL: KENANSVILLE (A)										
0 - 24	0.0445	0.15	100.0	91.7	72.6	13.3	13.3	2.0	1.3	0.0
24 - 36	0.0125	0.15	100.0	88.8	63.0	26.4	26.1	3.6	2.2	0.0
36 - 80	0.0446	0.10	100.0	92.7	75.9	12.8	12.6	1.7	1.1	0.0
SOIL: KENANSVILLEWS (A)										
0 – 23	0.0445	0.15	100.0	91.7	72.6	13.3	13.3	2.0	1.3	0.0
23 - 56	0.0178	0.15	100.0	87.6	59.4	20.8	20.8	3.5	2.2	0.0
56 - 72	0.0446	0.10	100.0	92.7	75.9	12.8	12.6	1.7	1.1	0.0
SOIL: KERSHAW (A)										
0 – 80	0.0466	0.10	100.0	95.3	84.4	1.8	1.8	0.8	0.6	0.0
SOIL: KIAWAH (B/D)										
0 – 15	0.0445	0.15	100.0	92.7	76.1	13.1	12.9	1.7	1.1	0.0
15 - 32	0.0442	0.10	100.0	86.9	56.9	14.5	14.5	3.3	2.2	0.0
32 - 48	0.0462	0.10	100.0	89.9	66.7	7.0	7.0	2.1	1.5	0.0
48 - 72	0.0462	0.10	100.0	92.1	74.1	5.9	5.9	1.6	1.1	0.0
SOIL: KIRKSEY (C)										
0 - 6	0.0067	0.43	100.0	94.5	81.9	57.2	52.6	3.7	2.3	0.0
6 - 38	0.0053	0.43	100.0	91.2	71.0	62.8	61.1	8.2	5.2	0.0
38 - 45	0.0069	0.43	100.0	91.7	72.6	50.5	47.7	4.7	2.9	0.0
SOIL: LAKELAND (A)										
0 – 43	0.0463	0.10	100.0	92.7	75.9	4.8	4.8	1.4	1.0	0.0
43 - 80	0.0463	0.10	100.0	94.6	82.4	3.9	3.9	1.0	0.7	0.0
SOIL: LAKELANDGR (A)										
0 – 80	0.0458	0.05	100.0	95.5	85.1	6.3	6.2	0.9	0.6	0.0
SOIL: LEAF (D)										
0 - 9	0.0069	0.28	100.0	90.8	69.7	48.8	46.6	5.0	3.1	0.0
9 - 72	0.0045	0.32	100.0	85.1	51.1	48.0	47.5	13.3	9.3	0.0

			Particle Sizes (mm)							
Depth	**D15(mm)**	**K**	**1.4**	**1.0**	**0.063**	**0.044**	**0.038**	**0.004**	**0.003**	**0.001**
SOIL: SANTUC (Z)										
0 - 3	0.0206	0.24	100.0	87.6	59.2	19.3	19.3	3.5	2.2	0.0
3 - 9	0.0207	0.24	100.0	88.7	62.7	19.4	19.4	3.1	1.9	0.0
9 - 26	0.0087	0.28	100.0	83.7	46.4	30.9	30.9	6.6	4.4	0.0
26 - 41	0.0073	0.28	100.0	81.2	38.1	30.9	30.9	9.1	6.3	0.0
41 - 60	0.0088	0.28	100.0	85.1	51.1	32.4	32.4	5.6	3.6	0.0
SOIL: SAPELO (D)										
0 – 17	0.0453	0.17	100.0	94.9	83.3	8.8	8.5	1.1	0.7	0.0
17 - 25	0.0452	0.15	100.0	92.4	75.1	9.9	9.9	1.7	1.1	0.0
25 - 49	0.0460	0.17	100.0	93.4	78.4	6.2	6.2	1.3	0.9	0.0
49 - 84	0.0204	0.24	100.0	81.0	37.4	18.4	18.4	6.2	4.4	0.0
SOIL: SATILLA (D)										
0 - 5	0.0053	0.24	100.0	89.5	65.4	58.5	57.3	9.0	5.8	0.0
5 - 24	0.0056	0.24	100.0	88.5	62.1	54.9	54.5	8.2	5.2	0.0
SOIL: SCRANTON (A/D)										
0 - 7	0.0194	0.15	100.0	90.6	69.0	20.5	20.2	2.7	1.7	0.0
7 - 41	0.0455	0.10	100.0	90.1	67.5	9.5	9.5	2.2	1.5	0.0
41 – 72	0.0467	0.10	100.0	91.3	71.5	3.6	3.6	1.6	1.2	0.0
SOIL: SEABROOK (C)										
0 - 8	0.0454	0.10	100.0	90.7	69.4	9.8	9.8	2.1	1.4	0.0
8 – 81	0.0454	0.10	100.0	90.7	69.4	9.8	9.8	2.1	1.4	0.0
SOIL: SEAGATE (A/D)										
0 – 12	0.0452	0.10	100.0	97.8	92.6	8.9	8.1	0.5	0.3	0.0
12 - 28	0.0445	0.15	100.0	91.7	72.6	13.3	13.3	2.0	1.3	0.0
28 - 36	0.0452	0.10	100.0	95.6	85.6	9.1	8.6	0.9	0.6	0.0
36 - 40	0.0312	0.28	100.0	80.4	35.6	15.8	15.8	6.1	4.4	0.0
40 - 64	0.0054	0.32	100.0	88.0	60.6	54.9	54.6	9.1	5.8	0.0
SOIL: SEEWEE (B)										
0 – 21	0.0452	0.10	100.0	93.8	79.7	9.9	9.9	1.4	0.9	0.0
21 - 30	0.0459	0.10	100.0	94.7	82.7	5.9	5.9	1.1	0.7	0.0
30 - 65	0.0460	0.10	100.0	94.7	82.6	5.4	5.4	1.0	0.7	0.0

			Particle Sizes (mm)							
Depth	**D15(mm)**	**K**	**1.4**	**1.0**	**0.063**	**0.044**	**0.038**	**0.004**	**0.003**	**0.001**
SOIL: SHELLBLUFF (B)										
0 - 5	0.0052	0.28	100.0	89.3	64.9	58.3	57.0	9.3	6.0	0.0
5 - 70	0.0054	0.28	100.0	90.0	67.1	59.3	58.1	8.2	5.2	0.0
SOIL: SMITHBORO (D)										
0 - 6	0.0064	0.37	100.0	93.3	78.1	57.5	53.7	4.7	2.9	0.0
6 - 75	0.0045	0.32	100.0	84.4	48.8	46.3	46.0	13.3	9.3	0.0
SOIL: SPRAY (B)										
0 - 6	0.0061	0.43	100.0	85.4	51.9	44.7	44.7	8.2	5.4	0.0
6 - 17	0.0046	0.28	100.0	83.0	44.0	42.4	42.4	13.2	9.3	0.0
SOIL: STALLINGS (C)										
0 – 12	0.0125	0.20	100.0	88.8	63.0	26.4	26.1	3.6	2.2	0.0
12 - 42	0.0155	0.17	100.0	87.8	59.9	22.6	22.6	3.6	2.2	0.0
42 - 80	0.0159	0.17	100.0	89.4	65.1	22.7	22.5	3.1	1.9	0.0
SOIL: STONEVILLE (B)										
0 - 5	0.0081	0.32	100.0	85.8	53.5	35.5	35.4	5.7	3.6	0.0
5 - 13	0.0062	0.32	100.0	88.9	63.6	50.5	49.8	6.6	4.1	0.0
13 - 38	0.0048	0.28	100.0	81.7	39.8	37.8	37.8	13.1	9.3	0.0
38 - 48	0.0064	0.24	100.0	86.8	56.6	45.6	45.3	7.0	4.4	0.0
SOIL: STONO (B/D)										
0 – 17	0.0084	0.24	100.0	88.5	62.1	36.6	36.1	4.7	2.9	0.0
17 - 37	0.0121	0.15	100.0	80.6	36.1	22.9	22.9	7.4	5.2	0.0
37 - 54	0.0454	0.10	100.0	90.8	69.7	10.8	10.8	2.1	1.4	0.0
SOIL: SUCHES (B)										
0 - 9	0.0072	0.24	100.0	88.3	61.6	42.0	41.4	5.5	3.4	0.0
9 - 31	0.0059	0.28	100.0	85.7	53.1	46.6	46.6	8.4	5.5	0.0
31 - 42	0.0077	0.28	100.0	84.7	49.7	35.6	35.6	6.5	4.2	0.0
SOIL: SUFFOLK (B)										
0 – 11	0.0075	0.32	100.0	92.1	74.1	46.7	43.8	3.9	2.4	0.0
11 - 47	0.0084	0.24	100.0	84.2	48.1	32.4	32.4	6.4	4.2	0.0
47 - 65	0.0233	0.15	100.0	91.7	72.8	19.3	18.6	2.2	1.4	0.0

Appendix D

FEMA Flood Map with Site Indicated



APPROXIMATE SCALE

MAP SCALE 1" = 1000'

500 0 1000 20

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CHARLESTON COUNTY,
SOUTH CAROLINA
AND INCORPORATED AREAS

PANEL 665 OF 855

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CHARLESTON, COUNTY OF	455413	0665	J
SEWEE ISLAND, TOWN OF	450287	0665	J

Notice to User: The MAP NUMBER shown below should be used when placing map orders; the COMMUNITY NUMBER shown above should be used on insurance applications for the subject community.

MAP NUMBER
45019C0665J

EFFECTIVE DATE:
NOVEMBER 17, 2004

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Appendix E

Input Data
Pre-Development

```
Number of Paths  13
Path Number   1
From Node..  10
To Node....   9
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number   2
From Node..   9
To Node....  11
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number   3
From Node..   8
To Node....  12
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number   4
From Node..   7
To Node....  12
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number   5
From Node..   5
To Node....  12
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number   6
From Node..   6
To Node....  11
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number   7
From Node..   4
To Node....  11
Path Type..   1
*
```

```
Number of Flow Controls.         0
**********************************
Path Number   8
From Node..   3
To Node....  12
Path Type..   1
*
Number of Flow Controls.         0
**********************************
Path Number   9
From Node..   2
To Node....  11
Path Type..   1
*
Number of Flow Controls.         0
**********************************
Path Number  10
From Node..   1
To Node....  11
Path Type..   1
*
Number of Flow Controls.         0
**********************************
Path Number  11
From Node..  12
To Node....  14
Path Type..   1
*
Number of Flow Controls.         1
Type 1
Weir Crest El.....    6.0100
Width of Opening, feet..   20.0000
Weir Coefficient........    3.3300
Number of Ends..........         2
**********************************
Path Number  12
From Node..  14
To Node....  15
Path Type..   2
*
Pipe Length, feet.......   20.0000
Manning Coefficient.....    0.0150
Pipe Rise, feet.........    1.5000
Pipe Span, feet.........    1.5000
Upstream Invert.........    6.0100
Forward Entrance Ke.....    0.0000
Downstream Invert.......    5.7500
Backflow Entrance Ke....    0.0000
```

```
Flapgate Flag..........         0
**********************************
Path Number  13
From Node..  15
To Node....  13
Path Type..   3
*
Channel Length, feet....  100.0000
Manning Coefficient.....    0.0400
Left Side Slope.........    1.0000
Right Side Slope........    1.0000
Upstream Bottom Width...    1.0000
Upstream Bottom El......    5.7500
Forward Entrance Ke.....    0.0000
Downstream Bottom Width.    1.0000
Downstream Bottom El....    5.3600
Backflow Entrance Ke....    0.0000
**********************************
Number of Nodes  15
Node   1
Subarea 10
Type 1
SCS_256
Total acres.............    1.5110
Weighted curve number...   74.5300
Hydraulic length, feet..  440.0000
Ground slope, percent...    0.3000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   10.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    8.0000
**********************************
Node   2
Subarea 9
Type 1
SCS_256
Total acres.............    1.0000
Weighted curve number...   78.8400
Hydraulic length, feet..  240.0000
Ground slope, percent...    0.5000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   10.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    8.0000
**********************************
Node   3
```

Subarea 8
Type 1
SCS_256
Total acres..... 0.7830
Weighted curve number... 76.3800
Hydraulic length, feet.. 200.0000
Ground slope, percent... 0.3000
Percent impervious cover 0.0000
Initial abstraction k... 0.0000
Flood elevation..... 10.0000
Dry Weather Base CFS.... 0.0000
Initial Water Elevation. 8.0000
****
Node 4
Subarea 7
Type 1
SCS_256
Total acres..... 2.3670
Weighted curve number... 76.0800
Hydraulic length, feet.. 570.0000
Ground slope, percent... 0.1000
Percent impervious cover 0.0000
Initial abstraction k... 0.0000
Flood elevation..... 10.0000
Dry Weather Base CFS.... 0.0000
Initial Water Elevation. 8.0000
****
Node 5
Subarea 4
Type 1
SCS_256
Total acres..... 0.1360
Weighted curve number... 77.2400
Hydraulic length, feet.. 30.0000
Ground slope, percent... 1.0000
Percent impervious cover 0.0000
Initial abstraction k... 0.0000
Flood elevation..... 10.0000
Dry Weather Base CFS.... 0.0000
Initial Water Elevation. 6.0100
****
Node 6
Subarea 6
Type 1
SCS_256
Total acres..... 0.7360
Weighted curve number... 80.0000
Hydraulic length, feet.. 100.0000

```
Ground slope, percent...    0.5000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   10.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    8.0000
***********************************
Node   7
Subarea 3
Type 1
SCS_256
Total acres.............    4.1910
Weighted curve number...   78.9200
Hydraulic length, feet..  250.0000
Ground slope, percent...    0.5000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   10.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    6.0100
***********************************
Node   8
Subarea 2
Type 1
SCS_256
Total acres.............    1.5280
Weighted curve number...   79.8100
Hydraulic length, feet..  100.0000
Ground slope, percent...    1.0000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   10.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    6.0100
***********************************
Node   9
Subarea 5
Type 1
SCS_256
Total acres.............    0.4550
Weighted curve number...   80.0000
Hydraulic length, feet..  325.0000
Ground slope, percent...    0.3000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   10.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    5.3600
```

```
************************************
Node  10
Subarea 1
Type 1
SCS_256
Total acres.............    0.9940
Weighted curve number...   79.6100
Hydraulic length, feet.. 1100.0000
Ground slope, percent...    0.2000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   10.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    6.4100
************************************
Node  11
Offsite
Type 4
Number of data points...         2
Hour      0.0000  Stage     5.3600
Hour     24.0000  Stage     5.3600
Flood elevation.........   10.0000
************************************
Node  12
Lake
Type 2
Number of data points...         2
Stage    10.0000  Acres     7.6000
Stage     6.0100  Acres     6.8100
Rational coefficient....    1.0000
Initial water...........    6.0100
Dry Weather Base CFS....    0.0000
************************************
Node  13
Outfall
Type 4
Number of data points...         2
Hour      0.0000  Stage     5.3600
Hour     24.0000  Stage     5.3600
Flood elevation.........   10.0000
************************************
Node  14
Pipe Entrance
Type 3
Flood elevation.........   10.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    6.0100
************************************
```

```
Node  15
Pipe Exit
Type 3
Flood elevation.........   10.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    5.3600
**********************************
Checksum 28
```

Appendix F

Input Data
Post-Development

```
Number of Paths  31
Path Number   1
From Node..   2
To Node....  30
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number   2
From Node..   1
To Node....   3
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number   3
From Node..   5
To Node....   3
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number   4
From Node..   6
To Node....   3
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number   5
From Node..   7
To Node....   6
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number   6
From Node..   8
To Node....   3
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number   7
From Node..  11
To Node....  10
Path Type..   1
*
```

```
Number of Flow Controls.         0
************************************
Path Number   8
From Node..  10
To Node....   3
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number   9
From Node..   9
To Node....  12
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number  10
From Node..  13
To Node....  12
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number  11
From Node..  19
To Node....  18
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number  12
From Node..  18
To Node....  20
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number  13
From Node..  17
To Node....  22
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number  14
From Node..  16
To Node....  21
Path Type..   1
```

```
*
Number of Flow Controls.         0
************************************
Path Number  15
From Node..  15
To Node....  14
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number  16
From Node..  14
To Node....  20
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number  17
From Node..  28
To Node....  29
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number  18
From Node..  27
To Node....  29
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number  19
From Node..  26
To Node....  25
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number  20
From Node..  25
To Node....  29
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number  21
From Node..  24
To Node....  25
```

```
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number  22
From Node..  23
To Node....  12
Path Type..   1
*
Number of Flow Controls.         0
************************************
Path Number  23
From Node..  29
To Node....  21
Path Type..   2
*
Pipe Length, feet.......  165.0000
Manning Coefficient.....    0.0150
Pipe Rise, feet.........    2.0000
Pipe Span, feet.........    2.0000
Upstream Invert.........    7.4700
Forward Entrance Ke.....    0.0000
Downstream Invert.......    7.1500
Backflow Entrance Ke....    1.0000
Flapgate Flag...........         0
************************************
Path Number  24
From Node..  21
To Node....  20
Path Type..   2
*
Pipe Length, feet.......   87.0000
Manning Coefficient.....    0.0150
Pipe Rise, feet.........    2.0000
Pipe Span, feet.........    2.0000
Upstream Invert.........    7.0500
Forward Entrance Ke.....    1.0000
Downstream Invert.......    6.7800
Backflow Entrance Ke....    1.0000
Flapgate Flag...........         0
************************************
Path Number  25
From Node..  20
To Node....  22
Path Type..   2
*
Pipe Length, feet.......  200.0000
Manning Coefficient.....    0.0150
```

```
Pipe Rise, feet.........    2.0000
Pipe Span, feet.........    2.0000
Upstream Invert.........    6.6800
Forward Entrance Ke.....    1.0000
Downstream Invert.......    6.3800
Backflow Entrance Ke....    1.0000
Flapgate Flag...........         0
***********************************
Path Number  26
From Node..  22
To Node....   3
Path Type..   2
*
Pipe Length, feet.......  120.0000
Manning Coefficient.....    0.0150
Pipe Rise, feet.........    2.0000
Pipe Span, feet.........    2.0000
Upstream Invert.........    6.2800
Forward Entrance Ke.....    1.0000
Downstream Invert.......    6.0400
Backflow Entrance Ke....    1.0000
Flapgate Flag...........         0
***********************************
Path Number  27
From Node..  14
To Node....  20
Path Type..   2
*
Pipe Length, feet.......   48.0000
Manning Coefficient.....    0.0130
Pipe Rise, feet.........    1.2500
Pipe Span, feet.........    1.2500
Upstream Invert.........    7.7500
Forward Entrance Ke.....    0.0000
Downstream Invert.......    6.7800
Backflow Entrance Ke....    1.0000
Flapgate Flag...........         0
***********************************
Path Number  28
From Node..   3
To Node....  31
Path Type..   1
*
Number of Flow Controls.         3
Type 1
Weir Crest El...........    7.5000
Width of Opening, feet..    3.0000
Weir Coefficient........    3.3300
```

```
Number of Ends.........         2
Type 1
Weir Crest El..........    8.5000
Width of Opening, feet..   4.0000
Weir Coefficient........   3.3300
Number of Ends.........         2
Type 1
Weir Crest El..........    8.5000
Width of Opening, feet..   4.0000
Weir Coefficient........   3.3300
Number of Ends.........         2
***********************************
Path Number  29
From Node..  31
To Node....   4
Path Type..   2
*
Pipe Length, feet.......  40.0000
Manning Coefficient.....   0.0150
Pipe Rise, feet.........   2.0000
Pipe Span, feet.........   2.0000
Upstream Invert.........   6.2700
Forward Entrance Ke.....   0.0000
Downstream Invert.......   5.6600
Backflow Entrance Ke....   0.0000
Flapgate Flag..........         0
***********************************
Path Number  30
From Node..  30
To Node....   4
Path Type..   2
*
Pipe Length, feet.......  20.0000
Manning Coefficient.....   0.0150
Pipe Rise, feet.........   2.0000
Pipe Span, feet.........   2.0000
Upstream Invert.........   5.7500
Forward Entrance Ke.....   0.0000
Downstream Invert.......   5.6600
Backflow Entrance Ke....   0.0000
Flapgate Flag..........         0
***********************************
Path Number  31
From Node..   4
To Node....  32
Path Type..   2
*
Pipe Length, feet.......  100.0000
```

```
Manning Coefficient.....    0.0150
Pipe Rise, feet.........    2.0000
Pipe Span, feet.........    2.0000
Upstream Invert.........    5.5600
Forward Entrance Ke.....    0.0000
Downstream Invert.......    5.3600
Backflow Entrance Ke....    0.0000
Flapgate Flag...........         0
***********************************
Number of Nodes  32
Node   1
Subarea 2
Type 1
SCS_256
Total acres.............    1.4560
Weighted curve number...   79.8100
Hydraulic length, feet..  100.0000
Ground slope, percent...    1.0000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   10.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    6.0100
***********************************
Node   2
Subarea 1
Type 1
SCS_256
Total acres.............    0.9940
Weighted curve number...   79.6100
Hydraulic length, feet.. 1100.0000
Ground slope, percent...    0.2000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   10.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    6.4100
***********************************
Node   3
Lake
Type 2
Number of data points...         2
Stage    10.0000  Acres     7.6000
Stage     7.5000  Acres     7.0000
Rational coefficient....    1.0000
Initial water...........    7.5000
Dry Weather Base CFS....    0.0000
***********************************
```

```
Node   4
JB
Type 3
Flood elevation.........   10.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
**********************************
Node   5
Subarea 3
Type 1
SCS_256
Total acres.............    3.9000
Weighted curve number...   82.0000
Hydraulic length, feet..  250.0000
Ground slope, percent...    0.5000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   10.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
**********************************
Node   6
Subarea C
Type 1
SCS_256
Total acres.............    0.7510
Weighted curve number...   82.0000
Hydraulic length, feet..  200.0000
Ground slope, percent...    1.0000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   13.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
**********************************
Node   7
Subarea A
Type 1
SCS_256
Total acres.............    0.3438
Weighted curve number...   98.0000
Hydraulic length, feet..   70.0000
Ground slope, percent...    1.0000
Percent impervious cover  100.0000
Initial abstraction k...    0.0000
Flood elevation.........   20.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
```

```
***********************************
Node   8
Subarea D
Type 1
SCS_256
Total acres.............    0.1845
Weighted curve number...   82.0000
Hydraulic length, feet..  100.0000
Ground slope, percent...    1.0000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   13.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
***********************************
Node   9
Subarea G
Type 1
SCS_256
Total acres.............    0.4361
Weighted curve number...   82.0000
Hydraulic length, feet..  325.0000
Ground slope, percent...    0.3000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   10.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    5.3600
***********************************
Node  10
Subarea F
Type 1
SCS_256
Total acres.............    0.5600
Weighted curve number...   82.0000
Hydraulic length, feet..  100.0000
Ground slope, percent...    1.0000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   13.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
***********************************
Node  11
Subarea MGR
Type 1
SCS_256
Total acres.............    0.0590
```

```
Weighted curve number...   98.0000
Hydraulic length, feet..   20.0000
Ground slope, percent...    1.0000
Percent impervious cover  100.0000
Initial abstraction k...    0.0000
Flood elevation.........   20.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
************************************
Node  12
Offsite
Type 4
Number of data points...         2
Hour      0.0000  Stage     5.3600
Hour     24.0000  Stage     5.3600
Flood elevation.........   10.0000
************************************
Node  13
Subarea E
Type 1
SCS_256
Total acres.............    0.7876
Weighted curve number...   82.0000
Hydraulic length, feet..  325.0000
Ground slope, percent...    0.5000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   13.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
************************************
Node  14
Pipe Inlet 1
Type 3
Flood elevation.........   13.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
************************************
Node  15
Subarea H
Type 1
SCS_256
Total acres.............    0.4729
Weighted curve number...   82.0000
Hydraulic length, feet..  275.0000
Ground slope, percent...    0.5000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
```

```
Flood elevation.........   13.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
**********************************
Node  16
Subarea GI-3
Type 1
SCS_256
Total acres.............    0.1579
Weighted curve number...   82.0000
Hydraulic length, feet..   50.0000
Ground slope, percent...    1.0000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   13.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
**********************************
Node  17
Subarea GI-1
Type 1
SCS_256
Total acres.............    0.2663
Weighted curve number...   82.0000
Hydraulic length, feet..  100.0000
Ground slope, percent...    1.0000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   13.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
**********************************
Node  18
Subarea GI-2
Type 1
SCS_256
Total acres.............    0.2663
Weighted curve number...   82.0000
Hydraulic length, feet..  100.0000
Ground slope, percent...    1.0000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   13.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
**********************************
Node  19
Subarea B
```

```
Type 1
SCS_256
Total acres.............    0.3328
Weighted curve number...   98.0000
Hydraulic length, feet..   50.0000
Ground slope, percent...    1.0000
Percent impervious cover  100.0000
Initial abstraction k...    0.0000
Flood elevation.........   20.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
**********************************
Node  20
GI-2
Type 3
Flood elevation.........   13.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
**********************************
Node  21
GI-3
Type 3
Flood elevation.........   13.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
**********************************
Node  22
GI-1
Type 3
Flood elevation.........   13.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
**********************************
Node  23
Subarea M
Type 1
SCS_256
Total acres.............    0.8061
Weighted curve number...   82.0000
Hydraulic length, feet..  350.0000
Ground slope, percent...    0.5000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   13.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
**********************************
Node  24
```

```
Subarea L
Type 1
SCS_256
Total acres.............    0.7529
Weighted curve number...   82.0000
Hydraulic length, feet..  325.0000
Ground slope, percent...    0.5000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   13.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
***********************************
Node  25
Subarea N
Type 1
SCS_256
Total acres.............    0.2668
Weighted curve number...   82.0000
Hydraulic length, feet..  325.0000
Ground slope, percent...    0.5000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   13.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
***********************************
Node  26
Subarea K
Type 1
SCS_256
Total acres.............    0.4210
Weighted curve number...   82.0000
Hydraulic length, feet..  300.0000
Ground slope, percent...    0.5000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   13.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
***********************************
Node  27
Subarea J
Type 1
SCS_256
Total acres.............    0.1962
Weighted curve number...   82.0000
Hydraulic length, feet..  150.0000
```

```
Ground slope, percent...    0.5000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   13.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
************************************
Node  28
Subarea I
Type 1
SCS_256
Total acres.............    0.2075
Weighted curve number...   82.0000
Hydraulic length, feet..  150.0000
Ground slope, percent...    0.5000
Percent impervious cover    0.0000
Initial abstraction k...    0.0000
Flood elevation.........   13.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
************************************
Node  29
Pipe Inlet 2
Type 3
Flood elevation.........   13.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
************************************
Node  30
JB Entrance
Type 3
Flood elevation.........   10.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    5.3600
************************************
Node  31
Pipe Entrance
Type 3
Flood elevation.........   10.0000
Dry Weather Base CFS....    0.0000
Initial Water Elevation.    7.5000
************************************
Node  32
Outfall
Type 4
Number of data points...         2
Hour      0.0000  Stage     5.3600
Hour     24.0000  Stage     5.3600
```

Flood elevation.....   10.0000

****

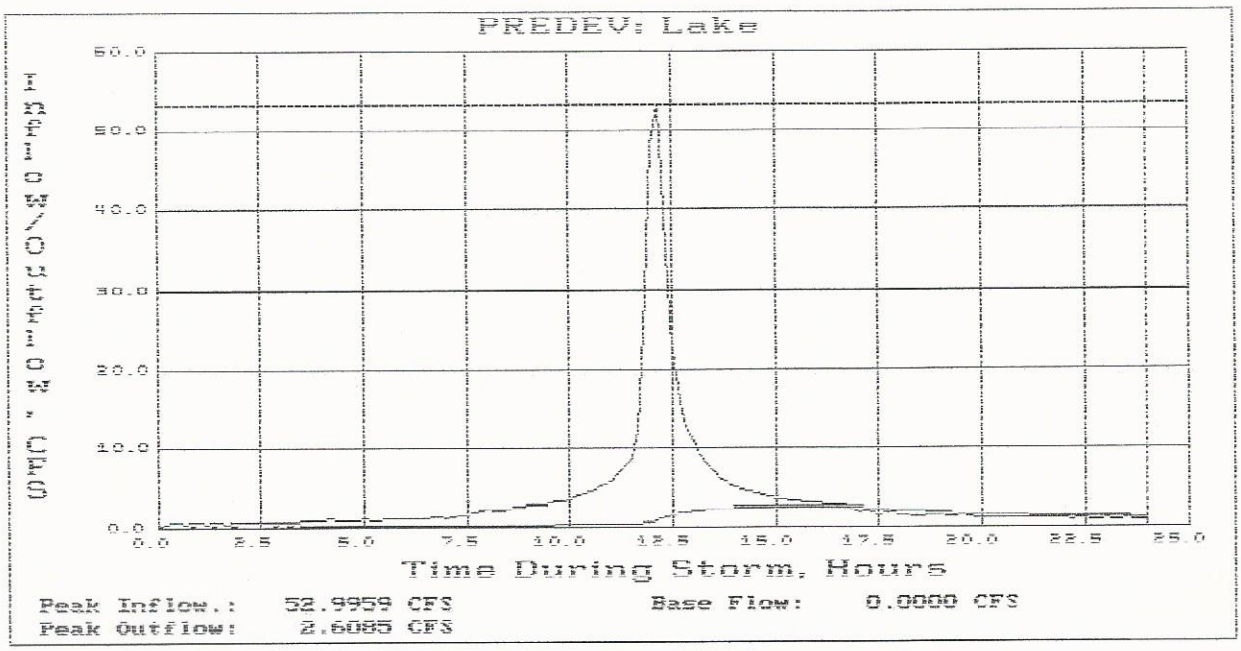
Checksum 63

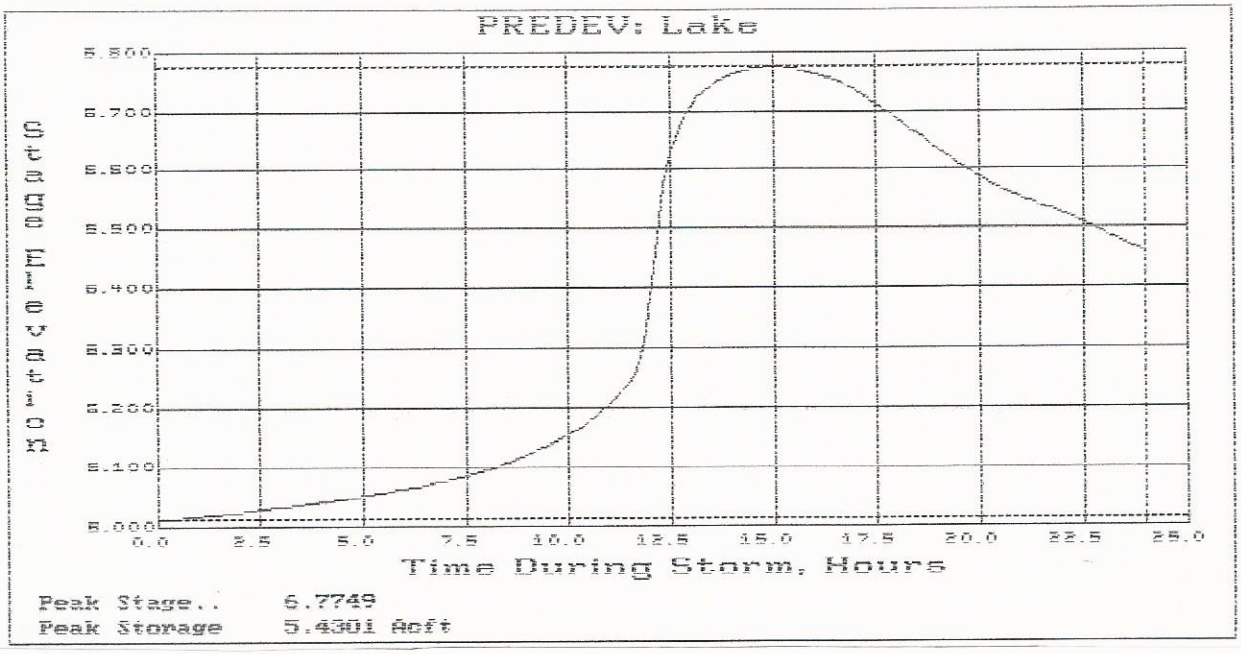
Appendix G

Pre-Development
2-Year Storm Event Output Text
10-Year Storm Event Graph and Output Text
25-Year Storm Event Output Text
100-Year Storm Event Output Text

Node	Name	Type	Inflow	Outflow	Stage	Storage
# 1	Subarea 10	SUBAREA	1.446	1.446	8.000	0.000
# 2	Subarea 9	SUBAREA	1.557	1.557	8.000	0.000
# 3	Subarea 8	SUBAREA	1.088	1.088	8.000	0.000
# 4	Subarea 7	SUBAREA	1.500	1.500	8.000	0.000
# 5	Subarea 4	SUBAREA	0.269	0.269	6.010	0.000
# 6	Subarea 6	SUBAREA	1.486	1.486	8.000	0.000
# 7	Subarea 3	SUBAREA	6.481	6.481	6.010	0.000
# 8	Subarea 2	SUBAREA	3.200	3.200	6.010	0.000
# 9	Subarea 5	SUBAREA	1.080	0.604	5.360	0.237
# 10	Subarea 1	SUBAREA	0.653	0.653	6.410	0.000
# 11	Offsite	OUTFALL	5.659	0.000	5.360	1.387
# 12	Lake	POND	33.258	1.262	6.515	3.525
# 13	Outfall	OUTFALL	1.221	0.000	5.360	1.084
# 14	Pipe Entrance	JUNCTION	1.262	1.224	6.499	0.046
# 15	Pipe Exit	JUNCTION	1.224	1.221	6.358	0.001

Node	Name	Type	Inflow	Outflow	Stage	Storage
# 1	Subarea 10	SUBAREA	2.598	2.598	8.000	0.000
# 2	Subarea 9	SUBAREA	2.700	2.700	8.000	0.000
# 3	Subarea 8	SUBAREA	1.923	1.923	8.000	0.000
# 4	Subarea 7	SUBAREA	2.684	2.684	8.000	0.000
# 5	Subarea 4	SUBAREA	0.472	0.472	6.010	0.000
# 6	Subarea 6	SUBAREA	2.564	2.564	8.000	0.000
# 7	Subarea 3	SUBAREA	11.243	11.243	6.010	0.000
# 8	Subarea 2	SUBAREA	5.515	5.515	6.010	0.000
# 9	Subarea 5	SUBAREA	1.888	1.049	5.360	0.412
# 10	Subarea 1	SUBAREA	1.139	1.139	6.410	0.000
# 11	Offsite	OUTFALL	9.976	0.000	5.360	2.443
# 12	Lake	POND	52.996	2.608	6.775	5.430
# 13	Outfall	OUTFALL	2.446	0.000	5.360	1.864
# 14	Pipe Entrance	JUNCTION	2.608	2.450	6.755	0.140
# 15	Pipe Exit	JUNCTION	2.450	2.446	6.621	0.002


PREDEV: Lake
Inflow and Outflow, CFS
50.0
40.0
30.0
20.0
10.0
0.0
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
22.5
25.0
Time During Storm, Hours
Peak Inflow.: 52.9959 CFS
Base Flow: 0.0000 CFS
Peak Outflow: 2.6085 CFS


PREDEV: Lake
Storage in Acre-Feet
5.800
5.700
5.600
5.500
5.400
5.300
5.200
5.100
5.000
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
22.5
25.0
Time During Storm, Hours
Peak Stage.. 6.7749
Peak Storage 5.4301 Acft

Node	Name	Type	Inflow	Outflow	Stage	Storage
# 1	Subarea 10	SUBAREA	3.099	3.099	8.000	0.000
# 2	Subarea 9	SUBAREA	3.188	3.188	8.000	0.000
# 3	Subarea 8	SUBAREA	2.283	2.283	8.000	0.000
# 4	Subarea 7	SUBAREA	3.198	3.198	8.000	0.000
# 5	Subarea 4	SUBAREA	0.558	0.558	6.010	0.000
# 6	Subarea 6	SUBAREA	3.021	3.021	8.000	0.000
# 7	Subarea 3	SUBAREA	13.272	13.272	6.010	0.000
# 8	Subarea 2	SUBAREA	6.498	6.498	6.010	0.000
# 9	Subarea 5	SUBAREA	2.235	1.238	5.360	0.488
# 10	Subarea 1	SUBAREA	1.347	1.347	6.410	0.000
# 11	Offsite	OUTFALL	11.836	0.000	5.360	2.902
# 12	Lake	POND	61.309	3.147	6.896	6.222
# 13	Outfall	OUTFALL	3.052	0.000	5.360	2.439
# 14	Pipe Entrance	JUNCTION	3.147	3.049	6.878	0.146
# 15	Pipe Exit					

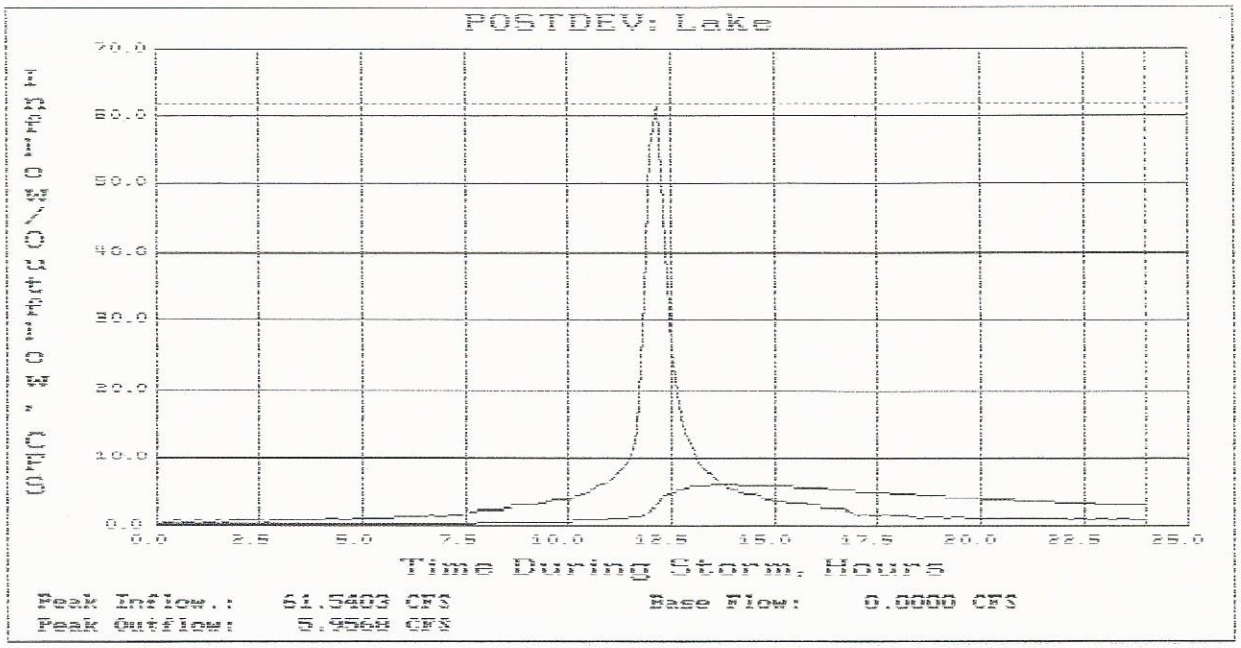
Node	Name	Type	Inflow	Outflow	Stage	Storage
# 1	Subarea 10	SUBAREA	4.223	4.223	8.000	0.000
# 2	Subarea 9	SUBAREA	4.267	4.267	8.000	0.000
# 3	Subarea 8	SUBAREA	3.085	3.085	8.000	0.000
# 4	Subarea 7	SUBAREA	4.351	4.351	8.000	0.000
# 5	Subarea 4	SUBAREA	0.751	0.751	6.010	0.000
# 6	Subarea 6	SUBAREA	4.033	4.033	8.000	0.000
# 7	Subarea 3	SUBAREA	17.765	17.765	6.010	0.000
# 8	Subarea 2	SUBAREA	8.669	8.669	6.010	0.000
# 9	Subarea 5	SUBAREA	3.006	1.659	5.360	0.658
# 10	Subarea 1	SUBAREA	1.810	1.810	6.410	0.000
# 11	Offsite	OUTFALL	15.986	0.000	5.360	3.932
# 12	Lake	POND	79.667	4.955	7.135	7.864
# 13	Outfall	OUTFALL	4.820	0.000	5.360	3.589
# 14	Pipe Entrance	JUNCTION	4.955	4.827	7.114	0.233
# 15	Pipe Exit	JUNCTION	4.827	4.820	6.955	0.002

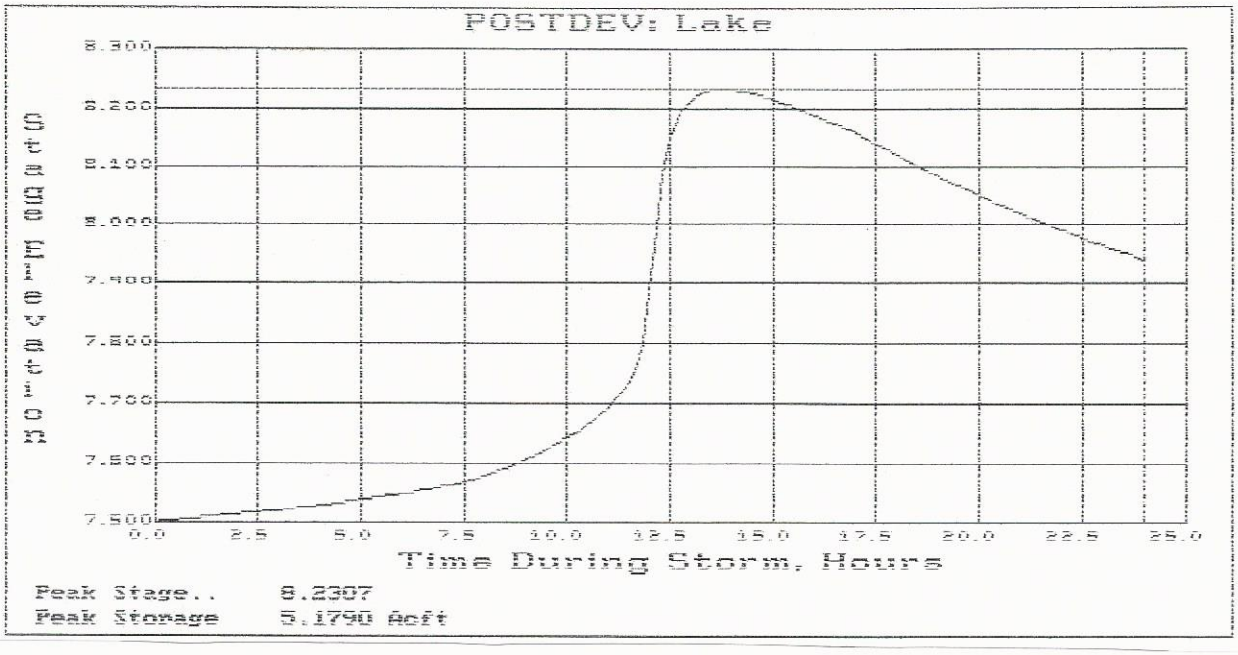
Appendix H

Post-Development
2-Year Storm Event Output Text
10-Year Storm Event Graphs and Text
25-Year Storm Event Output Text
100-Year Storm Event Output Text

Node	Name	Type	Inflow	Outflow	Stage	Storage
# 1	Subarea 2	SUBAREA	3.049	3.049	6.010	0.000
# 2	Subarea 1	SUBAREA	0.653	0.653	6.410	0.000
# 3	Lake	POND	38.573	3.152	7.971	3.327
# 4	JB	JUNCTION	4.022	4.028	6.468	0.000
# 5	Subarea 3	SUBAREA	6.611	6.611	7.500	0.000
# 6	Subarea C	SUBAREA	2.500	1.520	7.500	0.125
# 7	Subarea A	SUBAREA	0.980	0.980	7.500	0.000
# 8	Subarea D	SUBAREA	0.405	0.405	7.500	0.000
# 9	Subarea G	SUBAREA	0.627	0.627	5.360	0.000
# 10	Subarea F	SUBAREA	1.398	1.229	7.500	0.020
# 11	Subarea MGR	SUBAREA	0.168	0.168	7.500	0.000
# 12	Offsite	OUTFALL	3.147	0.000	5.360	0.523
# 13	Subarea E	SUBAREA	1.259	1.259	7.500	0.000
# 14	Pipe Inlet 1	JUNCTION	0.787	0.748	8.310	0.011
# 15	Subarea H	SUBAREA	0.787	0.787	7.500	0.000
# 16	Subarea GI-3	SUBAREA	0.347	0.347	7.500	0.000
# 17	Subarea GI-1	SUBAREA	0.585	0.585	7.500	0.000
# 18	Subarea GI-2	SUBAREA	1.534	0.585	7.500	0.121
# 19	Subarea B	SUBAREA	0.949	0.949	7.500	0.000
# 20	GI-2	JUNCTION	2.653	2.616	8.204	0.043
# 21	GI-3	JUNCTION	1.457	1.369	8.284	0.051
# 22	GI-1	JUNCTION	3.201	3.198	8.019	0.024
# 23	Subarea M	SUBAREA	1.261	1.261	7.500	0.000
# 24	Subarea L	SUBAREA	1.203	1.203	7.500	0.000
# 25	Subarea N	SUBAREA	2.317	0.426	7.500	0.302
# 26	Subarea K	SUBAREA	0.687	0.687	7.500	0.000
# 27	Subarea J	SUBAREA	0.382	0.382	7.500	0.000
# 28	Subarea I	SUBAREA	0.403	0.403	7.500	0.000
# 29	Pipe Inlet 2	JUNCTION	1.169	1.110	8.375	0.035
# 30	JB Entrance	JUNCTION	0.653	0.997	6.531	0.000
# 31	Pipe Entrance	JUNCTION	3.152	3.160	6.881	0.000
# 32	Outfall	OUTFALL	4.028	0.000	5.360	3.136

Node	Name	Type	Inflow	Outflow	Stage	Storage
# 1	Subarea 2	SUBAREA	5.255	5.255	6.010	0.000
# 2	Subarea 1	SUBAREA	1.139	1.139	6.410	0.000
# 3	Lake	POND	61.540	5.957	8.231	5.179
# 4	JB	JUNCTION	7.499	7.500	6.894	0.000
# 5	Subarea 3	SUBAREA	11.214	11.214	7.500	0.000
# 6	Subarea C	SUBAREA	4.087	2.590	7.500	0.194
# 7	Subarea A	SUBAREA	1.497	1.497	7.500	0.000
# 8	Subarea D	SUBAREA	0.688	0.688	7.500	0.000
# 9	Subarea G	SUBAREA	1.071	1.071	5.360	0.000
# 10	Subarea F	SUBAREA	2.344	2.087	7.500	0.031
# 11	Subarea MGR	SUBAREA	0.257	0.257	7.500	0.000
# 12	Offsite	OUTFALL	5.363	0.000	5.360	0.896
# 13	Subarea E	SUBAREA	2.143	2.143	7.500	0.000
# 14	Pipe Inlet 1	JUNCTION	1.336	1.174	8.611	0.048
# 15	Subarea H	SUBAREA	1.336	1.336	7.500	0.000
# 16	Subarea GI-3	SUBAREA	0.589	0.589	7.500	0.000
# 17	Subarea GI-1	SUBAREA	0.993	0.993	7.500	0.000
# 18	Subarea GI-2	SUBAREA	2.442	0.993	7.500	0.188
# 19	Subarea B	SUBAREA	1.449	1.449	7.500	0.000
# 20	GI-2	JUNCTION	4.376	4.307	8.535	0.077
# 21	GI 3	JUNCTION	2.430	2.243	8.626	0.119
# 22	GI-1	JUNCTION	5.299	5.289	8.309	0.049
# 23	Subarea M	SUBAREA	2.149	2.149	7.500	0.000
# 24	Subarea L	SUBAREA	2.048	2.048	7.500	0.000
# 25	Subarea N	SUBAREA	3.942	0.726	7.500	0.518
# 26	Subarea K	SUBAREA	1.168	1.168	7.500	0.000
# 27	Subarea J	SUBAREA	0.651	0.651	7.500	0.000
# 28	Subarea I	SUBAREA	0.689	0.689	7.500	0.000
# 29	Pipe Inlet 2	JUNCTION	2.001	1.841	8.737	0.094
# 30	JB Entrance	JUNCTION	1.139	1.573	6.934	0.000
# 31	Pipe Entrance	JUNCTION	5.957	6.097	7.201	0.000
# 32	Outfall	OUTFALL	7.500	0.000	5.360	5.514


POSTDEV: Lake
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
22.5
25.0
Time During Storm, Hours
Peak Inflow..: 51.5403 CFS
Base Flow: 0.0000 CFS
Peak Outflow: 5.9568 CFS


POSTDEV: Lake
8.300
8.200
8.100
8.000
7.900
7.800
7.700
7.600
7.500
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
22.5
25.0
Time During Storm, Hours
Peak Stage.. 8.2307
Peak Storage 5.1790 acft

POSTDEV: Lake, [POND]

Time	Rain	Runoff	Stage	CFS In	CFS Out	ACFT In	Storage	ACFT Out
0.000	0.000	0.000	7.500	0.000	0.000	0.000	0.000	0.000
0.167	0.009	0.429	7.500	0.429	0.006	0.003	0.003	0.000
0.333	0.021	0.537	7.501	0.537	0.008	0.010	0.009	0.000
0.500	0.035	0.644	7.502	0.650	0.010	0.018	0.018	0.000
0.667	0.044	0.429	7.504	0.436	0.014	0.025	0.025	0.000
0.834	0.056	0.537	7.504	0.545	0.018	0.032	0.031	0.000
1.000	0.070	0.643	7.506	0.656	0.022	0.040	0.039	0.000
1.167	0.079	0.429	7.507	0.450	0.027	0.048	0.047	0.001
1.334	0.091	0.537	7.508	0.561	0.030	0.055	0.053	0.002
1.500	0.105	0.643	7.509	0.672	0.035	0.063	0.061	0.002
1.667	0.114	0.429	7.510	0.457	0.039	0.071	0.069	0.003
1.834	0.126	0.537	7.511	0.567	0.043	0.078	0.075	0.003
2.000	0.140	0.644	7.512	0.678	0.047	0.087	0.083	0.004
2.167	0.154	0.644	7.513	0.708	0.052	0.096	0.092	0.005
2.334	0.168	0.644	7.514	0.713	0.058	0.106	0.101	0.005
2.500	0.182	0.643	7.516	0.710	0.063	0.116	0.110	0.006
2.667	0.191	0.429	7.517	0.488	0.067	0.124	0.117	0.007
2.834	0.203	0.537	7.518	0.593	0.071	0.132	0.124	0.008
3.001	0.217	0.644	7.519	0.724	0.076	0.141	0.132	0.009
3.167	0.231	0.644	7.520	0.730	0.081	0.151	0.141	0.010
3.334	0.245	0.644	7.521	0.742	0.086	0.161	0.150	0.011
3.501	0.259	0.644	7.523	0.769	0.091	0.171	0.159	0.012
3.667	0.273	0.644	7.524	0.764	0.097	0.182	0.168	0.014
3.834	0.287	0.644	7.525	0.765	0.102	0.192	0.177	0.015
4.001	0.301	0.645	7.527	0.766	0.107	0.203	0.186	0.017
4.168	0.320	0.858	7.528	1.022	0.113	0.215	0.197	0.018
4.334	0.336	0.750	7.530	0.938	0.120	0.229	0.209	0.020
4.501	0.350	0.644	7.531	0.826	0.126	0.241	0.220	0.021
4.668	0.364	0.644	7.533	0.817	0.131	0.252	0.229	0.023
4.834	0.380	0.752	7.534	0.939	0.138	0.264	0.239	0.025
5.001	0.399	0.857	7.536	1.086	0.144	0.278	0.251	0.027
5.168	0.413	0.644	7.537	0.854	0.151	0.292	0.263	0.029
5.334	0.429	0.752	7.539	0.980	0.157	0.304	0.273	0.031
5.501	0.448	0.858	7.541	1.105	0.164	0.319	0.285	0.033
5.668	0.467	0.858	7.543	1.126	0.172	0.334	0.298	0.036
5.834	0.485	0.858	7.544	1.145	0.179	0.350	0.312	0.038
6.001	0.504	0.858	7.546	1.158	0.187	0.365	0.325	0.040
6.168	0.523	0.858	7.548	1.165	0.194	0.381	0.338	0.043
6.335	0.541	0.858	7.550	1.174	0.202	0.398	0.352	0.046
6.501	0.560	0.860	7.552	1.191	0.210	0.414	0.365	0.049
6.668	0.584	1.073	7.554	1.439	0.218	0.432	0.380	0.052
6.835	0.604	0.964	7.557	1.343	0.228	0.451	0.396	0.055
7.001	0.623	0.860	7.559	1.234	0.236	0.469	0.411	0.058
7.168	0.647	1.073	7.561	1.476	0.245	0.488	0.426	0.061
7.335	0.672	1.182	7.563	1.634	0.255	0.509	0.444	0.065
7.502	0.700	1.289	7.566	1.826	0.267	0.533	0.465	0.068
7.668	0.733	1.502	7.570	2.109	0.281	0.560	0.488	0.072
7.835	0.768	1.611	7.573	2.312	0.296	0.590	0.514	0.076
8.002	0.805	1.714	7.577	2.490	0.312	0.623	0.543	0.080
8.168	0.838	1.502	7.582	2.273	0.329	0.656	0.572	0.085
8.335	0.873	1.611	7.585	2.418	0.345	0.689	0.599	0.089
8.502	0.910	1.719	7.590	2.602	0.362	0.723	0.629	0.094
8.668	0.952	1.931	7.594	2.905	0.380	0.761	0.662	0.099
8.835	0.994	1.931	7.599	2.952	0.400	0.801	0.697	0.105

POSTDEV: Lake, [POND]

Time	Rain	Runoff	Stage	CFS In	CFS Out	ACFT In	Storage	ACFT Out
9.002	1.036	1.931	7.604	3.029	0.420	0.843	0.732	0.110
9.168	1.078	1.931	7.609	3.045	0.441	0.884	0.768	0.116
9.335	1.123	2.041	7.615	3.214	0.463	0.928	0.805	0.122
9.502	1.170	2.148	7.620	3.411	0.485	0.973	0.844	0.129
9.669	1.221	2.360	7.626	3.750	0.509	1.023	0.887	0.136
9.835	1.272	2.361	7.633	3.824	0.535	1.075	0.932	0.143
10.002	1.324	2.365	7.639	3.888	0.561	1.128	0.977	0.151
10.169	1.384	2.790	7.646	4.475	0.590	1.185	1.027	0.158
10.335	1.447	2.899	7.654	4.762	0.622	1.249	1.082	0.167
10.502	1.513	3.009	7.663	5.006	0.656	1.316	1.141	0.176
10.669	1.588	3.433	7.672	5.674	0.707	1.390	1.205	0.185
10.835	1.667	3.653	7.682	6.116	0.781	1.471	1.276	0.195
11.002	1.751	3.871	7.692	6.566	0.858	1.559	1.352	0.207
11.169	1.849	4.506	7.704	7.554	0.946	1.656	1.437	0.219
11.336	1.962	5.167	7.718	8.706	1.046	1.768	1.535	0.233
11.502	2.089	5.835	7.734	9.924	1.163	1.896	1.648	0.248
11.669	2.280	8.797	7.756	14.295	1.316	2.063	1.798	0.265
11.836	2.759	22.035	7.799	33.395	1.634	2.391	2.106	0.285
12.002	3.511	34.549	7.882	55.186	2.324	3.002	2.689	0.313
12.169	4.267	34.761	7.989	61.540	3.315	3.806	3.454	0.351
12.336	4.730	21.287	8.086	45.904	4.331	4.546	4.142	0.404
12.502	4.916	8.541	8.146	25.934	4.975	5.041	4.572	0.468
12.669	5.042	5.793	8.178	17.597	5.330	5.341	4.801	0.539
12.836	5.156	5.241	8.198	13.990	5.567	5.558	4.944	0.614
13.003	5.258	4.707	8.212	11.647	5.730	5.735	5.043	0.692
13.169	5.342	3.862	8.221	9.306	5.838	5.879	5.107	0.772
13.336	5.422	3.641	8.226	8.032	5.900	5.999	5.146	0.853
13.503	5.496	3.426	8.229	7.150	5.939	6.103	5.169	0.934
13.669	5.561	3.004	8.231	6.213	5.957	6.195	5.179	1.016
13.836	5.622	2.782	8.230	5.632	5.954	6.277	5.179	1.098
14.003	5.678	2.575	8.229	5.148	5.942	6.351	5.171	1.180
14.170	5.734	2.575	8.228	4.992	5.923	6.421	5.159	1.262
14.336	5.788	2.464	8.226	4.740	5.900	6.488	5.145	1.343
14.503	5.839	2.356	8.223	4.519	5.871	6.552	5.127	1.424
14.670	5.885	2.146	8.220	4.141	5.835	6.611	5.106	1.505
14.836	5.930	2.035	8.217	3.873	5.795	6.667	5.081	1.585
15.003	5.972	1.931	8.213	3.656	5.748	6.718	5.054	1.665
15.170	6.014	1.931	8.209	3.582	5.701	6.768	5.025	1.743
15.336	6.053	1.820	8.205	3.386	5.651	6.816	4.995	1.822
15.503	6.091	1.716	8.200	3.190	5.597	6.862	4.962	1.899
15.670	6.128	1.716	8.196	3.142	5.542	6.905	4.929	1.976
15.837	6.165	1.717	8.191	3.104	5.488	6.948	4.896	2.052
16.003	6.203	1.712	8.187	3.083	5.435	6.991	4.864	2.127
16.170	6.235	1.502	8.182	2.771	5.379	7.031	4.830	2.202
16.337	6.268	1.502	8.177	2.710	5.318	7.069	4.794	2.275
16.503	6.301	1.502	8.172	2.681	5.259	7.106	4.758	2.348
16.670	6.333	1.502	8.167	2.661	5.199	7.143	4.723	2.420
16.837	6.359	1.167	8.162	2.177	5.144	7.176	4.685	2.491
17.003	6.377	0.863	8.156	1.660	5.078	7.203	4.641	2.562
17.170	6.401	1.073	8.149	1.827	5.009	7.227	4.595	2.631
17.337	6.422	0.961	8.143	1.666	4.942	7.251	4.551	2.700
17.503	6.440	0.863	8.136	1.497	4.873	7.272	4.505	2.767
17.670	6.464	1.073	8.130	1.747	4.807	7.295	4.461	2.834
17.837	6.485	0.961	8.124	1.622	4.745	7.318	4.418	2.900

POSTDEV: Lake, [POND]

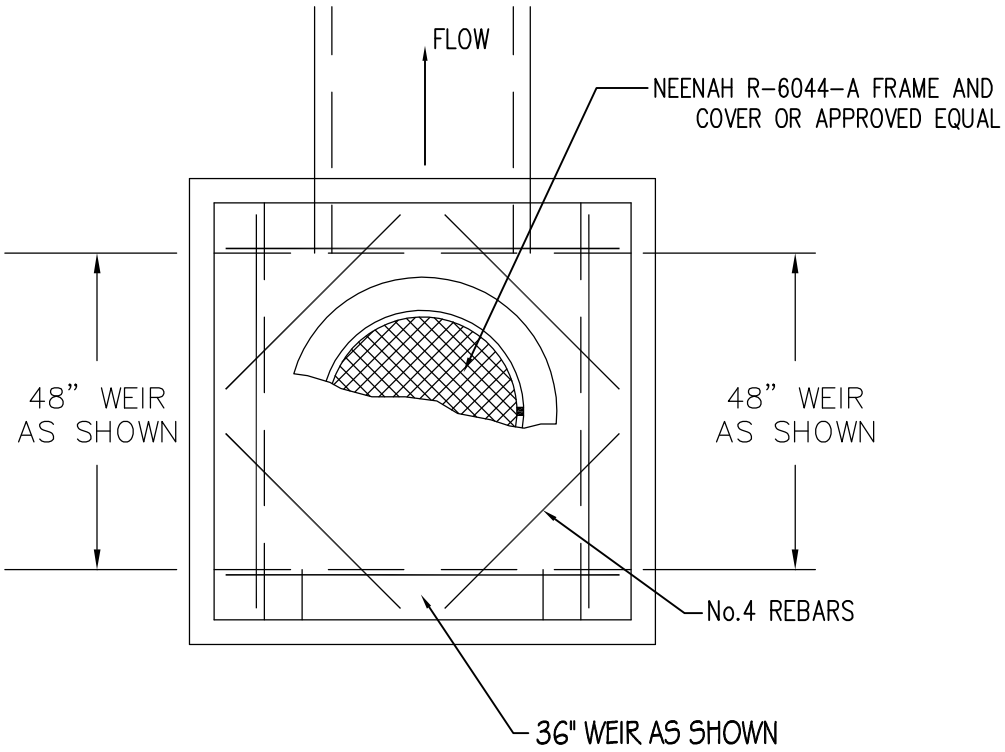
Time	Rain	Runoff	Stage	CFS In	CFS Out	ACFT In	Storage	ACFT Out
18.004	6.503	0.858	8.118	1.464	4.678	7.339	4.374	2.965
18.170	6.522	0.858	8.112	1.432	4.613	7.359	4.330	3.029
18.337	6.538	0.746	8.106	1.257	4.546	7.378	4.286	3.092
18.504	6.552	0.648	8.099	1.083	4.477	7.394	4.240	3.154
18.670	6.571	0.858	8.093	1.345	4.411	7.411	4.195	3.215
18.837	6.590	0.858	8.087	1.387	4.349	7.429	4.154	3.276
19.004	6.608	0.853	8.082	1.395	4.289	7.449	4.113	3.335
19.170	6.622	0.644	8.076	1.110	4.226	7.466	4.072	3.394
19.337	6.639	0.756	8.070	1.222	4.164	7.482	4.030	3.452
19.504	6.657	0.853	8.065	1.374	4.105	7.500	3.991	3.509
19.671	6.671	0.644	8.059	1.111	4.046	7.517	3.952	3.565
19.837	6.685	0.644	8.054	1.072	3.987	7.532	3.912	3.620
20.004	6.699	0.644	8.048	1.059	3.926	7.547	3.872	3.675
20.171	6.713	0.644	8.042	1.064	3.868	7.561	3.833	3.728
20.337	6.727	0.644	8.037	1.072	3.812	7.576	3.795	3.781
20.504	6.741	0.644	8.032	1.064	3.754	7.591	3.757	3.833
20.671	6.755	0.644	8.027	1.070	3.700	7.605	3.721	3.885
20.837	6.769	0.644	8.022	1.066	3.647	7.620	3.685	3.935
21.004	6.783	0.644	8.017	1.055	3.594	7.635	3.650	3.985
21.171	6.797	0.644	8.012	1.066	3.541	7.649	3.615	4.034
21.338	6.811	0.644	8.007	1.070	3.492	7.664	3.581	4.083
21.504	6.825	0.644	8.003	1.062	3.441	7.679	3.548	4.130
21.671	6.839	0.644	7.998	1.069	3.395	7.693	3.516	4.178
21.838	6.853	0.644	7.993	1.064	3.354	7.708	3.484	4.224
22.004	6.867	0.638	7.989	1.065	3.313	7.723	3.453	4.270
22.171	6.877	0.429	7.984	0.765	3.271	7.735	3.420	4.315
22.338	6.888	0.542	7.980	0.870	3.228	7.747	3.386	4.360
22.504	6.902	0.638	7.975	1.011	3.188	7.760	3.355	4.404
22.671	6.912	0.429	7.971	0.740	3.146	7.772	3.324	4.448
22.838	6.923	0.542	7.966	0.856	3.104	7.783	3.292	4.491
23.005	6.937	0.638	7.962	1.002	3.067	7.795	3.262	4.533
23.171	6.947	0.429	7.958	0.736	3.028	7.807	3.232	4.575
23.338	6.958	0.543	7.954	0.858	2.988	7.818	3.201	4.617
23.505	6.972	0.638	7.950	1.015	2.951	7.831	3.173	4.658
23.671	6.982	0.429	7.946	0.751	2.916	7.843	3.145	4.698
23.838	6.991	0.429	7.942	0.697	2.877	7.853	3.115	4.738
24.005	7.000	0.417	7.937	0.655	2.838	7.863	3.085	4.778

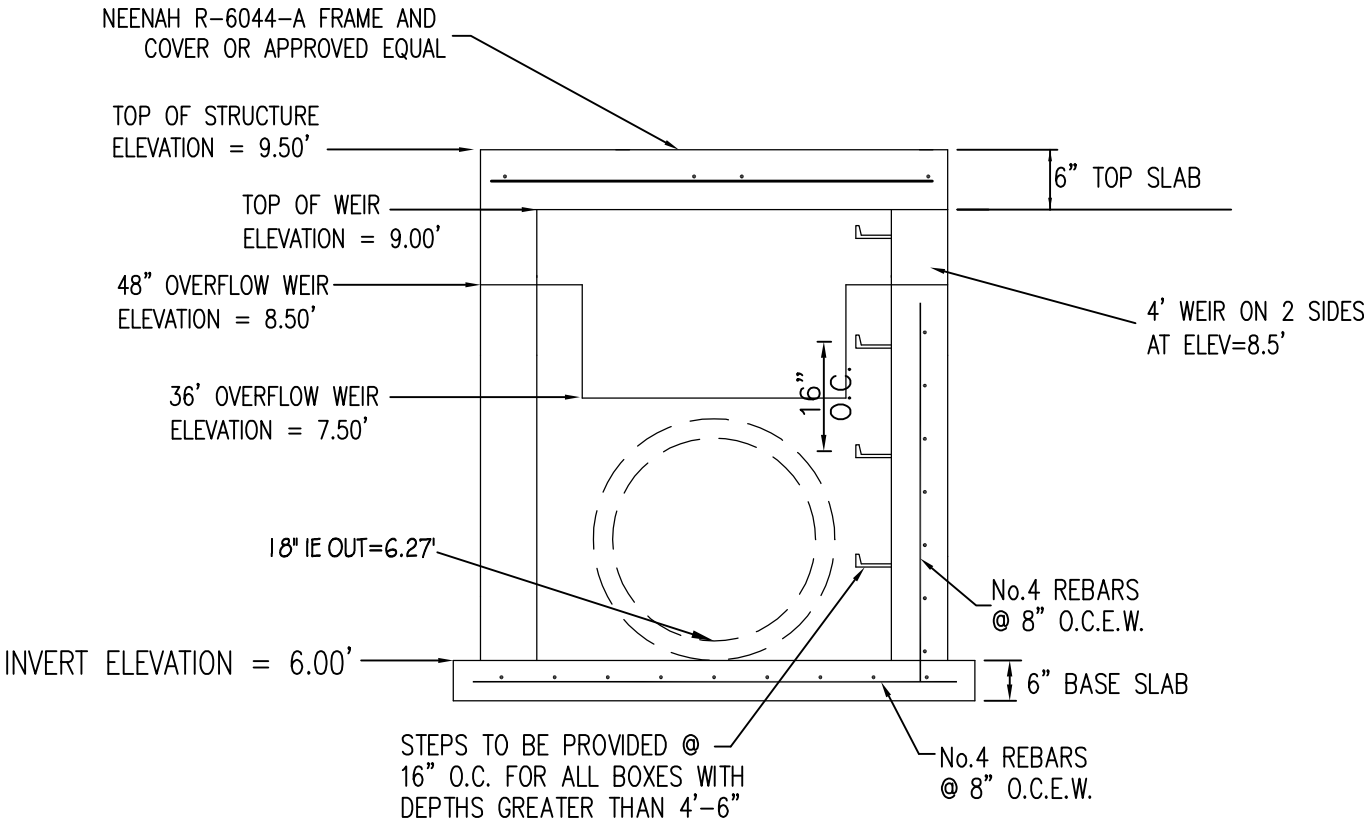
Node	Name	Type	Inflow	Outflow	Stage	Storage
# 1	Subarea 2	SUBAREA	6.192	6.192	6.010	0.000
# 2	Subarea 1	SUBAREA	1.347	1.347	6.410	0.000
# 3	Lake	POND	70.942	7.215	8.336	5.937
# 4	JB	JUNCTION	8.876	8.874	7.048	0.000
# 5	Subarea B	SUBAREA	13.155	13.155	7.500	0.000
# 6	Subarea C	SUBAREA	4.754	3.042	7.500	0.223
# 7	Subarea A	SUBAREA	1.712	1.712	7.500	0.000
# 8	Subarea D	SUBAREA	0.807	0.807	7.500	0.000
# 9	Subarea G	SUBAREA	1.259	1.259	5.360	0.000
# 10	Subarea F	SUBAREA	2.743	2.449	7.500	0.036
# 11	Subarea MGR	SUBAREA	0.294	0.294	7.500	0.000
# 12	Offsite	OUTFALL	6.300	0.000	5.360	1.056
# 13	Subarea E	SUBAREA	2.516	2.516	7.500	0.000
# 14	Pipe Inlet 1	JUNCTION	1.567	1.310	8.781	0.068
# 15	Subarea H	SUBAREA	1.567	1.567	7.500	0.000
# 16	Subarea GI-3	SUBAREA	0.690	0.690	7.500	0.000
# 17	Subarea GI-1	SUBAREA	1.165	1.165	7.500	0.000
# 18	Subarea GI-2	SUBAREA	2.822	1.165	7.500	0.216
# 19	Subarea B	SUBAREA	1.658	1.658	7.500	0.000
# 20	GI-2	JUNCTION	4.857	4.788	8.697	0.099
# 21	GI 3	JUNCTION	2.712	2.414	8.790	0.153
# 22	GI-1	JUNCTION	5.952	5.932	8.437	0.058
# 23	Subarea M	SUBAREA	2.524	2.524	7.500	0.000
# 24	Subarea L	SUBAREA	2.405	2.405	7.500	0.000
# 25	Subarea N	SUBAREA	4.628	0.852	7.500	0.611
# 26	Subarea K	SUBAREA	1.371	1.371	7.500	0.000
# 27	Subarea J	SUBAREA	0.765	0.765	7.500	0.000
# 28	Subarea I	SUBAREA	0.809	0.809	7.500	0.000
# 29	Pipe Inlet 2	JUNCTION	2.353	2.022	8.881	0.127
# 30	JB Entrance	JUNCTION	1.347	1.753	7.094	0.000
# 31	Pipe Entrance	JUNCTION	7.215	7.274	7.307	0.000
# 32	Outfall	OUTFALL	8.874	0.000	5.360	6.465

Node	Name	Type	Inflow	Outflow	Stage	Storage
# 1	Subarea 2	SUBAREA	8.260	8.260	6.010	0.000
# 2	Subarea 1	SUBAREA	1.810	1.810	6.410	0.000
# 3	Lake	POND	91.950	10.694	8.561	7.567
# 4	JB	JUNCTION	12.044	12.037	7.387	0.001
# 5	Subarea B	SUBAREA	17.431	17.431	7.500	0.000
# 6	Subarea C	SUBAREA	6.223	4.038	7.500	0.286
# 7	Subarea A	SUBAREA	2.185	2.185	7.500	0.000
# 8	Subarea D	SUBAREA	1.069	1.069	7.500	0.000
# 9	Subarea G	SUBAREA	1.675	1.675	5.360	0.000
# 10	Subarea F	SUBAREA	3.620	3.245	7.500	0.048
# 11	Subarea MGR	SUBAREA	0.375	0.375	7.500	0.000
# 12	Offsite	OUTFALL	8.365	0.000	5.360	1.412
# 13	Subarea E	SUBAREA	3.339	3.339	7.500	0.000
# 14	Pipe Inlet 1	JUNCTION	2.078	1.769	9.117	0.127
# 15	Subarea H	SUBAREA	2.078	2.078	7.500	0.000
# 16	Subarea GI-3	SUBAREA	0.915	0.915	7.500	0.000
# 17	Subarea GI-1	SUBAREA	1.543	1.543	7.500	0.000
# 18	Subarea GI-2	SUBAREA	3.659	1.543	7.500	0.277
# 19	Subarea B	SUBAREA	2.115	2.115	7.500	0.000
# 20	GI-2	JUNCTION	6.313	6.117	8.994	0.138
# 21	GI 3	JUNCTION	3.605	3.085	9.104	0.237
# 22	GI-1	JUNCTION	7.660	7.640	8.691	0.074
# 23	Subarea M	SUBAREA	3.351	3.351	7.500	0.000
# 24	Subarea L	SUBAREA	3.192	3.192	7.500	0.000
# 25	Subarea N	SUBAREA	6.141	1.131	7.500	0.817
# 26	Subarea K	SUBAREA	1.818	1.818	7.500	0.000
# 27	Subarea J	SUBAREA	1.016	1.016	7.500	0.000
# 28	Subarea I	SUBAREA	1.075	1.075	7.500	0.000
# 29	Pipe Inlet 2	JUNCTION	3.131	2.690	9.209	0.196
# 30	JB Entrance	JUNCTION	1.810	1.690	7.412	0.039
# 31	Pipe Entrance	JUNCTION	10.694	10.627	7.593	0.010
# 32	Outfall	OUTFALL	12.037	0.000	5.360	8.521

Appendix I

Outlet Control Structure





OUTLET CONTROL STRUCTURE DETAIL

N.T.S.