

SECTION A

PENINSULAR CITY AREA

INDEX

PENINSULAR AREA WATERSHEDS

<u>WATERSHED</u>	<u>PAGE</u>
Algonquin	74
Austin Avenue	79
Beaufain	54
Braswell	76
Calhoun Street East	57
Calhoun Street West	59
Church Street	48
Citadel North	72
Citadel South	72
Colonial Lake	51
Congress Street	72
Cooper Street	68
Doscher Avenue	78
Dunneman Street	72
East Bay North	69
Elgin Street	77
Exchange Street	48
Fishburne Street	66
Greenleaf	76
Grove Street	73
Hasell Street	55
Heriot Street	75
Huger Street	70
Jackson Street	69
King Street	49
Limehouse Street	50
Marina	54
Market Street	53
Meeting Street	49
Meeting Street North	71
Milford Street	78
Milford West	76
Morrison Drive North	74
North Romney Street	74
Peachtree Street	75
Pinckney Street	52
Port Area #1	62
Port Area #2	62
Port Area #3	62
Queen Street	52
Reid Street	63
Runey Street	71
Rutledge Avenue	51
Simons Street	73
Society Street	55
Spring Street	65
St. Lawrence	77

PENINSULAR AREA WATERSHEDS (CONTINUED)

<u>WATERSHED</u>	<u>PAGE</u>
10th Avenue	73
Tradd Street	48
V.A. Hospital	61
Water Street	48
West Battery	51

EXPLANATION OF HYDRAULIC DATA TABLES

The Hydraulic Data Tables contain information, by watershed areas, for each of the drainage facilities within the respective area. The data listed in each column is as follows:

Column 1: Location of the system to be analyzed, listing upstream manhole number and downstream manhole number.

Column 2: Drainage Area to system to be analyzed in acres.

Column 3: Runoff coefficient for the area listed in Column 2. (See Table 1)

Column 4: Total CA is the sum of Column 2 times Column 3 plus CA for areas upstream of the point of analysis.

Column 5: Travel time is the time required for runoff to reach the point of analysis from the most remote point within in the watershed.

Column 6: Discharge (Q) equals CIA where CA is the total found in Column 4 times the rainfall intensity (I) in inches per hour from Figure No. 3 using the travel time in Column 5.

Column 7: Existing system description.

Column 8: Length of existing system.

Column 9: Slope of existing system. Both the physical slope (actual slope of system) and the hydraulic slope (water surface profile) are listed for each system. The hydraulic slope is placed in parenthesis and is used to compute the capacity of the existing system.

Column 10: Capacity of existing system in cubic feet per second computed from Manning's equation.

Column 11: Velocity of existing system in feet per second. Discharge divided by flow area.

Column 12 & 13: Recommended Improvements. List improvements required (Column 12) and associated cost (Column 13).

Column 14: Comments

10

The Peninsular City Area is the most heavily developed portion of the study area with approximately 80 to 90 percent of the land area presently developed. The area is comprised of three distinct areas of development; (a) commercial and residential development south of the Crosstown Expressway, (b) residential development between the Crosstown Expressway and Mount Pleasant Street, and (c) industrial development north of Mount Pleasant Street. This high density development and the lack of adequate drainage facilities results in numerous flooding problems throughout the Peninsular City area.

The existing stormwater drainage facilities within this area consist mainly of vitrified clay pipe or brick arches, some of which date back to the 1850's, and the majority of which are inadequate for design limits. Of the existing stormwater drainage facilities, the most notable is an existing tidal drain system which was built in the 1850's as a combined sanitary and storm sewer. The system is constructed as a brick arch culvert (3' to 4' wide and approximately 7' high) which is interconnected with outlets to either the Ashley or Cooper Rivers. A brick arch along Meeting Street from Reid Street to the Battery and one along Calhoun Street from the Ashley River to the Cooper River comprise the main components of the system. When originally placed into service the system was controlled by a tide gate at each discharge point. Each day at low tide one gate was opened which allowed the system to remain flushed, and free of siltation. Over the years the tide gate system was abandoned which resulted in the siltation of the tidal drain system as

it is presently in use. The existing tidal drain system and the original shoreline are depicted in Figure No. 15.

The existing tidal drain system comprises the backbone for the drainage system in the Peninsular City area south of the Crosstown Expressway. The recommended plan will utilize this existing system along with a network of new stormwater pumping stations. The plan is based on making certain improvements to the existing tidal drain system. By utilizing this old system complemented with the construction of the new pumping stations, the cost of the recommended improved system will be significantly less than constructing a complete new system.

In addition to the system of new recommended stormwater pumping stations, the major portion of the existing systems in the city either require replacement or parallel systems. Table Nos. 10 thru 35 list the existing stormwater drainage facilities along with recommended improvements and associated construction cost. The total construction cost for each watershed is listed at the end of each table and includes 20 percent of the total construction cost for improvement to upstream areas. The cost for stormwater pumping stations is not included.

Stormwater Pumping Stations

For a number of locations in the Lower Peninsular City, the low area profiles and tide elevations at the design limits selected proved to require gravity systems that were so large as to be impractical to construct and unreasonable to fund. Alternative methods of providing acceptable stormwater protection dictated that the most feasible solution would be to mechanically pump the stormwater during periods of high tide. By providing pumping stations on the lower ends of the drainage basins, the tidal effect on the drainage system for that drainage area is nullified and the upstream facilities can be designed at a practical, acceptable size and configuration. It is recognized that the initial cost of pumping stations is high for the area served initially, but for overall protection on a "most cost effective" and practical basis, the pumping stations proved to be a more acceptable solution for certain areas.

A total of nine stormwater pumping stations are recommended for the Peninsular City area, and will serve a total of 1514 acres upon installation. The locations of the pump stations along with their approximate service areas are shown on Figure No. 16. The pump stations as envisioned will use hydraulically driven propeller pumps which allow for the location of the pump motor up to 300 feet away from the wet well and pump. On the initial priority schedule, no line work upstream of the stations is proposed due to the construction cost for the pump station. Only that amount of line work required to connect to the existing tidal drain system is recommended. However, as additional projects are funded and line improvements implemented, the effectiveness of the pump stations will increase.

Because of the high initial cost of the pump stations, the construction of the stations is separated into three phases (See Table No. 9 for pump station size and associated cost). First phase construction will consist of placing the wet well, pump house, one pump and one force main in service. Due to the limited capacity of the existing drainage facilities, one pump will provide adequate capacity to drain water from the existing drainage systems until the upstream drainage facilities are improved. At such time as the upstream improvements are constructed, the installation of one or two additional pumps and force mains will be required.

TABLE 9
STORMWATER PUMP STATIONS

NO.	LOCATION	FLOW (cfs)	PUMP SIZE	FORCE MAIN SIZE & LENGTH	DRAINAGE AREA (ACRES)	WATERSHEDS SERVED	CONSTRUCTION COST			
							PHASE I	PHASE II	PHASE III	TOTAL
1.	Colonial Lake	728	3 - 120,000 GPM	850 L.F. of Triple 84"	215	Beaufain, Colonial Lake, Lime- house, Meeting, Rutledge	\$ 3,096,250	\$ 799,450	\$ 799,450	\$ 4,695,150
2.	Cooper @ Jackson	424	3 - 70,000 GPM	200 L.F. of Triple 66"	175	Cooper Street and Jackson Streets	\$ 1,787,400	\$ 223,200	\$ 223,200	\$ 2,233,800
3.	Reid @ East Bay	315	3 - 50,000 GPM	1700 L.F. of Triple 60"	100	Calhoun Street East and Society Street	\$ 2,074,800	\$ 804,000	\$ 804,000	\$ 3,682,800
4.	Calhoun @ East Bay	621	3 - 100,000 GPM	1290 L.F. of Triple 84"	210	Calhoun Street West and Society Street	\$ 3,068,900	\$1,065,500	\$1,065,500	\$ 6,199,900
5.	Calhoun Street West	765	3 - 120,000 GPM	1350 L.F. of Triple 84"	200	Calhoun Street West	\$ 3,439,450	\$1,142,650	\$1,142,650	\$ 5,724,750
6.	Market @ Concord	345	3 - 60,000 GPM	150 L.F. of Triple 66"	74	Hasell Street, Market Street, and Pinckney Street	\$ 1,599,300	\$ 180,900	\$ 180,900	\$ 1,961,100
7.	Fishburne Street	683	3 - 110,000 GPM	300 L.F. of Triple 84"	250	Fishburne Avenue and Spring Street	\$ 2,553,150	\$ 403,950	\$ 403,950	\$ 3,361,050
8.	V.A. Hospital	192	3 - 30,000 GPM	150 L.F. of Dual 54"	45	V.A. Hospital	\$ 1,087,600	\$ 162,400	\$ -	\$ 1,250,000
9.	Cannon @ President	617	3 - 100,000 GPM	2000 L.F. of Triple 84"	245	Spring Street	\$ 3,556,200	\$1,552,800	\$1,552,800	\$ 6,661,800
10.	Forest Acres	300	3 - 50,000 GPM	2300 L.F. of Dual 66"	170	Forest Acres	\$ 2,065,500	\$1,081,500	\$ -	\$ 3,147,000
TOTAL							\$24,328,550	\$7,416,350	\$6,172,450	
										GRAND TOTAL \$37,917,350

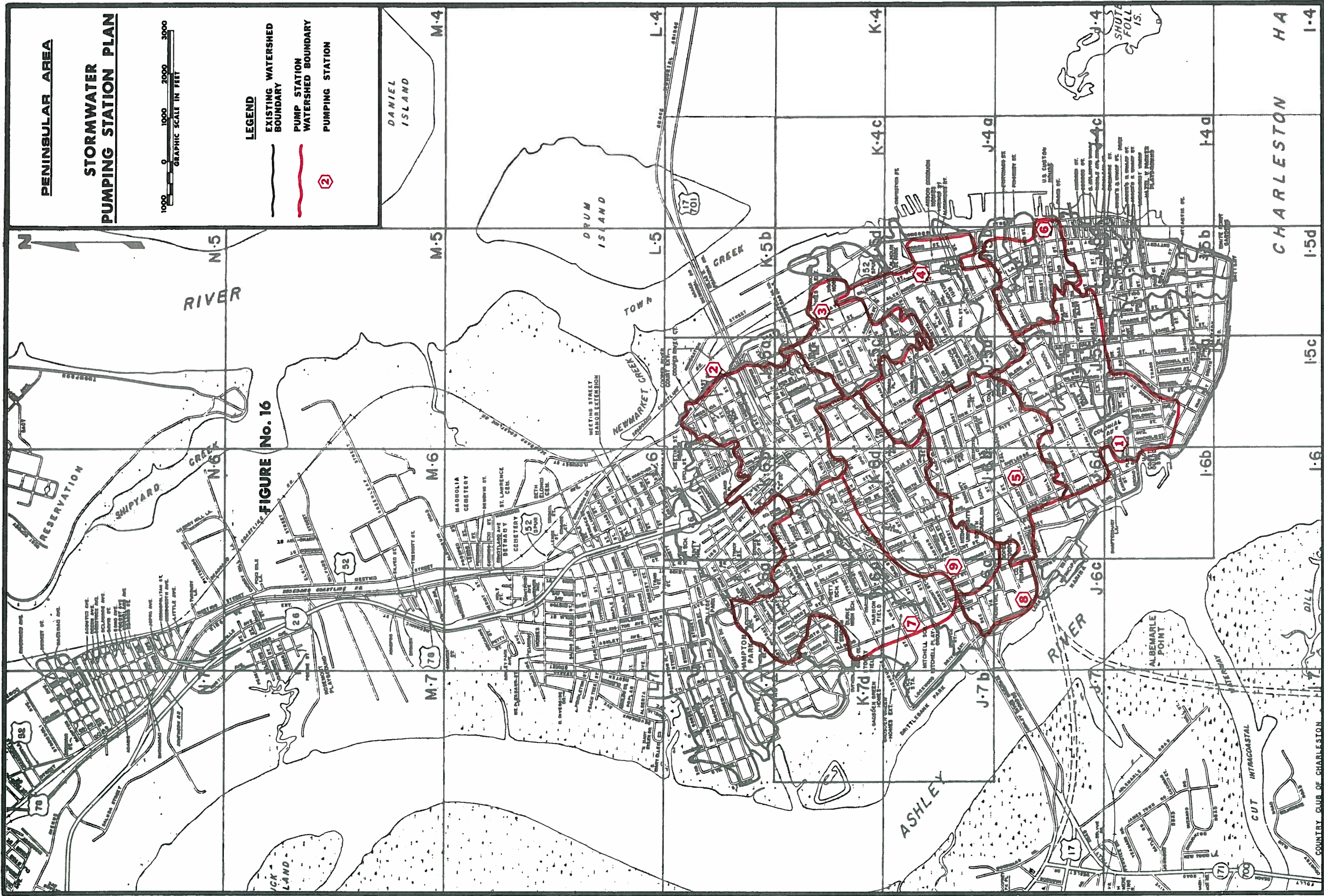


TABLE 10

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN)	DISCHARGE (CFS)	EXISTING SYSTEM	LENGTH	SLOPE (FT./ FT.)	CAPACITY (CFS.)	VELOCITY (FPS.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
CHURCH STREET (I-5b,I-5d)													
15.47 to 15.46	0.66	0.7	0.46	3	4	2.5'x3.5' B.A.	320'	(0.0011)	16	2.2	370' - 30" RCP	46,700	Relief system 15.47 to 15.47A. Ties to Water St. system.
15.46 to 15.45	3.02	0.7	2.51	6	20	2.5'x3' B.A.	650'	(0.0011)	14	2.1		Adequate	Peak discharge reduced by relief system
15.45 to 15.42A	6.37	0.7	7.03	10	46	2.5'x3' B.A.	320'	(0.0011)	14	2.1		Adequate	Peak discharge reduced by relief system
15.42A to 15.42	3.02	0.45	8.39	12	51	2.5'x3' B.A.	50'	(0.0011)	14	2.1	50' - 24" RCP	9,250	Parallel system.
												55,950	SUBTOTAL
												11,200	UPSTREAM IMPROVEMENTS
												67,150	TOTAL
WATER STREET (I-5b)													
15.36 to 15.35	1.00	0.7	0.7	4	6	0.7'x2' B.A.	240'	(0.0075)	3	2.5	240' - 18" RCP	22,950	Replace existing B.A.
15.35 to 15.34	1.90	0.7	2.03	6	16	0.7'x2' B.A.	290'	(0.0173)	4	3.9	290' - 24" RCP	31,100	Replace existing B.A.
15.38 to 15.34	2.1	0.7	1.47	4	12	3.5'x2.2' B.A.	310'	(0.0002)	7	0.9		Adequate	Available head
15.34 to 15.33	3.86	0.7	6.20	8	43	3.5'x2.2' B.A.	320'	(0.0002)	7	0.9	450' - 42" RCP	92,400	Parallel system
15.33 to 15.30	5.9	0.7	10.33	10	68	3.5'x3' B.A.	200'	(0.0002)	10	1.0	70' - Dual 48" RCP	40,400	Remove existing pipe
												186,850	SUBTOTAL
												37,400	UPSTREAM IMPROVEMENTS
												224,250	TOTAL
TRADD STREET (I-4a,I-5b)													
15.18 to 15.15	1.10	0.9	0.99	4	8	0.7'x2' B.A.	400'	(0.0056)	2	2.2		Adequate	This system is adequate; however requires cleaning
15.15 to 15.13	2.61	0.9	3.34	7	23	36" RCP	270'	(0.0056)	43	6.1			
15.13 to 15.12	1.72	0.9	4.89	9	33	36" RCP	315'	(0.0056)	43	6.1			
15.12 to 14.11	1.45	0.9	6.20	11	40	36" RCP	455'	(0.0056)	43	6.1			
EXCHANGE STREET (I-4a,I-5b,J-4c,J-5d)													
15.4 to 15.3	6.01	0.9	5.41	9.0	37	2'x4' Brick Arch	95'	(0.0121) 0.0139	41	6.5		Adequate	
15.3 to 14.2	2.32	0.9	7.50	10	49	36" RCP	380'	(0.0121) 0.0035	63	9.0		Adequate	
14.2 to 14.1	2.48	0.9	9.73	13	58	36" RCP	150'	(0.0121) 0.0073	63	9.0		Adequate	

Church Street

The Church Street watershed drains a total of 13 acres of residential and business development located in the southeastern corner of the Peninsular City. The watershed is bounded on the north by Tradd Street, on the west by Meeting Street and on the east and south by the Charleston Harbor. An existing brick arch conveys the runoff from the area to the Charleston Harbor. Installation of a 30" RCP relief system along Atlantic Street is recommended to reduce the amount of flow which the existing brick arch must handle. Upon completion of the relief system, a 24" RCP parallel to the existing brick arch is required across Murray Boulevard.

Water Street

The Water Street watershed is located east of Meeting Street and is bounded on the north by Tradd Street and on the south by Atlantic Street. The 14.8 acre basin is drained by a 3 foot wide brick arch that runs east on Water Street to the Harbor. A 42" RCP parallel to the brick arch along Water Street from Church Street to East Bay Street and a dual 48" RCP to the outfall are recommended. This system will also serve the northern portion of the Church Street watershed which is to be diverted down Atlantic Street to East Bay Street.

Tradd Street

The Tradd Street watershed is located east of Meeting Street and immediately south of Broad Street and drains a total of 6.9 acres of residential development. Existing drainage facilities consist of a 4'x2.5' brick arch along Tradd Street which connects into a 36" RCP prior to discharge in the Cooper River. The system is adequate, however, the pipes need to be cleaned to improve their hydraulic capacity.

Exchange Street

The Exchange Street watershed drains 10.8 acres around the intersection of Broad Street and East Bay Street. The existing 36" RCP system is adequate to handle the estimated runoff, however, it should be cleaned to improve the hydraulic capacity of the system.

TABLE 11

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
MEETING STREET (I-5a,I-5b,I-5d,J-5c,J-5d)													
J5.79 to J5.49	0.88	0.9	0.79	2.0	7	2.1'x2.2' Brick Arch	250'	(0.0002) -0.003	3	0.8	250' - 24" RCP	27,000	Replace existing system
J5.49 to J5.42	1.11	0.9	1.79	4.0	15	3.2'x2.5' Brick Arch	230'	(0.0002) -0.0066	7	0.9	230' - 30" RCP	28,650	Replace existing system
J5.42 to J5.44	4.27	0.9	5.63	7.0	41	2.5'x2.5' Brick Arch	315'	(0.0002) 0.0033	5	0.9	315' - 42" RCP	63,500	Parallel system
J5.44 to J5.46	2.3	0.9	7.70	9.0	52	2.5'x2.5' Brick Arch	180'	(0.0002) 0.0033	5	0.9	180' - 48" RCP	41,050	Parallel system
J5.46 to J5.39	3.34	0.9	10.71	10.0	70	24" RCP	525'	(0.0002) 0.006	3	0.9	545' - Dual 42" RCP	227,300	Relief system J5.46 to J5.11. Replace existing system
J5.39 to J5.8	6.97	0.9	16.98	14.0	98	2.5'x3.0' Brick Arch	495'	(0.0028) -0.0021	26	4.0	495' - 30" RCP	61,300	Replace existing system
J5.72 to J5.16	8.17 0.76	0.7 0.25	5.90	9.0	40	24" RCP	235'	(0.0036) 0.0011	12	3.7	1030' - Dual 54" RCP	578,550	Relief system to pump station #1. J5.8 to J5.70
J5.16 to J5.11	2.46	0.9	8.12	11.0	52	24" RCP	285'	(0.0036) 0.001	12	3.7	I	I	
J5.11 to J5.10	1.76	0.9	9.70	13.0	58	24" RCP	190'	(0.0036) 0.0015	12	3.7	515' - Dual 42" RCP	209,800	
J5.10 to J5.8	2.39	0.9	11.85	14.0	69	24" RCP	325'	(0.0036) 0.0031	12	3.7	I	I	
J5.8 to I5.6	3.50	0.9	31.98	17.0	176	3'x8' Brick Arch	570'	(0.0028) 0.001	29	3.6		Adequate	Relief by pump station #1
I5.7 to I5.6	1.78	0.9	1.6	4.0	14	2.5'x3.0' Brick Arch	220'	(0.0236)	64	9.7		Adequate	
I5.6 to I5.52	5.72 2.50	0.9 0.45	39.85	21.0	207	3.5'x3' Brick Arch	1700'	(0.0023) 0.001	33	3.5	1700' - 36" RCP	305,650	Parallel system
I5.52 to I5.51	18.02 1.88	0.7 0.45	52.46	32.0	244	5'x3' Brick Arch	550'	(0.0023) 0.001	54	3.8	950' - 54" RCP	270,200	Parallel system
I5.51 to I5.48	3.61 5.05	0.25 0.7	57.75	36.0	254	5'x3' Brick Arch	400'	(0.0026) -0.0026	56	4.1	I	I	Parallel system
												1,813,000 362,600 2,175,600	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
KING STREET (I-5a,I-5b,I-5c,I-5d)													
I5.41 to I5.64	4.66	0.7	3.26	8	23	3.5'x2.5' B.A.	200'	(0.0039) 0.0023	34	4.2		Adequate	
I5.65 to I5.64	0.74	0.45	0.33	4	3	1.5'x2' B.A.	185'	(0.0014) 0.0154	4	1.7		Adequate	
I5.64 to I5.63	1.29	0.45	4.17	9	28	3.6'x2.5' B.A.	130'	(0.0014)	21	2.5	440' - 24" RCP	49,800	Parallel system
I5.63 to I5.60	1.84	0.45	5.00	10	33	3.6'x2.5' B.A.	310'	(0.0014) 0.0028	21	2.5	I	I	Parallel system
I5.60 to I5.58	4.22	0.45	6.90	12	42	2.9' x 2.5' B.A.	380'	(0.0029) 0.0028	22	3.4	380' - 30" RCP	48,000	Parallel system
I5.58 to I5.56	11.09	0.45	11.89	15	68	3.0'x2.5' B.A.	380'	(0.0006)	11	1.6	430' - Dual 36" RCP	168,400	Replace existing arch
I5.56 to I5.55	7.67	0.45	15.34	18	83	2.3'x4' B.A.	50'	(0.0006)	12	1.6	I	I	
												266,200 53,250 319,450	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

Meeting Street

The Meeting Street watershed drains the immediate area around Meeting Street from Market Street to Murray Boulevard. The 76.5 acre basin is drained by a brick arch tidal drain that runs the length of Meeting Street and outfalls into the harbor, and provides less than 10 percent of required capacity.

It is recommended that the flow be divered from north of Queen Street to the proposed Colonial Lake pump station. This will reduce the flow that must be handled by the existing drainage system on Meeting Street. The relief system consist of dual 42" RCP's and 54" RCP's along Queen Street from Meeting Street to Lenwood Street. At Lenwood Street the system will connect to the proposed 6'x8' box which conveys runoff from the Limehouse watershed to the Colonial Lake pump station. Various line improvements are recommended to convey runoff to the proposed relief system.

In addition to the relief system, the existing system south of Broad Street should also be improved. The recommendation is made to install a parallel system of 36" RCP's and 54" RCP's next to the existing brick arch.

King Street

The King Street watershed drains a total of 31.5 acres, and is located south of Broad Street between Meeting Street on the east and Legare Street on the west. The watershed is drained by an existing brick arch that runs southward along King Street to the harbor. A parallel system of 24" RCP and 30" RCP is recommended to provide necessary capacity from Weims Court to South Battery. From this point to the harbor, replacing the existing brick arch system with dual 36" RCP is recommended.

TABLE 12

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./ FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORM WATER CONDUIT	COST (DOLLARS)	
LIMEHOUSE STREET (I-5a, I-5b, I-5c, J-5a, J-5c)													
J5.113 to J5.114	0.90 0.94	0.9 0.25	1.05	4	9	2'x2.5' B.A.	370'	(0.0005) -0.0008	5	1.2			Clean existing arch
J5.114 to J5.115	1.58	0.9	2.47	7	18	2.9'x2.5' B.A.	150'	(0.0027) 0.0011	22	3.3		Adequate	
J5.115 to J5.92	0.64	0.9	3.05	8	21	2.3'x2.5' B.A.	170'	(0.0018) 0.0094	13	2.5	170' - 24" RCP	19,000	Parallel system
J5.92 to J5.91	0.41 6.38	0.25 0.9	8.89	9	60	24" VCP	290'	(0.0045)	13	4.2	685' - 42" RCP	137,550	Parallel system
J5.91 to J5.89	4.94	0.9	13.34	11	85	24" VCP	395'	(0.0066)	16	5.1			
J5.89 to J5.80	5.58 9.99	0.9 0.45	22.86	14	133	3'x3' B.A.	410'	(0.0003) -0.0028	10	1.2	410' - Dual 4'x6' Box	308,650	Replace existing B.A. flow to pump station #1
J5.77 to J5.80	3.60	0.9	3.24	6	25	24" VCP	135'	(0.0178) 0.0063	26	8.3		Adequate	Flow to pump station #1
J5.80 to J5.80A	2.18	0.9	28.06	17	154	3'x3' B.A.	170'	(0.0003)	10	1.2	1055' - Dual 4'x6' Box	786,500	Replace arch
J5.80A to J5.74	1.12 0.67	0.9 0.6	29.47	18	159	1.8'x3' B.A.	410'	(0.0003)	4	0.9			Replace arch flow to pump station #1
J5.74 to J5.70	0.84 0.76 1.38	0.6 0.9 0.45	31.27	21	163	4.2'x3' B.A.	475'	(0.0003) -0.0023	15	1.3	1850' - 6'x8' Box	852,700	Relief system J5.70 to pump station #1
J5.70 to I5.76	12.30 5.35	0.45 0.9	41.63	24	184	4'x4' B.A.	535'	(0.0003) -0.0002	20	1.4		Adequate	Peak discharge reduced by pump station #1
I5.77 to I5.76	7.53	0.45	3.39	6	26	24" VCP	175'	(0.004)	12	3.9	175' - 30" RCP	24,000	Parallel system
I5.76 to I5.74	1.31 2.80	0.6 0.45	47.06	28	231	3'x5' B.A.	55'	(0.0022)	37	3.0		Adequate	Due to relief system
I5.74 to I5.73	2.25	0.45	48.08	29	231	4.1'x3' B.A.	600'	(0.0022)	40	3.5		Adequate	Available head
I5.23 to I5.27	6.11	0.45	2.75	8	19	2.5'x3' B.A.	225'	(0.0043) 0.0034	27	4.1		Adequate	
I5.27 to I5.73	3.51	0.45	4.33	9	29	2.5'x3' B.A.	735'	(0.005) 0.0039	29	4.5		Adequate	
I5.73 to I5.72	13.38	0.45	58.43	33	269	3.5'x3' B.A.	495'	(0.0022) 0.0037	32	3.4	1645' - 4'x6' Box; 200' - 30" RCP & 850' - 24" RCP	734,650	Relief system I5.73A to I5.73B
I5.72 to I5.71	9.85	0.45	62.86	36	277	4'x4' B.A.	800'	(0.0007) -0.0002	31	2.2		Adequate	Due to relief system
I5.71 to I5.70	27.16	0.45	75.08	41	308	4'x4' B.A.	265'	(0.0007) 0.001	31	2.2	265' - 24" RCP	28,600	Parallel system
I5.70 to I5.69	4.38	0.45	77.05	43	308	4'x4' B.A.	310'	(0.0007) 0.0002	31	2.2	310' - 30" RCP	37,950	Parallel system
I5.69 to I5.68	6.86	0.45	80.14	45	313	36" CMP	50'	(0.0007) -0.0036	10	1.4	50' - Dual 36" RCP	27,750	Parallel system
											2,957,350		SUBTOTAL
											591,500		UPSTREAM IMPROVEMENTS
											3,548,850		TOTAL

Limehouse Street

The Limehouse Street watershed drains 144.7 acres of the Peninsular City area and is bounded on the east by the Meeting Street and King Street watersheds, on the west by the Rutledge Avenue watershed, and extends from George Street on the north to Murray Boulevard on the south.

Existing drainage facilities consist of a brick arch tidal drain that runs northward from Murray Boulevard to Calhoun Street. The existing tidal drain system is inadequate, providing less than 20 percent of the required capacity at high tide.

The recommendation is made to redirect a portion of the runoff to the proposed Colonial Lake pump station via a 6'x8' box section to be constructed along Queen Street from Lenwood Boulevard to the Colonial Lake pump station. This redirection will reduce the discharge which must be handled by the system south of Broad Street. However, the existing system is inadequate for this reduced flow rate. A relief system to be constructed along Lenwood Boulevard from Tradd Street to Murray Boulevard is also recommended to divert a portion of the runoff from the existing tidal drain on Limehouse Street. The system will consist of a 4'x6' box section which will convey the runoff from the area to the Charleston Harbor. In addition, a parallel 30" RCP along Limehouse Street from Lowndes Street to the harbor is required.

TABLE 13

[illegible]

West Battery

The West Battery Watershed drains 3.7 acres around the intersection of Murray Boulevard and Tradd Street. The majority of the area lies below elevation 5 mean sea level, which results in the area being inundated during very high tides. Replacement of the existing 10" CIP with a 24" RCP is recommended. This improvement will not prevent inundation by extremely high tides, but will drain once the tide recedes.

Rutledge Avenue

The Rutledge Avenue watershed drains the southwest corner of the Peninsular City between Broad Street and Murray Boulevard. The 65.6 acre basin is drained by a 24" VCP which extends southward along Rutledge Avenue from Broad Street to the discharge into the Charleston Harbor.

Recommended improvements include the construction of a system of 42" RCP, 48" RCP, and 54" RCP which will convey the majority of the runoff from the area to the proposed Colonial Lake pump station. This system will redirect the runoff from the area north of Tradd Street to the proposed pump station.

Replacing the existing system from Gibbes Street to the harbor with a system composed of 36" RCP and 42" RCP is also required.

Colonial Lake

The Colonial Lake watershed consists of the area including and surrounding Colonial Lake. The 23.8 acre watershed is drained by a 42" RCP which discharges from Colonial Lake to the Ashley River.

Construction of a pump station which will convey the runoff from the area to the Ashley River is recommended. In addition to the Colonial Lake watershed, the pump station will also serve the Beaufain, Limehouse Street, Meeting Street, and Rutledge Avenue watersheds. Improvement of the existing 36" aluminum culvert crossing Halsey Boulevard by the addition of two 36" RCP culverts parallel to the existing culvert is recommended. Consideration should also be given to raising the existing road near the intersection of Halsey Boulevard and Broad Street to eliminate existing flooding which occurs at high tides.

TABLE 14

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./ FT.)	CAPACITY (C.F.S.)	VELOCITY (FPS)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
QUEEN STREET (I-5b, J-4c, J-5d)													
J5.5 to J5.3	9.81	0.9	8.83	7	64	4'x2.5' Brick Arch	405'	(0.0052) 0.0017	47	5.1	405' - 42" RCP	83,800	Parallel system
J5.3 to J5.2	3.62	0.7	11.36	10	74	4'x2.5' Brick Arch	325'	(0.0054) 0.0043	48	5.2	325' - 42" RCP	68,400	Parallel system
J5.2 to J4.2	7.14	0.9	17.79	12	109	4.5'x3.5' Brick Arch	460'	(0.0054) 0.0029	87	6.0	460' - 42" RCP	94,350	Parallel system
J4.2 to J4.1A	5.63	0.9	22.86	15	130	48" RCP	100'	(0.002) 0.001	56	4.4	100' - 54" RCP	33,250	Parallel system
J4.4 to J4.1A	2.65	0.9	2.39	4	20	18"x29" CMP	105'	(0.0019) 0.0001	6	1.8	105' - 30" RCP	14,050	Replace existing 18"x29" CMP
J4.1A to J4.1	1.07	0.9	26.21	16	147	48" CMP	150'	(0.0009) 0.0073	24	1.9	150' - 4'x6' box	62,200	Replace 48" CMP
												356,050	SUBTOTAL
												71,250	UPSTREAM IMPROVEMENTS
												427,300	TOTAL
PINCKNEY STREET (J-4c, J-5d)													
J4.11 to J4.9	12.4	0.8	9.90	14	57	18"x29" CMP	205'	(0.0028) -0.0059	7	2.2	410' - 36" RCP	91,050	Outlets to harbor
											460' - Dual 42" RCP	188,650	Relief system to pump station #6. J5.55A to J5.19
												279,700	SUBTOTAL
												55,950	UPSTREAM IMPROVEMENTS
												335,650	TOTAL

Queen Street

The Queen Street watershed is a 30 acre area located east of Meeting Street and immediately south of the Old Marketplace , and contains predominately small business type developments. Existing stormwater drainage facilities consist of a brick arch that runs eastward on Queen Street, tying into a 48" CMP at Concord Street prior to discharging into the Cooper River.

A system of 30" RCP through 48" RCP parallel to the existing brick arch, and a 4'x6' box section to replace the 48" CMP is recommended.

Pinckney Street

The Pinckney Street watershed drains 12.4 acres of industrial development and is bordered on the north by the Hasell Street watershed and on the south by the Market Street watershed. It is recommended that part of the stormwater runoff be handled by the 42" RCP relief system that is recommended to run from Hasell Street to the proposed Market Street pump station. Replacing the existing 18"x29" CMP outfall with a 36" RCP is recommended.

TABLE 15

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT. / FT.)	CAPACITY (C.F.S.)	VELOCITY (FPS)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
MARKET STREET (J-4c, J-5b, J-5d)													
J5.136 to J5.133	0.37	0.9	0.33	2	3	2.5'x3.0' Brick Arch	215'	(0.0108) 0.0019	43	6.6		Adequate	
J5.132 to J5.133	0.80	0.9	0.72	2	6	24" RCP	565'	(0.0018) 0.0018	8	2.6		Adequate	
J5.133 to J5.61	5.94	0.9	6.40	3	54	2.5'x3.0' Brick Arch	315'	(0.0018) -0.0054	18	2.7	315' - 30" RCP	40,350	Parallel system
J5.60 to J5.61	0.13	0.9	0.12	2	1	2.6'x2.5' Brick Arch	340'	(0.0091) 0.0041	34	5.8		Adequate	
J5.66 to J5.61	3.7	0.9	3.33	2	28	2.8'x2.5' Brick Arch	470'	(0.0079) 0.0018	35	5.6		Adequate	
J5.61 to J5.62	0.41	0.9	10.22	5	87	2.5'x3.0' Brick Arch	165'	(0.0079) 0.0175	18	2.7	165' - 4'x5' Box	60,800	Replace 2.5'x3.0' brick arch
J5.62 to J5.64	4.85	0.9	14.59	6	112	2.5'x3.0' Brick Arch	185'	(0.0018) -0.0063	18	2.7	515' - 4'x6.5' Box	194,700	Replace existing 2.5'x3' brick arch
J5.64 to J5.36	2.67	0.9	16.99	7	124	2.5'x3.0' Brick Arch	295'	(0.0018) -0.0063	18	2.7			
J5.41 to J5.36	2.1	0.9	1.89	2	16	2.8'x2.5' Brick Arch	490'	(0.0071) (0.0012)	34	5.3		Adequate	
J5.36 to J5.35	2.67	0.9	21.28	9	145	2.8'x2.5' Brick Arch	610'	(0.0018) 0.0036	17	2.7	1325' - Dual 4'x5' box	949,100	Parallel system
J5.35 to J5.26	12.90 1.7	0.9 0.25	33.32	13	200	2.8'x2.5' Brick Arch	365'	(0.0002) 0.0050	6	1			
J5.26 to J5.19	4.24	0.9	37.14	15	212	3.0'x3.0' Brick Arch	350'	(0.0002) 0.0050	8	1			
J5.19 to J4.7	6.1	0.9	42.63	17	234	3.0'x3.0' Brick Arch	450'	(0.0002) 0.0032	8	1	385' - Dual 5'x6' box	293,200	Discharge to pump station #6
J4.7 to J4.6	6.9	0.9	48.84	20	259	6.6'x20.0' Brick Arch	75'	(0.0002) -0.0559	165	1.9			
												1,538,150 307,650 1,845,800	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

Market Street

The Market Street watershed consists of the area including and surrounding the Old Market Place. The 55.5 acre basin is drained by a 4' wide brick arch that runs eastward on Market Street from Meeting Street to the Cooper River and by a 5' wide brick arch running along Meeting Street. The existing drainage facilities provide less than 20 percent of the required capacity.

Replacing the existing brick arch on Meeting Street with a 4'x5' box section and placing a dual 4'x5' box section along Market Street parallel to the existing brick arch is recommended. The box culverts will lead to a proposed pump station at the intersection of Concord Street and Market Street which will discharge into the Charleston Harbor. Runoff from the Hasell Street and Pinckney Street watersheds will also be removed by the proposed pump station.

TABLE 16

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
BEAUFAIN (I-6b, J-5c, J-6d)													
J5.86 to J5.85	11.0	0.6	9.39	9	64	30" VCP	255'	(0.0004) 0.0023	7	1.4	480' - 48" RCP	107,400	Replace 30" VCP
	6.2	0.45											
J5.85 to J5.84	1.8	0.45	10.20	11	65	30" VCP	225'	(0.0004) 0.0016	7	1.4			Replace 30" VCP
J5.84 to I6.13	4.5	0.45	12.23	13	73	30" VCP	950'	(0.0004)	7	1.4	475' - 54" RCP	129,400	Replace 30" VCP
J5.87 to J6.4	3.8	0.7	6.31	8	44	24" VCP	470'	(0.0036) 0.0013	10	3.1	410' - 36" RCP	72,450	Relief system J5.87 to J5.84
	8.1	0.45											
J6.4 to J6.3	8.2	0.45	10.0	11	64	2.1'x2' B.A.	480'	(0.0006) 0.006	5	1.3	410' - 30" RCP	49,600	Relief system J6.4 to J6.2
J6.3 to I6.13	14.7	0.45	16.62	14	96	30" VCP	405'	(0.0002)	5	1.0	405' - 42" RCP	80,800	Relief system to pump station #1, J6.3 to J6.2
I6.13 to I6.10	6.0	0.45	31.55	19	169	5'x5' Box	730'	(0.0004)	43	1.9	475' - 48" RCP 480' - Dual 54" RCP	374,400	To Colonial Lake pump station
I6.10 to I6.8	6.6	0.45	34.52	24	176	5'x5' Box	270'	(0.0004)	43	1.9		Adequate 814,050 162,850 976,900	Relief system to pump station SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
MARINA (J-6c, J-6d)													
J6.12 to J6.11	3.2	0.45	1.44	4	12	24" RCP	70'	(0.001) -0.0044	14	4.5		Adequate	
J6.11 to J6.10	2.0	0.25	5.41	5	46	2' F.B. Channel	380'	(0.001)	20	1.8	380' - 4' F.B. Channel	3,250	
	7.7	0.45											
U6.10 to J6.9				7	46	24" RCP	100'	(0.001) -0.0204	14	4.5	100' - Dual 36" RCP	34,950	Replace existing 24" RCP
J6.16 to J6.14	5.5	0.7	3.82	11	24	30" RCP	110'	(0.0027) 0.0153	18	3.8	190' - 36" RCP	41,200	Replace 30" RCP
J6.14 to J6.13	1.5	0.9	5.15	12	32	30" RCP	80'	(0.0027) -0.0144	18	3.8			
J6.7 to J6.6	20.0	0.9	30.24	19	164	42" RCP	100'	0.0228	54	5.6	100' - Dual 4'x8' Box	224,900 304,300 60,900 365,200	Parallel system. Price includes raising Lockwood Blvd. to elevation 6.0. SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
	3.80	0.45											

Beaufain

The Beaufain watershed drains the area bounded by Beaufain Street on the south, Pitt Street on the east, Montague Street on the north and Lockwood Drive on the west.

The existing drainage system is a 30" VCP along Beaufain Street which connects into a box section that crosses Lockwood Drive and outlets to the Ashley River. Due to the inadequacy of this system, it is recommended that the majority of the runoff be redirected to the proposed Colonial Lake pump station. Recommended system improvements include a system of dual 54" RCP's along Ashley Avenue from Beaufain Street to the Colonial Lake pump station, and a series of 54" RCP and 48" RCP along Beaufain Street. The downstream reaches of the Beaufain System west of Gadsden Street will be adequate upon completion of the system to divert runoff to the Colonial Lake pump station. The existing system requires cleaning and a new tide gate installed at the end of the existing box section.

Marina

The Marina watershed includes the area around the old City Marina and is bounded by Calhoun Street on the north, Barre Street on the east, Montague Avenue on the south, and Lockwood Drive on the west. The existing drainage facilities consist of a lake located east of Lockwood Drive, a pipe system into the lake from the present City Marina site west of Lockwood Drive, and a channel which drains the area east of Barre Street.

It is recommended that the existing channel which drains the area around Barre Street be cleaned and widened. Also, it is recommended that the existing 24" RCP culvert under Halsey Boulevard be replaced with dual 36" diameter culverts. In addition, placing dual 4'x8' box culverts parallel to the existing 42" RCP outfall under Lockwood Drive is required. It is also recommended that Lockwood Drive be raised to elevation 6.0 mean sea level which will reduce the frequency that Lockwood Drive is inundated by tide waters.

TABLE 17

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (FPS)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
HASELL STREET (J-4a, J-4c, J-5b, J-5d)													
J5.59 to J5.54	3.44	0.7	2.41	5.0	20	2.5'x2.5' Brick Arch	475'	(0.0012) 0.0077	12	2.1		Adequate	Requires cleaning
J5.54 to J5.50	5.36	0.7	6.16	8.0	43	24" RCP	450'	(0.0058) 0.0073	15	4.8	550' - Dual 36" RCP	193,900	Relief system to pump station #6
J5.50 to J5.12A	4.59	0.9	10.29	11.0	66	24" RCP	270'	(0.0015) -0.0079	8	2.4	450' - 36" RCP	85,150	Reverse flow to relief system @ J5.54
J4.12A to J4.10	4.24	0.7	13.26	13.0	80	24" RCP	470'	(0.0015) -0.0014	5	1.6		Adequate	Due to relief system
												279,050 55,850 334,900	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
SOCIETY STREET (J-5a, J-5b, J-5c, J-5d)													
J5.143 to J5.142	0.61	0.7	0.43	5	4	2'x3' B.A.	190'	(0.0004) 0.0022	6	1.1		Adequate	
J5.142 to J5.140	1.11	0.7	1.21	6	9	1.9'x3' B.A.	310'	(0.0004) 0.0013	5	1.1		Adequate	With available head
J5.140 to J5.138	8.0	0.7	6.81	8	48	3.5'x3' B.A.	375'	(0.0018)	29	3.0	375' - 42" RCP	75,000	Replace existing arch
J5.138 to J5.137	5.1	0.7	10.38	11	66	3.5'x3' B.A.	110'	(0.0045)	55	5.1	110' - 24" RCP	12,900	Parallel system
J5.137 to J5.136	0.77	0.7	10.92	12	67	4.2'x3.5' B.A.	700'	(0.0021) 0.0051	49	3.7	700' - 30" RCP	85,100	Parallel system
J5.136 to J5.135	8.5	0.7	16.87	17	93	4.5'x3.5' B.A.	570'	(0.0023) -0.0001	57	3.9	570' - 36" RCP	102,500	Parallel system
J5.135 to J5.134	6.6	0.7	21.49	21	112	3.75'x3.5' B.A.	365'	(0.0022) 0.0032	43	3.6	365' - 48" RCP	83,100	Parallel system
J5.134 to J5.134A	2.87	0.7	23.50	23	120	3.8'x3.5' B.A.	220'	(0.0195)	130	10.9	220' - 48" RCP	55,500	Parallel system
J5.148 to J5.134A	5.2	0.9	4.68	5	40	2.5'x2.5' B.A.	340'	(0.0121)	37	6.6	1265' - 8'x6' Box	472,200	Relief system to pump station #4
J5.131 to J5.134A	2.89	0.9	2.60	5	22	3.2'x1.8' B.A.	280'	(0.0061)	24	4.5		Adequate	
J5.134A to J5.129	2.57	0.9	33.09	26	162	3.8'x3' B.A.	100'	(0.0061)	60	5.8		Adequate	With relief system to pump station
J5.129 to J5.128	1.41	0.9	34.36	27	168	3.8'x4' B.A.	315'	(0.0005) -0.0019	24	1.8		Adequate	
J5.128 to J4.13	4.61	0.9	38.51	28	187	3.4'x4' B.A.	860'	(0.0005) 0.0013	21	1.7		Adequate	60" CMP on end of brick arch
												886,300 177,300 1,063,600	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

Hasell Street

The Hasell Street watershed drains 17.6 acres and is located east of Meeting Street and immediately north of the Old Market place. The existing drainage system consists of a brick arch that runs eastward along Hasell Street to East Bay Street. The brick arch ties into a 24" RCP at East Bay Street which discharges to the Cooper River. Replacing the brick arch with a 36" RCP is recommended. At East Bay Street, a relief system consisting of dual 36" RCP will take the majority of the Hasell Street runoff to the proposed Market Street pump station. The remainder of the Hasell Street system will be adequate upon completion of the relief system.

Society Street

The Society Street watershed drains 50 acres and is located south of Calhoun Street and north of Market Street on the east side of the Peninsular City. Existing drainage facilities consist of a 4 foot wide brick arch that runs eastward along Society Street and through the port area before outfalling into the Cooper River.

The recommended system improvements include replacing the arch on King Street that runs from George Street to Society Street with a 42" RCP. A system of various sized pipes parallel to the existing arch on Society Street is required. At the intersection of Society Street and East Bay Street, it is proposed to redirect the 4'x6' box to a pump station recommended for the Calhoun Street East watershed. With the relief provided by the pump station, the remainder of the Society Street system is adequate.

TABLE 18

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./ FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
CALHOUN STREET EAST (J-4a, J-5a, J-5b, K-5c, K-5d)													
J5.126 to J5.127	0.9	0.9	0.81	3	7	2'x4' Box	180'	(0.0003)	10	1.3			Runoff directed to Spring Street system
J5.127 to J5.45A	7.5	0.9	7.56	5	64	2'x4' Box	635'	(0.0003) -0.0011	10	1.3			
J5.45A to K5c.39	15.0	0.9	21.06	9	143	3'x3.5' Box	565'	(0.0003) 0.0016	16	1.5	565' - Dual 42" RCP	229,000	Replace existing box
K5.37 to K5c.39	2.5	0.9	2.25	5	19	3'x3' Box	465'	(0.01) 0.0014	74	8.2		Adequate	
K5c.39 to J5.40A	4.7	0.9	27.54	13	165	3'x3' Box	335'	(0.0003) 0.0016	13	1.4	835' - Dual 48" RCP	147,550	Replace existing box
J5.40A to J5.41A	6.1	0.9	33.03	15	188	3.5'x2.5' Box	110'	(0.0003) 0.0016	12	1.4	110' - Dual 4'x5' Box	90,000	Replace existing box
J5.41A to J5.185	2.6	0.9	35.37	16	198	3.5'x2.5' Box	540'	(0.0003) 0.0013	12	1.4	540' - Dual 4'x5' Box	396,000	Replace existing box
J5.185 to J5.184	7.9	0.9	42.48	20	225	3.75'x2.5' Box	195'	(0.0003) 0.0013	13	1.4	195' - Dual 4'x5' Box	149,200	Replace existing box
J5.184 to J5.180	3.3	0.9	45.45	21	236	4'x2.5' B.A.	425'	(0.0003) 0.0013	11	1.2	425' - Dual 4'x5' Box	302,550	Replace existing box
J5.180 to J5.179	0.5 3.8	0.25 0.9	49.00	24	250	4'x3' B.A.	325'	(0.0003) -0.0001	14	1.3	325' - Dual 4'x5' Box	239,650	Replace existing brick arch
J5.169 to J5.179	11.1	0.9	9.99	9	68	4'x3.5' B.A.	670'	(0.0087) 0.0028	94	7.4		Adequate	
J5.172 to J5.174	0.7	0.9	0.63	3	5	1'x2.5' B.A.	320'	(0.0034) 0.0071	4	2.2		Adequate	
J5.174 to J5.175	2.2	0.9	2.61	5	17	2'x2.5' B.A.	155'	(0.005) 0.0012	17	8.9		Adequate	
J5.175 to J5.179	4.3	0.9	6.48	6	30	3.25'x3.25' B.A.	260'	(0.021) 0.0313	98	10.4		Adequate	
J5.179 to J5.193	4.9 4.6	0.9 0.25	71.03	26	348	4.5'x3.5' B.A.	830'	(0.0003)	21	1.4	830' - Dual 5'x6' box	637,700	Replace existing arch
J5.192 to J5.191	7.2	0.7	5.04	8	35	24" RCP	160'	(0.0055) 0.0051	15	4.6	860' - 80" RCP	47,350	Parallel system
J5.191 to J5.193	0.7	0.7	5.53	9	38	24" RCP	200'	(0.0088)	18	5.9			
J5.193 to J5.194A	3.1 4.6	0.7 0.9	82.87	32	385	4.5'x3.5' B.A.	585'	(0.001)	38	2.6	585' - Dual 5'x6' Box	448,700	Replace existing arch
(CONTINUED)													

TABLE 18

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (FPS.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
CALHOUN STREET EAST (CONTINUED)													
J5.200 to J5.197	1.7	0.9	1.53	3	13	24" RCP	390'	(0.009) 0.0113	19	5.9		Adequate	
J5.197 to J5.194A	2.8	0.9	4.05	6	31	24" RCP	280'	(0.003) 0.0049	11	3.4	280' - 30" RCP	34,450	Parallel system
J5.194A to J5.167	16.9 4.8	0.9	101.38	36	446	4'x3.5' B.A.	250'	(0.0021) 0.0049	46	3.6	310' - Dual 6'x6' Box	251,550	Replace existing system to pump station #4
J5.167 to J5.165	7.4	0.9	108.04	38	459	4.6'x3.5' B.A.	300'	(0.0008) 0.0024	35	2.3	295' - Dual 4'x5' Box	232,950	Replace existing system. Redirect water to pump station #4
J5.165 to J5.163	23.2	0.8	126.60	40	519	4.5'x3.5' B.A.	255'	(0.006)	92	6.4	255' - 4'x5' Box	95,200	
J5.150 to J5.151	3.4	0.8	2.72	4	23	1.2'x2' B.A.	255'	(0.0044) 0.0112	5	2.7	255' - 30" RCP	31,500	Replace existing arch
J5.152 to J5.151	3.8	0.6	2.28	4	19	24" VCP	170'	(0.0025) 0.0064	10	3.1	170' - 30" RCP	21,600	Replace existing 24" VCP
J5.159 to J5.151	2.4	0.6	1.44	3	12	1.2'x2' B.A.	270'	(0.0038)	5	2.6	270' - 24" RCP	29,050	Replace existing arch
J5.151 to J5.155	1.6	0.6	7.40	6	57	24" VCP	355'	(0.0003) 0.0004	1	0.3	575' - 48" RCP	130,450	Replace existing 24" VCP
J5.155 to J5.157	3.5	0.6	9.50	8	67	24" VCP	220'	(0.0003) -0.0004	1	0.3			
J5.157 to J5.163	2.6	0.6	11.06	9	75	24" VCP	250'	(0.0003)	1	0.3	250' - 4'x5' Box	93,400	Replace existing 24" VCP. Redirect water to pump station #4
J5.163 to J5.162	3.3	0.6	139.64	42	558	3.4'x4' B.A.	305'	(0.0003)	5	0.4		Adequate	Relief by pump station #4
J5.162 to J4.16	8.4	0.8	146.36	44	571	4'x6' Box	560'	(0.0003) -0.0031	15	0.6		Adequate	Relief by pump station #4
												3,607,850 712,600 4,329,450	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

Calhoun Street East

The Calhoun Street East watershed drains 184 acres via an existing 4.5 foot wide brick arch which runs eastward along Calhoun Street to the Cooper River. Existing drainage facilities also include a 3.5 foot wide brick arch running southward along Meeting Street that connects with the brick arch on Calhoun Street. The area is located along either side of Calhoun Street from Concord Street on the east to King Street on the west, and includes the area between King Street and Meeting Street from Calhoun Street to Mary Street.

It is recommended that the existing brick arch on Meeting Street be replaced with dual 4'x5' box sections and the existing brick arch on Calhoun Street be replaced with dual 5'x6' boxes from Meeting Street to Alexander Street. At this location the size increases to a 6'x6' box section which conveys runoff to a proposed pump station which will be located near the intersection of Calhoun Street and East Bay Street. Runoff from the downstream areas along Marsh Street will also be redirected to the proposed pump station via a new 4'x6' box section which will replace the existing 24" VCP.

TABLE 19

HYDRAULIC ANALYSIS FOR PENINSULAR AREA														
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (CFS)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (CFS.)	VELOCITY (FPS)	RECOMMENDED IMPROVEMENTS		COMMENTS	
											STORMWATER CONDUIT	COST (DOLLARS)		
CALHOUN STREET WEST (CONTINUED)														
J6.56 to J6.55	4.6	0.7	3.22	4	27	24" VCP	245'	(0.0009) 0.0006	6	1.9	245' - 30" RCP	30,400	Replace existing 24" VCP	
J6.55 to J6.36	1.4	0.7	4.20	5	36	24" VCP	395'	(0.00026) 0.0006	8	2.6	395' - 36" RCP	69,850	Replace existing 24" VCP	
J6.36 to J6.33	3.9	0.7	99.77	25	499	3.7'x3' Box	290'	(0.00026)	16	1.4	790' - Dual 6'x6' Boxes	633,600	Flow to pump station #5 J6.36 to J6.33 & J6.33 to pump station	
J6.33 to J6.30	9.6	0.7	106.49	27	522	3.1'x3' Box	350'	(0.00026)	12	1.3		Adequate		
J6.31 to J6.30	15.1	0.7	10.57	6	81	24" VCP	260'	(0.0013)	7	2.2	305' - 4'x6' Box 75' - 4'x6.5' Box	147,800	Redirect water to Pump Station #5. J6.31 to pump station #5	
J6.30 to J6.29	2.7	0.9	119.49	29	574	3.1'x3' Box	60'	(0.00026)	12	1.3			Redirect water to pump station; See J6.31 to J6.30 for associated cost	
J6.60 to J6.59	7.6	0.7	5.32	6	41	24" VCP	245'	(0.002)	9	2.8	245' - 42" RCP	50,050	Replace 24" VCP	
J6.59 to J6.58	3.1	0.7	7.49	8	52	24" VCP	300'	(0.0011)	7	2.1	300' - Dual 30" RCP	73,450	Replace 24" VCP	
J6.58 to J6.29	6.8	0.7	12.25	10	80	24" VCP	345'	(0.0011)	7	2.1	345' - Dual 36" RCP	128,800	Replace 24" VCP	
J6.29 to J6.28	0.3	0.9	132.01	31	620	3.1'x3' Box	230'	(0.00026)	12	1.3	430' - 4'x6' Box	161,550	Redirect water to pump station #5. Replace box	
J6.28 to J6.27	1.6	0.7	133.13	33	606	3.1'x3' Box	200'	(0.00026)	12	1.3			Replace box	
J6.27 to J6.26	10.3	0.9	142.40	34	641	3.1'x3' Box	220'	(0.00026)	12	1.3	220' - Dual 42" RCP	96,500	Redirect water to pump station #5	
J6.61 to J6.26	9.6	0.9	8.64	5	73	30" VCP	320'	(0.0051) 0.003	25	5.2	320' - Dual 36" RCP	114,300	Relief system to pump station #5. Replace 30" VCP.	
J6.26 to J6.25	3.3	0.9	154.01	36	678	3.5'x3' Box	260'	(0.00026) 0.0017	15	1.4		Adequate	Peak flow reduced by pump station	
J6.25 to J6.23	2.9	0.9	156.62	38	678	3.5'x3' Box	210'	(0.00026) 0.0009	15	1.4		Adequate	Peak flow reduced by pump station	
J6.23 to J6.22	3.4	0.9	159.68	39	678	5.3'x4' Box	590'	(0.00026) 0.0009	37	1.7		Adequate	Peak flow reduced by pump station	
J6.22 to J6.21	3.6	0.9	162.92	43	678	5.4'x4.5' Box	340'	(0.00026) -0.0008	44	1.8		Adequate	Peak flow reduced by pump station	
J6.21 to J6.20	1.3	0.9	164.09	45	678	5.5'x5' Box	120'	(0.00026) 0.0029	53	1.9		Adequate	Peak flow reduced by pump station	
J6.20 to J6.18	0.3	0.9	164.36	46	678	5.5'x5' Box	345'	(0.00026) 0.0005	53	1.9		Adequate	Peak flow reduced by pump station	
J6.18 to J6.17	2.0	0.9	166.16	48	678	6'x5' Box	340'	(0.00026) 0.0005	59	2.0		Adequate	Peak flow reduced by pump station	
												3,200,800 640,200 3,841,000	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL	

TABLE 19

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CAI)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORM WATER CONDUIT	COST (DOLLARS)	
CALHOUN STREET WEST - 5a, J-5c, J-6b, J-6c, J-6d)													
J-111 to J5.109	9.0	0.9	9.10	5	79	4'x3.5' B.A.	270'	(0.0044) 0.0027	67	5.2		Adequate	
J5.109 to J5.106	3.0	0.9	10.80	7	79	6'x4' B.A.	290'	(0.0045) 0.0027	210	9.4		Adequate	
J5.121 to J5.120	8.6	0.7	6.02	7	44	5'x3' B.A.	120'	(0.0014) 0.0005	42	3.0		Adequate	
J5.120 to J5.119	0.8	0.7	11.62	8	81	4.5'x3' B.A.	585'	(0.0014) 0.0005	36	2.9	570' - 36" RCP	125,400	Parallel system
J5.119 to J5.118	12.5	0.7	20.37	12	124	4.5'x3' B.A.	85'	(0.0075) -0.0037	84	6.7			Parallel system
J5.118 to J5.117	1.0	0.7	21.07	13	126	4.5'x3' B.A.	270'	(0.0047) -0.0037	67	5.3	270' - 42" RCP	54,850	Parallel system
J5.117 to J5.106	7.8	0.7	26.53	15	151	5.5'x3.5' B.A.	355'	(0.002) 0.0019	70	3.9	355' - 4'x4' Box	126,000	Parallel system
J5.108 to J5.106	2.50	0.7	1.75	4	15	5.25'x3.75' B.A.	600'	(0.0082) 0.0028	146	8.0		Adequate	
J5.106 to J5.104	7.4	0.9	45.74	17	252	5.75'x4' B.A.	340'	(0.002) -0.0017	86	4.2	505' - 5'x6' Box	188,600	Parallel system
J5.104 to J5.100	2.4	0.9	47.90	19	256	4.5'x4' B.A.	165'	(0.002) -0.0017	63	3.9			
J5.103 to J5.102	5.7	0.7	3.99	6	31	24" VCP	265'	(0.0034) 0.0011	11	3.6	265' - 36" RCP	47,900	Replace existing 24" VCP
J5.102 to J5.100	2.6	0.7	5.81	8	41	24" VCP	195'	(0.0034) 0.0059	11	3.6	195' - 42" RCP	40,450	Replace existing 24" VCP
J5.100 to J5.99	1.5	0.7	54.76	20	290	4'x5' B.A.	165'	(0.0032) 0.0017	86	5.0	525' - 6'x6' Box	208,350	Parallel system
J5.99 to J6.37	2.0	0.7	56.16	21	292	5'x3.5' B.A.	360'	(0.0032) 0.0017	78	4.8			Parallel system
J5.96 to J5.95	9.5	0.7	6.65	8	45	36" Brick Pipe	260'	(0.0035) 0.003	28	4.0	260' - 30" RCP	32,100	Parallel system
J5.95 to J5.93	2.8	0.7	8.61	10	56	1.75'x3' B.A.	140'	(0.0016) 0.0021	9	2.1	335' - 42" RCP	70,350	Parallel system
J5.93 to J5.94	1.7	0.7	9.80	11	63	2.2'x3' B.A.	195'	(0.0016) 0.0016	14	2.4			Parallel system
J5.94 to J6.37	1.5	0.7	10.85	12	66	2.8'x3' B.A.	190'	(0.0016) 0.0079	20	2.6	190' - 42" RCP	39,500	Parallel system
J6.54 to J6.53	12.1	0.7	8.47	9	58	24" VCP	215'	(0.002) 0.0017	9	2.8	365' - Dual 36" RCP	141,550	Replace existing 24" VCP
J6.53 to J6.52	2.9	0.7	10.50	10	69	24" VCP	150'	(0.0001) -0.0081	2	0.6			
J6.52 to J6.51	12.9	0.7	19.53	11	125	24" VCP	325'	(0.0001) -0.0037	2	0.6	380' - 4'x6.5' Box	374,650	Replace existing 24" VCP
J6.51 to J6.50	2.3	0.7	21.14	13	127	1'x3.3' B.A.	230'	(0.0006) -0.0037	2	0.9			Replace existing B.A.
J6.50 to J6.37	2.6	0.7	22.96	15	131	2.5'x2.5' B.A.	425'	(0.0006) 0.0041	8	1.5			Replace existing B.A.
J6.37 to J6.36	4.1	0.7	92.84	23	473	5'x3.5' Box	310'	(0.0006) 0.0019	43	2.5	310' - Dual 5'x6' Boxes	244,800	Replace existing 5'x3.5' Box
(CONTINUED)													

(CONTINUED)

Calhoun Street West

The Calhoun Street West watershed drains 212.6 acres along Calhoun Street and is bounded by King Street on the east, Bee Street on the north, Lockwood Drive on the west and Montagu Street on the south. Existing drainage facilities consist of a 4 foot wide box that runs westward along Calhoun Street, outfalling into the Ashley River.

A pump station to be located at the old Charleston Museum site is recommended for this watershed, and will convey the stormwater runoff from the area to the Marina Lake. Two systems are proposed which will connect the pump station to the exiting tidal drain on Calhoun Street. The first system will convey runoff from the area east of Rutledge Avenue to the pump station and consist of dual 6'x6' box sections from the pump station to Calhoun Street and along Calhoun Street to Smith Street. The second system consist of a 4'x6' box section which will convey runoff from the area west of Rutledge Avenue to the pump station.

In addition to the improvements along Calhoun Street, the existing drainage facilities on Smith Street, Pitt Street, Coming Street, Barre Street, and Ashley Avenue require improvements, as well as numerous upstream systems which require replacement.

TABLE 20

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./ FT.)	CAPACITY (C.F.S.)	VELOCITY (FPS.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORM WATER CONDUIT	COST (DOLLARS)	
V.A. HOSPITAL (J-6a, J- 6c, J- 6d)													
J6.104 to J6.103	2.56	0.8	2.05	8	14	30" RCP	50'	(0.0462) 0.0016	76	15.6		Adequate	
J6.103 to J6.102	6.18	0.8	6.99	13	42	30" RCP	35'	(0.0462) 0.0034	76	15.6	35' - 30" RCP	5,900	Parallel system. Parallel system. Flow to existing pump station
J6.102 to J6.101	2.43 0.87	0.8 0.9	9.71	14	56	30" RCP	205'	(0.009)	34	6.9	205' - 30" RCP	25,700	
J6.94 to J6.92	0.98	0.9	0.88	5	7	30" RCP & 24" RCP	140'	(0.005) -0.0005	39	5.0	140' - 24" RCP	16,000	Replace existing 24" RCP
J6.92 to J6.90	1.07	0.9	1.84	6	14	30" RCP & 24" RCP	140'	(0.0036) 0.0019	33	4.3		Adequate	
J6.91 to J6.90	3.46	0.8	2.78	12	17	24" RCP	140'	(0.0036) 0.0029	14	4.4	140' - 30" RCP	18,150	Replace 24" RCP
J6.90 to J6.86	0.90	0.8	5.34	13	32	48" RCP	230'	(0.0036) -0.0022	75	5.9	230' - 36" RCP	41,950	Replace 48" RCP, increase slope
J6.89 to J6.87	1.91	0.8	1.53	11	10	24" RCP	275'	(0.0063)	16	4.9		Adequate	
J6.87 to J6.86	1.65	0.9	3.02	13	18	24" RCP	50'	(0.0005) -0.0124	4	1.4	50' - 30" RCP	7,650	Replace 24" RCP
J6.99 to J6.97	1.83	0.8	1.46	3	12	30" RCP	170'	(0.0029) -0.0003	19	3.9	170' - 30" RCP	21,600	Replace existing 30" RCP (negative slope)
J6.98 to J6.97	1.46	0.9	1.31	7	10	30" RCP	45'	(0.0029) 0.0169	19	3.9		Adequate	
J6.97 to J6.96	1.36	0.8	3.86	8	27	1.5'x4' Box	70'	(0.0017) 0.0031	16	2.7	295' - 36" RCP	52,950	Replace existing 1.5'x4' box
J6.96 to J6.86	0.80	0.8	4.50	9	31	30" RCP	225'	(0.0017) 0.0096	15	3.0			Replace 30" RCP
J6.86 to J6.81	1.60	0.9	14.30	15	82	60" RCP	295'	(0.0005) 0.0012	50	2.6	295' - 60" RCP	81,600	Replace or relay existing 60" RCP
(CONTINUED)													

TABLE 20

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (FPS)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
V.A. HOSPITAL (CONTINUED)													
J6.84 to J6.83	1.17	0.9	1.05	4	9	24" RCP	190'	(0.0016) 0.0037	8	2.5		Adequate	with proposed pump station
J6.83 to J6.82	1.54	0.9	2.44	5	21	30" RCP	120'	(0.0016) 0.0049	14	2.9		Adequate	
J6.82 to J6.81	0.38	0.9	2.78	6	21	30" RCP	100'	(0.0004) 0.0034	7	1.4		Adequate	
J6.81 to J6.66	2.90	0.8	19.40	17	107	60" RCP	180'	(0.0004) 0.003	45	2.3	180' - 60" RCP	56,550	Replace or relay existing 60" RCP. Flow to pump station #8
J6.79 to J6.77	1.69	0.9	1.52	7	11	30" RCP	220'	(0.001) 0.0013	11	2.3		Adequate	
J6.78 to J6.77	3.42	0.8	2.74	9	19	24" RCP	90'	(0.0005) -0.0042	4	1.4	90' - 30" RCP	12,300	Replace existing 24" RCP
J6.77 to J6.74	3.17	0.8	6.80	10	45	36" RCP	280'	(0.0009) 0.0032	17	2.4	280' - 48" RCP	68,200	Replace 36" RCP
J6.74 to J6.73	2.91	0.8	9.13	12	56	36" RCP	130'	(0.0009) -0.0065	17	2.4	130' - 48" RCP	30,500	Replace 36" RCP
J6.73 to J6.72	1.46	0.8	10.3	13	62	42" RCP	210'	(0.0009) 0.0028	26	2.7	210' - 48" RCP	47,400	Replace 42" RCP
J6.72 to J6.69	2.33	0.8	12.16	15	69	42" RCP	400'	(0.0009) 0.0019	26	2.7	660' - 48" RCP	154,450	Replace 42" RCP
J6.69 to J6.68	0.96	0.8	12.93	18	70	42" RCP	160'	(0.0009) 0.0035	26	2.7			Replace 42" RCP
J6.68 to J6.67	1.74	0.9	14.50	19	78	48" RCP	100'	(0.0042) 0.0001	81	6.4			Replace 48" RCP
J6.65 to J6.63	2.92	0.8	36.24	20	192	5'x8' Box	120'	0.0045	264	6.6			To be removed for installation of force main from pump station
												640,900 128,200 769,100	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

VA Hospital

The VA Hospital drainage basin drains 55.7 acres around the VA Hospital. Existing drainage facilities include two systems which discharge into the Ashley River via a 5'x8' box culvert under Lockwood Drive. In addition, there is an existing pump station located on Doughth Street which conveys runoff from the area north of the VA Hospital to the Ashley River.

A pump station located along the east side of Lockwood Drive is recommended for this area. The proposed pump station will eliminate the tidal influence which presently limits the capacity of the system. In addition, upstream improvements will include a system which will serve the area near the intersection of Spring Street and Lockwood Drive that is frequently inundated during periods of high tide and moderate to heavy rainfall. During final design of this system the existing pump station on Doughth Street should be re-evaluated to determine if it could be abandoned as a result of the new pump station.

TABLE 21

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (FPS)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
PORT AREA #1 (K-5d)													
K5.8 to K5.7	11.63	0.9	10.47	10	69	40"x65" CMP	215'	(0.0005) 0.0003	25	1.6	215' - Dual 36" RCP	78,800	Parallel system
K5.7 to K5.6	4.45	0.9	14.48	11	93	40"x65" CMP	130'	(0.0005) 0.01	25	1.6	330' - Dual 42" RCP	150,750	Parallel system
K5.6 to K5.5	1.24	0.9	15.60	12	95	40"x65" CMP	200'	(0.0005)	25	1.6			
												229,550 45,950 275,500	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
PORT AREA #2 (K-5d)													
K5.15 to K5.14	1.51	0.9	1.36	5	12	18"x29" CMP	110'	-0.0006	0	0	280' - Dual 24" RCP	60,100	Replace 18"x29" CMP. Outlet via Port Area #3
K5.14 to Outfall	0.7	0.9	1.99	6	15	18"x29" CMP	90'		0	0			
												60,100 12,050 72,150	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
PORT AREA #3 (K-5d)													
K5.10 to K5.9	5.81	0.9	5.23	5	44	18"x29" CMP	90'	0	0	0	440' - Dual 30" RCP	109,700	Replace 18"x29" CMP
K5.9 to Outfall	0.6	0.9	5.77	6	44	18"x29" CMP	50'	0	0	0			
												109,700 21,950 131,650	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

Port Area 1

The Port Area 1 watershed is a 17.3 acre area in the port area that is drained by an existing 40"x65" CMP system. A parallel system consisting of dual 36" RCP's enlarging to dual 42" RCP's is recommended to provide the required capacity. It should be noted that these improvements are on private property (South Carolina State Ports Authority) and provide drainage for this property only.

Port Area 2

The Port Area 2 is located within the Port Area and drains 5.9 acres via an existing 18"x29" CMP. A system of dual 30" RCP's is proposed to replace the existing 18"x29" CMP. It should be noted that these improvements are on private property (South Carolina State Ports Authority) and provide drainage for this property only.

Port Area 3

The Port Area 3 watershed is a 2.2 acre area within the port area that is drained by an existing 18"x29" CMP. Recommended improvements include replacing the existing system with dual 24" RCP's which will connect with the proposed system for the Port Area 2. It should be noted that these improvements are on private property (South Carolina State Ports Authority) and provide drainage for this property only.

TABLE 22

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./ FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORM WATER CONDUIT	COST (DOLLARS)	
REID STREET (J-5a, J-5b, K-5c, K-5d)													
K5c.35 to K5c.32	4.6	0.7	0.82	7	6	24" VCP	320'	(0.0114) 0.0064	21	6.7		Adequate	
K5c.32 to K5c.18	2.24	0.7	2.39	9	16	24" VCP	500'	(0.0095) 0.0097	19	6.1		Adequate	
K5c.18B to K5c.18A	1.55	0.7	1.09	3	9	3.5'x3.5' B.A.	450'	(0.0036)	50	4.5		Adequate	
K5c.18A to K5c.18	9.95	0.7	8.06	6	62	3.5'x3.5' B.A.	320'	(0.0036)	50	4.5	320' - 24" RCP	34,100	Parallel system
K5c.28 to K5c.27	14.93	0.7	10.45	10	68	24" VCP	60'	(0.0063) 0.001	16	4.9	490' - Dual 36" RCP	183,850	Replace 24" VCP
K5c.27 to K5c.24	0.43	0.7	10.75	11	69	24" VCP	260'	(0.0063) 0.0019	16	4.9			Replace 24" VCP
K5c.24 to K5.23	1.2	0.7	11.59	13	70	24" VCP	170'	(0.0097) 0.001	19	6.1			Replace 24" VCP
K5.23 to K5c.21	2.2	0.7	13.13	14	76	24" VCP	315'	(0.0019) 0.0019	9	2.7	315' - Dual 42" RCP	127,000	Replace 24" VCP
K5c.21 to K5c.20	3.5	0.7	15.58	16	87	24" VCP	285'	(0.0003)	3	1.1	285' - Dual 48" RCP	132,450	Replace 24" VCP
K5c.20 to K5c.18	9.44	0.7	22.19	18	120	24" VCP	240'	(0.0003)	3	1.1	240' - 4'x6.5' Box	96,000	Replace 24" VCP
K5c.18 to K5.17	5.1	0.7	36.21	20	192	5'x4' B.A.	485'	(0.0003) -0.0008	28	1.5	485' - 4'x6.5' Box	193,000	Replace existing arch
K5.17 to K5.16	10.9 6.85	0.7 0.9	50.01	23	255	5'x4' B.A.	335'	(0.0003)	28	1.5	400' - 6'x6' Box	167,050	Replace existing arch Flow to pump station #3
K5.16 to K5.1	9.1	0.9	58.20	25	291	4.7'x4.25' B.A.	460'	(0.0003)	28	1.5		Adequate	Relief by pump station #3
K5.2 to K5.1	4.6	0.9	4.14	5	35	24" CMP	210'	(0.001) 0.0001	4	1.3	210' - 36" RCP	41,600	Replace 24" CMP
K5.1 to K5.3	5.0	0.9	66.84	28	324	4.5'x4.8' B.A.	250'	(0.001) 0.0016	55	2.9		Adequate	Peak discharge reduced by pump station
K5.3 to Outfall	2.65	0.9	69.22	30	332	4.2'x5' B.A.	690'	(0.0002)	23	1.3		Adequate	
												975,050 195,050 1,170,100	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

Reid Street

The Reid Street watershed is located immediately north of the Calhoun Street East watershed and is drained by a 5 foot wide box that runs eastward along Reid Street from America Street , through the port area, and into the Cooper River.

Recommended improvements include replacing the existing system on America Street which connects with the Reid Street system. The new system consists of dual 36" RCP's, dual 42" RCP's, and dual 48" RCP's. The existing 4' wide box system on Reid Street also requires replacement with a 6'x6' box section which will convey runoff to a proposed pump station located at the intersection of Reid Street and East Bay Streets. The remainder of the drainage system will be adequate as a result of the proposed pump station.

TABLE 23

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (CFS.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (FPS.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORM WATER CONDUIT	COST (DOLLARS)	
SPRING STREET (CONTINUED)													
J6.25 to J6.24	5.9	0.6	113.37	38	482	5'x3' Box	20'	(0.0003) 0.006	19	1.4		Adequate	Relief by pump station #9
K6.5 to K6.2	4.1 9.5	0.6 0.9	11.01	14	64	24" VCP	490'	(0.0026)	10	3.2	770' - Dual 36" RCP	278,600	Replace 24" VCP
K6.2 to K6c.11	2.4	0.6	12.45	17	68	24" VCP	280'	(0.0026)	10	3.2			
K6c.10 to K6c.11	0.9	0.6	0.54	2	5	24" RCP	160'	(0.0012) 0.0009	7	2.2		Adequate	
K6c.11 to K6c.22	1.3	0.6	13.77	19	74	24" RCP	515'	(0.0012) 0.0044	7	2.2	515' - Dual 42" RCP	212,800	Replace 24" VCP
K6c.22 to K6c.23	1.9	0.6	14.91	22	77	4'x4' Box	200'	(0.0012) 0.0044	55	3.4		Adequate	
K6.1 to K6c.23	5.8	0.9	5.22	5	44	24" VCP	790'	(0.0013)	7	2.2	210' - 36" RCP, 580' - Dual 30" RCP	188,600	Replace 24" VCP
K6c.23 to J6.16	4.0	2.4 0.6	22.53	23	115	4'x4' Box	330'	(0.0012) -0.0064	55	3.4		Adequate	Relief system K6c.23 to J6.14A to J6.23A. Cost under Fishburn Watershed
J6.16 to J6.14	3.8	2.28 0.6	24.81	25	124	4'x4' Box	170'	(0.0012) 0.0099	55	3.4	730' - Dual 36" RCP	265,100	Relief system J6.14 to J6.14A
J6.14 to J6.24	2.3 21.0	0.9 0.6	39.48	26	193	4'x4' Box	615'	(0.0012) 0.0029	55	3.4		Adequate	Peak flow reduced by relief system
J6.24 to J6.23	1.9 1.9	0.9 0.6	155.70	39	654	5'x3' Box	205'	(0.0003) 0.0014	25	1.6			To be abandoned
J6.23 to J6.22	9.6	0.6	161.46	40	40 662	5'x3' Box	200'	(0.0003) 0.0014	25	1.6		Adequate	Relief by pump station
J6.22 to J6.21	6.7 10.0	0.6 0.9	174.48	41	123 707	5'x4' Box	225'	(0.0003) -0.0012	25	1.6	225' - 54" RCP	63,100	Parallel system
J6.21 to J6.20	9.7	0.9	183.21	42	733	5'x3' Box	240'	(0.0003) 0.0015	25	1.6	240' - 4'x5' Box	86,900	Parallel system
J6.20 to J6.18	8.0 5.3	0.6 0.9	192.78	43	761	5'x3' Box	240'	(0.0003) -0.0063	25	1.6	240' - 4'x6' Box, 1075' - 6'x6' Box	93,150 426,250	J6.20 to J6.18 J6.18 to pump station #7
J6.18 to J7.14	20.0	0.9	210.78	44	822	5'x5' Box	610'	(0.0003) -0.0063	50	2.0		Adequate	Relief by pump station
											5,284,500	SUBTOTAL	
											1,056,900	UPSTREAM IMPROVEMENTS	
											6,341,400	TOTAL	

Spring Street

The Spring Street watershed is the largest basin in the Peninsular City area and drains approximately 295 acres. The area drained is located on either side of the Crosstown Expressway and is bounded on the south by Bee Street, on the east by King Street, on the north by Fishburne Street and on the south by Lockwood Drive Extension. Existing drainage facilities consist of a 4 foot wide box which runs westward along Spring Street, discharging into the Ashley River, and provides less than 6 percent of the required capacity.

Recommended improvements for this basin begins at the intersection of Spring and Meeting Streets and replaces the existing brick arch with dual 36" RCP to King Street. At King Street it is proposed to continue with a 4'x6' box that enlarges to a 6'x8' box running to Rutledge Avenue. Dual 6'x6' boxes are then needed to a proposed pump station located near the intersection of Cannon Street and President Street. The pump station will provide relief for the downstream system but improvements will still be required, and include a 4'x6' box parallel to the existing box on Spring Street from Westcott Street to Hagood Avenue, then northward along Hagood Avenue to a proposed pump station which will also serve the Fishburne watershed.

TABLE 24

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN)	DISCHARGE (CFS)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (CFS)	VELOCITY (FPS)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
FISHBURNE STREET (J-6a, J-7b, K-6a, K-6b, K-6c, K-6d)													
K6.4 to K6c.6	31.4	0.6	18.84	12	106	24" VCP	485'	(0.0001)	2	0.6	485' - Dual 36" RCP	176,200	Replace 24" VCP
K6c.1 to K6c.3	18.5	0.6	11.10	15	58	24" RCP	290'	(0.0021)	9	2.9	290' - Dual 30" RCP	71,200	Replace 24" RCP
K6c.3 to K6c.4	5.8	0.6	14.58	17	73	24" RCP	290'	(0.0021)	9	2.9	290' - Dual 36" RCP	104,200	Replace 24" RCP
K6c.4 to K6c.6	6.2	0.6	18.30	19	88	24" RCP	610'	(0.0021)	9	2.9	610' - Dual 42" RCP	246,250	Replace 24" RCP
K6c.6 to K6c.8	6.7	0.6	41.16	23	185	24" RCP	280'	(0.0001) 0.0050	2	0.6	780' - 5'x6' Box	296,900	Replace 24" RCP
K6c.8 to K6c.15	4.5	0.6	43.86	25	193	24" VCP	500'	(0.0001) -0.0011	2	0.6			Replace 24" VCP
K6c.17 to K6c.15	10.1 37.1	0.25 0.60	24.79	23	112	24" VCP	600'	(0.0052) 0.0034	14	4.5	600' - 48" RCP	132,750	Replace 24" VCP
K6c.15 to K6c.32	10.5 2.8	0.6 0.45	76.21	27	324	2.1'x4' Box	1190'	(0.0001)	6	0.8	1190' - Dual 5'x6' Box	912,250	Replace box
K6c.32 to J6.4	17.9 11.9	0.9 0.25	95.30	35	372	8' F.B. Channel	520'	(0.0001)	69	1.0	520' - Dual 5'x6' Box	407,050	Fill existing channel
J6.4 to J6.5					372	48" RCP	30'		55	4.4	80' - Dual 6'x7' Box	73,950	To pump station #7
J6.7 to J6.5	11.5 4.1	0.25 0.6	5.34	11	31	24" RCP	380'	(0.0001)	2	0.6	1200' - 4'x8' Box	524,650	Relief system K6C.23 to pump station #7
J6.5 to J6.12	4.9	0.6	103.58	39	373	8' F.B. Channel	280'	(0.0001)	69	1.0	Adequate		Relief by pump station
J6.12 to J6.13					373	36" CMP	70'	(0.0001)	22	3.1	Adequate		Relief by pump station
J6.13 to J6.2	16.0 2.4	0.7 0.9	116.94	41	409	28' F.B. Channel	1230'	(0.0001) 0.0024	269	1.3	900' - 50' F.B. Channel	148,350	Relief by pump station
J7.9 to J7.7	3.6	0.9	3.24	8	21	30" RCP	340'	(0.0052) 0.0064	26	5.2	Adequate		
J7.7 to J7.5	1.6 6.1	0.9 0.25	6.21	10	37	42" RCP	200'	(0.0052) 0.0007	63	6.5	Adequate		
J7.5 to J6.2	2.0 1.7	0.9 0.25	8.44	11	49	42" RCP	460'	(0.0052) 0.0060	63	6.5	Adequate		
J6.2 to J6.1	2.4	0.25	125.98	49	409	5'x8' Box	180'		225	5.6	180' - Dual 6'x8' Boxes	153,600	Parallel culverts
												3,247,350	SUBTOTAL
												649,500	UPSTREAM IMPROVEMENTS
												3,896,850	TOTAL

Fishburne Street

The Fishburne Street drainage basin is located north of the Crosstown Expressway and is bordered on the east by Coming Street and on the west by Lockwood Drive. The 219.7 acre watershed is drained by a 2'x4' box running westward along Fishburne Street before discharging into a large drainage channel which discharges into the Ashley River via a 5'x8' concrete box under Lockwood Drive.

The recommendation is to replace the existing system on Fishburne Street with dual 36" RCP's from Rutledge Avenue to Ashley Avenue, and a 5'x6' box section from Ashley Avenue to President Street. From this point to the proposed pump station dual 5'x6' boxes are required. The proposed pump station is recommended to be located on the west side of Hagood Avenue at the intersection of Hagood and Line Streets and will discharge into the existing channel which outlets to the Ashley River. This pump station will also handle a portion of the water from the Spring Street watershed.

TABLE 25

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./ FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
COOPER STREET (K-5a, K-5c, K-6b, K-6d)													
K6b.32 to K6b.30	2.7	0.9	2.43	10	15	24" RCP	100'	(0.0024) 0.0033	10	3.1		Adequate	Available head
K6b.30 to K6b.29					15	24" RCP	30'	(0.0024) 0.0077	10	3.1		Adequate	Available head
K6b.29 to K6b.34	2.6	0.9	4.77	11	28	30" RCP	470'	(0.0024) 0.0014	17	3.5	470' - 24" RCP	51,000	Parallel system
K6b.34 to K6.14	8.0 0.8	0.45 0.90	9.09	14	48	36" RCP	645'	(0.0024) 0.0027	28	4.0	645' - 30" RCP	78,750	Parallel system
K6.9 to K6.10	4.8	0.45	2.16	4	16	24" RCP	425'	(0.0023) 0.002	9	3.0	535' - 24" RCP	59,350	Parallel system
K6.10 to K6.13	1.1	0.9	3.15	7	21	24" RCP	110'	(0.0023) 0.0002	9	3.0	I	I	
K6.13 to K6.14	7.2	0.45	6.39	8	41	24" RCP	405'	(0.0023) 0.0044	9	3.0	405' - 36" RCP	74,600	Replace 24" RCP
K6.14 to K5c.1	5.6	0.7	19.40	18	95	36" RCP	325'	(0.0027) 0.0019	30	4.2	510' - 42" RCP	109,950	Parallel system
K5c.1 to K5c.2A	2.2	0.7	20.94	20	101	36" RCP	185'	(0.0027)	30	4.2	I	I	Parallel system
K6.18 to K6.20	2.2	0.9	1.98	3	15	24" RCP	70'	(0.0012) -0.0297	7	2.2	350' - 30" RCP	47,950	Replace 24" RCP
K6.20 to K6.22	1.1	0.9	2.97	4	22	24" RCP	280'	(0.0012) 0.0093	7	2.2	I	I	Replace 24" RCP
K6.22 to K5c.8	1.5 5.7	0.9 0.6	7.74	6	54	24" RCP	825'	(0.0012) 0.0020	7	2.2	825' - 42" RCP	167,400	Replace 24" RCP
K5c.8 to K5c.6	14.1	0.9	20.43	12	114	24" VCP	330'	(0.0012) 0.0017	7	2.2	730' - 4'x6' Box	272,900	Replace 24" VCP
K5c.6 to K5c.3	3.0	0.6	22.29	14	118	24" VCP	170'	(0.0012) 0.0025	7	2.2	I	I	Replace 24" VCP
K5c.3 to K5c.2A	3.0 0.8	0.6 0.9	24.81	15	129	24" VCP	230'	(0.0012)	7	2.2	I	I	Replace 24" VCP
K5c.2A to K5a.43	1.2	0.7	45.75	21	215	36" RCP	540'	(0.0027)	30	4.2	1270' - Dual 4'x6' Box	948,000	Replace 36" RCP
K5a.43 to K5a.41	1.1	0.9	46.74	25	215	42" RCP	730'	(0.0027)	45	4.7	I	I	Replace 42" RCP
(CONTINUED)													

TABLE 25

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (FPS.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORM WATER CONDUIT	COST (DOLLARS)	
COOPER STREET (CONTINUED)													
K5a.37 to K5a.33	2.6	0.7	1.82	4	13	30" VCP	410'	(0.0036) 0.0009	21	4.3		Adequate	
K5a.33 to K5a.32	2.1	0.45	2.77	7	18	30" VCP	315'	(0.0036) 0.0017	21	4.3		Adequate	
K5a.32 to K5a.29	1.8	0.45	3.58	9	22	30" VCP	550'	(0.0036) 0.0007	21	4.3		Adequate	
K5a.29 to K5a.41	1.0 0.7	0.25 0.9	4.46	13	25	30" VCP	25'	(0.0036) 0.0007	21	4.3		Adequate	With available head
K5c.4 to K5a.46	1.0	0.9	0.9	3	7	24" RCP	350'	(0.0076) 0.0051	17	5.4		Adequate	
K5a.46 to K5a.50	2.5	0.45	2.30	5	15	24" RCP	275'	(0.0018) -0.0017	8	2.6	275' - 30" RCP	35,650	Replace 24" RCP
K5a.52 to K5a.50	33.8	0.45	15.21	16	78	24" RCP	180'	(0.0029)	11	3.4	180' - Dual 36" RCP	67,000	Replace 24" RCP
K5a.50 to K5a.40	2.9	0.45	18.55	17	93	30" RCP	250'	(0.0018) 0.0064	15	3.1	250' - Dual 36" RCP	90,600	Replace 30" RCP
K5a.39 to K5a.40	3.2 4.5	0.9 0.45	4.91	5	37	24" VCP	185'	(0.0054)	14	4.6	185' - 36" RCP	34,100	Replace 24" VCP
K5a.40 to K5a.41	0.7	0.9	24.09	19	116	30" RCP	120'	(0.0008)	10	2.0	120' - Dual 42" RCP	52,100	Replace 24" RCP
K5a.41 to K5a.41A	1.1 0.8	0.9 0.6	75.29	31	301	42" RCP	510'	(0.0022)	58	4.6	815' - Dual 4'x6' Box	620,400	K5a.41 to K5A.22.1
K5a.41A to K5a.21	4.6 1.1	0.6 0.9	79.04	34	304	54" RCP	440'	(0.0008)	48	3.0	200' - Dual 4'x6' Box	144,000	K5a.22.1 to pump station #2
												2,853,750	SUBTOTAL
												570,750	UPSTREAM IMPROVEMENTS
												3,424,500	TOTAL

Cooper Street

The Cooper Street watershed drains the area surrounding the Highway 17 and I-26 interchange. Existing drainage facilities consists of a parallel system of 30" VCP, 42" VCP, and 54" RCP on either side of the Cooper River Bridges extending from King Street to East Bay.

Recommended improvements include the construction of a stormwater pump station near the intersection of Morrison Drive and Jackson Street. The pump station will allow new systems to be installed at a greater slope, thus decreasing the pipe size required, and will also provide protection during periods of high tide. In addition, the pump station will enable the existing drainage facilities to function better due to increase hydraulic capacity. Also included is the replacement of the existing drainage facilities along the south side of the Cooper River Bridges. The recommended system is composed of dual 4'x6' box sections which conveys the runoff to the proposed pump station.

TABLE 26

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (FPS.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
JACKSON STREET (K-5a, K-6b)													
K6b.18 to K6b.19	3.1 1.5	0.70 0.45	2.85	6	20	24" VCP	70'	(0.0025) -0.0043	10	3.1	70' - 24" RCP	8,900	Parallel system
K6b.19 to K6b.21	1.0 0.8	0.7 0.45	3.91	7	26	24" VCP	350'	(0.0025) 0.0032	10	3.1	755' - 30" RCP	93,300	Parallel system
K6b.21 to K5a.2	2.1	0.7	5.38	9	33	24" VCP	405'	(0.0025) 0.0024	10	3.1			
K5a.2 to K5a.3	3.2	0.45	6.82	12	38	24" VCP	315'	(0.0025) 0.002	10	3.1	315' - 36" RCP	56,350	Parallel system
K5a.4 to K5a.3	4.4	0.6	2.64	5	20	24" VCP	350'	(0.0025)	10	3.1	350' - 24" RCP	37,100	Parallel system
K5a.3 to K5a.7	1.4 2.0	0.6 0.30	10.90	14	58	24" VCP	540'	(0.0022) 0.0019	9	2.9	540' - 42" RCP	109,700	Parallel system
K5a.8 to K5a.7	10.8	0.6	6.48	6	45	24" VCP	350'	(0.0023) 0.0043	9	3.0	350' - 36" RCP	62,250	Replace 24" VCP
K5a.7 to K5a.11A	3.6 1.6	0.6 0.3	20.02	18	98	3.5'x3.5' Box	520'	(0.0022)	52	4.3	520' - 42" RCP	105,850	Parallel system
K5a.17 to K5a.16	1.6	0.6	0.96	4	7	24" RCP	280'	(0.0022) 0.0004	9	2.9			Adequate
K5a.16 to K5a.11A	1.5	0.6	1.86	6	13	24" RCP	535'	(0.0022)	9	2.9			Adequate With available head
K5a.11A to K5a.11	6.4	0.6	25.72	21	121	3.5'x3.5' Box	70'	(0.0022)	52	4.3	70' - 4'x6' Box	28,600	Replace 3.5'x3.5' box
K5a.14 to K5a.11	4.4	0.7	3.08	11	18	24" RCP	340'	(0.0017) 0.0013	8	2.6	340' - 30" RCP	43,200	Replace 24" RCP
K5a.11 to K5a.9	3.0 0.5	0.6 0.7	30.95	22	142	3.5'x3.5' Box	140'	(0.0017) -0.0134	46	3.7	90' - 4'x6' Box	35,800	To pump station #2
												581,050 116,250 697,300	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
EAST BAY NORTH (K-5a, K-5b, K-5c, K-5d)													
K5a.27 to K5a.26	6.0	0.9	5.40	5	40	24" RCP	270'	(0.0023) 0.0063	9	3.0	310' - 42" RCP	57,850	Relief system
K5a.26 to K5a.25	1.6	0.9	6.84	7	45	24" RCP	180'	(0.0023) 0.0041	9	3.0	180' - Dual 36" RCP	67,000	Replace 24" RCP
K5a.25 to K5a.23	0.80	0.90	7.56	8	48	30" RCP	150'	(0.0023) 0.0041	17	3.5	150' - Dual 36" RCP	56,800	Replace 30" RCP
K5a.23 to K5a.20	4.0	0.9	11.16	9	69	30" RCP	440'	(0.0023) 0.0006	17	3.5	440' - Dual 36" RCP	86,550	Parallel system
												268,200 53,650 321,850	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

Jackson Street

The Jackson Street watershed is located immediately north of the of the Cooper River bridges and drains 52.9 acres which includes Archer School, East Bay School, and the surrounding apartment complexes. This basin is drained by a 24" VCP which extends westward along Jackson Street from the outfall under Morrison Drive to Meeting Street.

A pipe system parallel to the existing system is recommended from Meeting Street to Morrison Drive to provide the required capacity with a 4'x6' box section under Morrison Drive. The new box culvert will discharge into a proposed pump station which is recommended to provide needed slope for the replacement systems and to provide stormwater runoff during periods of high tide. The proposed location for the pump station is on the east side of Morrison Drive at the intersection of Morrison Drive and Jackson Street, and will provide relief for the Cooper Street system.

East Bay North

The East Bay North watershed drains a total of 12.4 acres located along either side of East Bay Street and bounded on the south by Columbus Street and on the north by Jackson Street. Existing drainage facilities consist of a system of 24" RCP and 30" RCP extending northward along East Bay Street from Blake Street to the discharge point near the Cooper River Bridge.

Recommended improvements include replacing the existing system with dual 36" RCP's from Cooper Street to the outfall in the Cooper River.

TABLE 27

HYDRAULIC ANALYSIS FOR PENINSULAR AREA														
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS	
											STORMWATER CONDUIT	COST (DOLLARS)		
HUGER STREET (K-5a, K-6a, K-6b, K-6c, K-6d)														
K6b.1 to K6b.3	3.5	0.25	11.78	13	65	24" VCP	480'	(0.0054) 0.0027	14	4.6	480' - 48" RCP	107,400	Replace 24" VCP	
	5.6	0.70												
	15.5	0.45												
K6b.6 to K6b.5	3.6	0.45	4.35	8	28	24" VCP	215'	(0.0059)	15	4.8	215' - 30" RCP	26,900	Replace 24" VCP	
	3.9	0.70												
K6b.5 to K6b.3	3.0	0.70	8.52	9	53	24" VCP	470'	(0.0068)	16	5.1	470' - 42" RCP	96,250	Replace 24" VCP	
	4.6	0.45												
K6b.3 to K6b.8	4.8	0.7	32.26	16	165	30" VCP	690'	(0.0011) 0.0011	12	2.4	780' - Dual 4'x6' Box	640,600	Replace 30" RCP Outlet to New Market Creek K6b.8 to K6b.8A	
	19.1	0.45												
K6b.8 to K6b.9	4.3	0.7	41.12	21	193	30" VCP	470'	(0.0011) 0.0011	12	2.4	15' F.B. Channel	8,650	Replace 30" VCP. Peak flow reduced by relief system	
	13.0	0.45												
K6b.9 to K6b.14	1.6	0.45	47.93	24	213	30" VCP	290'	(0.0011) 0.0005	12	2.4	290' - 42" RCP	61,700		
	8.7	0.70												
K6b.17 to K6b.15	4.7	0.70	3.29	4	24	24" VCP	350'	(0.0037)	12	3.8	350' - 30" RCP	44,350	Replace 24" VCP	
K6b.15 to K6b.14	7.6	0.7	8.61	6	60	24" VCP	340'	(0.0062)	15	4.9	340' - 42" RCP	68,300	Replace 24" VCP	
K6b.14 to K6b.23	8.0	0.7	62.14	26	267	30" VCP	525'	(0.0011)	12	2.4	525' - Dual 48" RCP	249,400	Replace 30" VCP	
												1,303,550	SUBTOTAL	
													260,750	UPSTREAM IMPROVEMENTS
													1,564,300	TOTAL

Huger Street

The Huger Street watershed drains 111.5 acres between Meeting Street on the east and Ashley Avenue on the west. The watershed is drained by a 30" VCP which extends eastward along Huger Street to Meeting Street then north along Meeting Street to Newmarket Creek.

It is recommended that the existing system along Huger Street from King Street to Meeting Street be replaced with a dual 4'x6' box section which will outlet into Newmarket Creek along the east right-of-way at I-26. The remainder of the Huger Street system will also require improvement with 42" RCP's and 48" RCP's being required along Huger Street and Meeting Street to the outlet at Newmarket Creek.

TABLE 28

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./ FT.)	CAPACITY (C.F.S.)	VELOCITY (FPS.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
RUNEY STREET (K-6b,L-6)													
K6b.28 to K6b.27	8.8	0.7	6.16	6	43	24" RCP	300	(0.0048) -0.0003	14	4.3	300' - 36" RCP	38,050	Parallel system
												38,050	SUBTOTAL
												7,650	UPSTREAM IMPROVEMENTS
												45,700	TOTAL
MEETING STREET NORTH (K-6b,L-6)													
L6.17A to L6.16	0.3 5.0	0.35 0.9	4.61	9	29	24" RCP	950'	(0.0028)	10	3.3	950' - 36" RCP	181,750	Parallel system
L6.16 to L6.15	10.4	0.9	13.97	15	73	24" RCP	510'	(0.0028)	10	3.3	510' - 54" RCP	155,400	Parallel system
L6.15 to L6.14	6.0 7.1	0.7 0.45	21.37	18	105	24" RCP	350'	(0.0028)	10	3.3	350' - 54" & 36" RCP	165,500	Replace 24" RCP
L6.14 to L6.11	4.3 10.1	0.7 0.45	28.93	20	137	24" RCP	360'	(0.0028)	10	3.3	360' - Dual 54" RCP	204,450	Replace 24" RCP
L6.4 to L6.6	0.8 31.5	0.9 0.45	14.90	14	79	24" RCP	300'	(0.0013)	7	2.2	300' - 60" RCP	98,650	Replace 24" RCP
L6.6 to L6.9	6.1	0.45	17.65	16	90	24" RCP	300'	(0.0013)	7	2.2	300' - 60" RCP	98,650	Parallel system
L6.9 to L6.10	3.6 4.7	0.7 0.45	22.29	18	109	24" RCP	600'	(0.0013)	7	2.2	1130' - 72" RCP	431,650	Replace 24" RCP
L6.10 to L6.11	1.3 3.0	0.7 0.45	24.55	22	113	24" RCP	530'	(0.0013)	7	2.2	┌───┐ └───┘	┌───┐ └───┘	
L6.11 to L6.12	6.5 9.7	0.45 0.7	63.20	26	272	24" RCP	300'	(0.0029)	11	3.4	1410' - Dual 5'x6' Box	1,136,650	Abandon existing 24" RCP & 30" RCP
L6.12 to L6.13	1.2 2.7	0.6 0.45	65.14	28	274	24" RCP	420'	(0.0029)	11	3.4	┌───┐ └───┘	┌───┐ └───┘	
L6.13 to K6b.25	2.5 16.2	0.45 0.7	77.61	31	310	30" RCP	690'	(0.0029)	19	3.9	┌───┐ └───┘	┌───┐ └───┘	
												2,472,700	SUBTOTAL
												494,550	UPSTREAM IMPROVEMENTS
												2,967,250	TOTAL

Runey Street

The Runey Street watershed drains 8.8 acres of industrial and commercial development located between I-26 and Meeting Street. Approximately 50 percent of the area is presently undeveloped. The existing 24" RCP outfall into Newmarket Creek is inadequate and a parallel 36" RCP is recommended.

Meeting Street North

The Meeting Street North watershed drains the area on each side of Meeting Street between the intersection of Morrison Drive and Meeting Street, and Newmarket Creek. Existing facilities consist of a pipe conduit on Meeting Street which discharges into Newmarket Creek. The existing drainage facilities are inadequate providing less than 35 percent of the required capacity. A new pipe conduit system along Meeting Street consisting of 72" RCP, 60" RCP, 54" RCP and 48" RCP is recommended to provide the needed capacity.

TABLE 29

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./ FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
DUNNEMAN STREET (K-7)													
K7.11 to K7.40	1.8	2.0	1.68	15	9	24" RCP	375'	(0.0017) 0.0017	8	2.6		Adequate	Available head
	2.0	0.3											
K7.40 to K7.38	2.0	0.3	3.48	18	17	24" RCP	165'	(0.0017) 0.0017	8	2.6	165' - 36" RCP	26,050	Replace 24" RCP
	2.0	0.6											
K7.38 to K7.35	2.7	0.4	4.56	19	22	24" RCP	210'	(0.0017) 0.0017	8	2.6	210' - 36" RCP	31,000	Replace 24" RCP
K7.35 to K7.34	2.0	0.9	6.36	20	30	24" RCP	510'	(0.0017) 0.0017	8	2.6	450' - 36" RCP	64,300	Parallel system. Excavation in marsh required
												121,350	SUBTOTAL
												24,300	UPSTREAM IMPROVEMENTS
												145,650	TOTAL
CITADEL SOUTH (K-6a, K-6c, K-7, K-7d)													
K7d.11 to K7d.6	9.5	0.25	5.80	10	35	24" RCP	400'	(0.0036) -0.0058	12	3.7	400' - 36" RCP	62,550	Parallel system
	5.7	0.6											
K7d.6 to K7d.4	17.7	0.6	16.42	13	90	30" RCP	255'	(0.0036) 0.0001	21	4.3	255' - 48" RCP	47,200	Parallel system
K7d.4 to K6c.36	8.1	0.6	21.28	15	111	36" RCP	540'	(0.0036) 0.0039	35	4.9	540' - 48" RCP	99,000	Parallel system
K6c.36 to K7d.1	7.4	0.6	25.72	19	123	36" RCP	270'	(0.0036) 0.0028	35	4.9	270' - 54" RCP	63,450	Parallel system
												272,200	SUBTOTAL
												54,450	UPSTREAM IMPROVEMENTS
												326,650	TOTAL
CITADEL NORTH (K-6a, K-7d)													
K7.23 to K7.24	3.0	0.45	9.73	27	41	24" RCP	100'	(0.0051) 0.0050	14	4.5	100' - 36" RCP	17,900	Replace 24" RCP
	33.5	0.25											
K7.24 to K7.26	3.2	0.25	11.55	28	49	24" RCP	450'	(0.0051) 0.0019	14	4.5	1280' - 42" RCP	196,200	Replace 24" RCP
	1.7	0.6											
K7.26 to K7.29	2.5	0.6	13.05	31	52	24" RCP	380'	(0.0051) 0.0073	14	4.5			
K7.29 to K7.31	2.9	0.6	14.79	34	57	24" RCP	450'	(0.0051) 0.0044	14	4.5			
												214,100	SUBTOTAL
												42,850	UPSTREAM IMPROVEMENTS
												256,950	TOTAL
CONGRESS STREET (K-6c)													
K6c.33 to K6c.34	1.8	0.6	1.08	5	9	24" RCP	500'	(0.0027) 0.0023	10	3.2		Adequate	
	2.9	0.9											
K6c.34 to K6c.34A	7.2	0.6	8.82	12	54	24" RCP	530'	(0.0067) -	16	5.1	530' - 42" RCP	110,800	Replace existing 24" RCP
	2.7	0.3											
												110,800	SUBTOTAL
												22,200	UPSTREAM IMPROVEMENTS
												133,000	TOTAL

Dunneman Street

The Dunneman Street watershed drains 12.5 acres of residential development located along Dunneman Street from Rutledge Avenue to the Ashley River. An existing system of 24" RCP from the Ashley River to Eighth Avenue provides less than 50 percent of the required capacity. A replacement system of 36" RCP is recommended.

Citadel South

The Citadel South watershed drains 48 acres of The Citadel via a system of 24" RCP, 30" RCP, and 36" RCP which outlets into the Ashley River marsh. The existing system provides less than 30 percent of the required capacity. Recommended improvements consist of a parallel system of 36" RCP, 48" RCP, and 54" RCP.

Citadel North

The Citadel North watershed drains a total of 46.8 acres of residential development along the northern edge of The Citadel which also includes a portion of Hampton Park. The existing drainage facilities consist of a 24" RCP system which discharges into the Ashley River and is inadequate. Replacement of the system with a 42" RCP is recommended.

Congress Street

The Congress Street watershed drains 14.6 acres located immediately southeast of The Citadel between Huger Street on the north and Congress Street on the south. Existing drainage facilities consist of a 24" VCP that runs west on Congress Street and outfalls into the Ashley River marsh.

Replacement of the 24" VCP with a 42" RCP is recommended.

TABLE 30

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (FPS.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
GROVE STREET (K-6a, K-6b, K-7, L-6)													
L6.3 to K6a.7	29.8	0.45	13.41	12	75	24" RCP	700'	(0.0006) 0.001	5	1.5			Relief provided by Simons Street system L6.3 to L6.3A
K6a.7 to K6a.5	1.0 0.9 9.8 26.0	0.9 0.45 0.9 0.45	14.72	17	75	24" RCP	300'	(0.0006) 0.001	5	1.5		Adequate	Peak discharge reduced by relief system
K6a.5 to K6a.3	7.8	0.25	37.19	19	179	24" RCP	135'	(0.0006) 0.001	5	1.5	135' Dual 4'x7' Box	112,050	Remove 24" RCP
K6a.3 to K6a.2	13.0 19.6	0.45 0.25	47.94	20	228	24" RCP	715'	(0.0006) 0.001	5	1.5	715' - Dual 4'x8' Box	629,350	Remove 24" RCP
K6a.2 to K6a.1	3.9	0.45	49.70	25	228	30" RCP	480'	(0.0006) 0.001	17	1.8	480' - Dual 4'x8' Box	422,400	Remove 30" RCP
K6a.1 to K7.17	2.4	0.45	50.78	28	228	3.5'x3' Brick Arch	490'	(0.0006) 0.0008	17	1.8	490' - Dual 4'x8' Box	430,950	Remove 3.5'x3' Brick Arch
K7.17 to K7.15	7.0	0.45	53.93	31	228	3.5'x3' Brick Arch	400'	(0.0006) 0.0008	17	1.8	1120' - Dual 4'x8' Box	995,950	Relief system K7.17 to K7.15A. Remove 3.5'x3' Brick Arch
K7.15 to K7.10	9.4	0.45	58.16	34	228	3.5'x3' Brick Arch	540'	(0.0006) 0.0008	17	1.8		Adequate	Relief system
K7.10 to K7.7	2.5	0.45	59.29	38	228	3.5'x3' Brick Arch	470'	(0.0006) 0.0011	17	1.8	470' - 24" RCP	36,400	Parallel system
K7.7 to K7.4	30.4	0.45	72.97	41	255	3.5'x3' Brick Arch	500'	(0.0006) 0.0011	17	1.8	500' - 4'x8' Box	193,450	Parallel system
K7.4 to K7.2	2.0	0.45	73.87	44	255	3.5'x3' Brick Arch	450'	(0.0006) 0.0011	17	1.8	450' - 4'x8' Box	168,750	Parallel system
K7.2 to K7.1	3.4	0.45	75.40	47	255	3.5'x3' Brick Arch	400'	(0.0006) 0.0011	17	1.8	400' - 4'x6' Box	147,850	Parallel system
											3,137,150 627,450 3,764,600	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL	
SIMMONS STREET (K-6a, K-7, L-6, L-7)													
L6.2 to L6.1	0.6	0.45	0.27	4	2	18" RCP	60'	0.004	7	4.0	980' - 54" RCP	276,750	L6.3 to L6.3A Relief system for Grove Street
L6.1 to K7.20	109.9	0.45	49.73	38	179	Marsh	960'						
K7.20 to K7.19					179	Dual 30" RCP	110'	0.0002	56	5.7	110' - Dual 54" RCP	55,800	Parallel system
											332,550 66,550 399,100	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL	
10TH AVENUE (L-6, L-7)													
L7.5 to L7.3	2.6 30.0	0.25 0.45	14.15	13	78		350'				415' - 18" RCP 690' - 24" RCP 495' - 36" RCP 260' - 42" RCP 320' - 48" RCP	258,800	Relief system L7.5A to L7.5B
L7.3 to L7.2	0.8	0.45	14.51	15	78	24" RCP	320'	(0.0069)	16	5.2	500' - 18" RCP 345' - 30" RCP	66,100	Replace existing system L7.3A to L7.2
											324,900 65,000 389,900	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL	

Grove Street

The Grove Street watershed drains 168.9 acres of residential development located along either side of Grove Street and west of I-26. Existing drainage facilities consist of a brick arch which extends from the outfall into the Ashley River marsh eastward along Grove Street to Eleventh Avenue and a pipe conduit system from this point to Rutledge Avenue. The existing drainage facilities are inadequate.

Recommended improvements include a relief system from Rutledge Avenue to the marsh at the end of Simons Street which will reduce the discharge to the downstream area. In addition to the Simons Street relief system, replacement of the existing system along Grove Street is required. The first segment consists of dual box sections along Grove Street from Rutledge Avenue to Ninth Avenue, then along Ninth Avenue to the Ashley River marsh. The second segment consists of a parallel box section along Grove Street from Eighth Avenue to the Ashley River.

Simons Street

The Simons Street watershed drains 110.5 acres of residential development located between Rutledge Avenue and Tenth Avenue. The existing drainage system is inadequate and consist of a series of small pipe conduits (18" diameter and less) which discharge into the marsh near Simons Street. Recommended improvements for this area include a relief system down Simons Street from Rutledge Avenue which will provide relief for the Grove Street watershed, and a system of dual 54" RCP culverts parallel to the dual 30" RCP under Tenth Avenue.

Tenth Avenue

The Tenth Avenue watershed drains 33 acres of residential development and is bounded by North Ashley Avenue on the east, Marlow Street on the north, Alberta Drive on the south, and the Ashley River on the west. Existing drainage facilities consist of a 24" RCP which outlets into the Ashley River marsh west of Tenth Avenue and is inadequate. Recommended improvements include a relief system composed of 48" RCP, 42" RCP, 36" RCP, 24" RCP and 18" RCP along Hester Street from Maple Street to the Ashley River marsh. Also included is replacing the existing 24" RCP along Tenth Avenue with a 30" RCP.

TABLE 31

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
NORTH ROMNEY STREET (L-6)													
L6.36 to L6.39	2.8	0.25	0.70	7	5	24" RCP	140'	(0.0008) 0.0050	6	1.8		Adequate	
L6.39 to L6.50	71.9 15.8	0.25 0.6	28.16	33	110	Marsh	640'	(0.0008) 0.0018				Adequate	
L6.50 to L6.51					110	36" RCP	110'	(0.0008) 0.0018	28	4.0	110' - Dual 48" RCP	36,000	Parallel system
L6.51 to L6.42	11.0	0.35	32.01	34	123	Marsh	240'	(0.0008) 0.0021				Adequate	
L6.42 to L6.45					123	36" RCP	170'	(0.0008) -0.0014	28	4.0	170' - Dual 48" RCP	55,000	Parallel system
L6.56 to L6.58	9.0	0.35	3.15	9	20	24" RCP	110'	(0.0091) 0.0017	15	4.8	110' - 18" RCP	7,000	Parallel system
L6.58 to L6.45	1.3	0.35	3.61	17	20	18' F.B. Channel	1060'	(0.0005) 0.0017	715	3.4		Adequate	
L6.45 to L6.40			35.62	37	130	18' F.B. Channel	60'	(0.0005) -0.0463	715	3.4		Adequate	
L6.41 to L6.40	7.1	0.6	4.26	12	24	24" RCP	100'	(0.0102) 0.0114	20	6.3	100' - 18" RCP	7,050	Parallel system
L6.40 to L6.46	1.3	0.6	40.66	38	146	18' F.B. Channel	130'	(0.0041) 0.0078	2048	9.7		Adequate	
L6.46 to L6.48					146	30" RCP & 36" RCP	80'	0.020	47	4.0	80' - Dual 48" RCP	25,400	Parallel system
												130,450 26,100 156,550	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
MORRISON DRIVE NORTH (L-6)													
L6.59 to L6.60	6.2	0.9	5.58	6	39	24" RCP	125'	(0.0013) 0.0036	7	2.2	125' - 48" RCP	23,050	Replace 24" RCP
L6.60 to L6.53	14.6	0.7	15.80	14	84	3' F.B. Channel	1030'	(0.0013) 0.0036	104	2.9	350' - Dual 42" RCP	104,400	Channel adequate Replace 18" RCP
L6.53 to L6.52					84	24" RCP	80'	(0.0039) 0.0012	14	4.5	80' - Dual 36" RCP	160,150	Parallel pipes
L6.52 to L6.54	3.4	0.7	18.18	16	93	4' F.B. Channel	250'	(0.0039) 0.0012	207	2.2		Adequate	
L6.54 to L6.55					93	24" RCP	60'	(0.0039) 0.0012	14	4.5	60' - 54" RCP	72,850	Parallel pipe
												360,450 72,100 432,550	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
ALGONQUIN (L-6, M-6)													
M6.93 to M6.91	17.2	0.7	12.04	17	60	24" RCP	510'	(0.0048)	14	4.3	510' - 42" RCP	80,050	Replace 24" RCP
M6.91 to M6.90	24.2 36.2	0.7 0.25	38.03	20	181	30" CMP	130'	(0.0048)	16	3.3	130' - Dual 48" RCP	46,300	Replace 30" CMP
M6.90 to L6.34	6.8 24.70	0.7 0.25	48.97	25	215	Marsh	800'	(0.0048)				Adequate	Retention in marsh
L6.34 to L6.35					215	5'x4' B.A.	90'	(0.0048) 0.0002	113	6.2	90' - 4'x4' Box	28,000	Parallel pipe
												154,350 30,900 185,250	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

North Romney Street

The North Romney Street watershed is located between Morrison Drive on the west and the Cooper River on the east and drains 120.2 acres. The land use in the area varies greatly from cemetery (74.7 acres) to apartment complexes (8.4 acres). The existing drainage system consist of culverts at roadway crossings which outlet into the surrounding marsh. These existing culverts are inadequate and parallel systems are recommended at Brigade Street and North Romney Street.

Morrison Drive North

The Morrison Drive North watershed drains 24.2 acres of commercial development located on each side of Morrison Drive from Brigade Street on the north to Conroy Street on the south. The existing drainage facilities consist of a series of roadway culverts and open channels which are inadequate. Recommended improvements include a parallel 54" RCP under the Seaboard Systems Railroad, dual 36" RCP parallel to the existing 36" RCP under the Seaboard Systems Railroad spur track, dual 42" RCP under Romney Street, and various channel improvements.

Algonquin

The Algonquin watershed is located east of Meeting Street between Greenleaf Street on the north and Algonquin Road on the south. The existing system of pipe conduits, open channels, and roadway culverts drains 109.1 acres of industrial development and cemetery, and is inadequate. A replacement system of 42" RCP and 48" RCP is recommended. This includes excavation in the marsh which will require a South Carolina Coastal Council permit.

TABLE 32

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT. / FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
HERIOT STREET (L-6, M-6)													
L6.20 to L6.19	5.1	0.45	2.30	9	14	24" RCP	190'	(0.0014) 0.0024	7	2.3	190' - 30" RCP	23,950	Replace 24" RCP
L6.18 to L6.19	5.3 4.8	0.7 0.45	5.87	8	38	24" RCP	50'	(0.0124) -0.0058	22	6.9	50' - 36" RCP	11,500	Replace 24" RCP
L6.19 to L6.22	2.6 3.6	0.7 0.45	11.61	11	67	30" RCP	400'	(0.0048) 0.0007	25	5.0	400' - 42" RCP	85,800	Replace 30" RCP
L6.27 to L6.25	4.8	0.7	3.36	8	22	24" RCP	90'	(0.0026) 0.0051	10	3.2	250' - 30" RCP	32,700	Replace 24" RCP
L6.25 to L6.22	0.3	0.9	3.63	9	23	24" RCP	160'	(0.0131) 0.0070	22	7.1			
L6.22 to L6.24	1.6	0.9	16.68	14	88	36" RCP	180'	(0.0048) -0.0012	40	5.7	970' - 48" RCP	227,100	Relief system L6.28 to L6.28A
L6.24 to L6.28	0.8	0.9	17.40	15	90	36" RCP	350'	(0.0048) 0.0021	40	5.7			
L6.28 to L6.31	5.6	0.7	21.32	17	107	36" RCP	440'	(0.0048) 0.0057	40	5.7			
L6.31 to M6.58	1.33	0.9	22.52	20	107	36" RCP	170'	(0.0048)	40	5.7			Outfall to marsh dredging may be required
M6.61 to M6.60	6.3 9.5	0.7 0.45	8.69	19	42	36" RCP	70'	(0.0049) 0.0216	40	5.7			Adequate
M6.60 to M6.59	19.9	0.7	22.62	20	107	5' F.B. Channel	30'	(0.0049) 0.0040	263	6.0			Adequate
M6.59 to M6.58	8.9	0.8	52.26	24	233	4'x4.5' Box	250'	(0.015) 0.0005	128	7.1			Due to relief system
												381,050 76,250 457,300	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
PEACHTREE STREET (L-6, L-7)													
L7.1	87.1	0.45	39.20	19	188	15" VCP			2	1.4			3 - Relief systems
											790' - 48" RCP 480' - 42" RCP 560' - 36" RCP	385,850	Relief system on Peachtree Street L7.1E to L7.1
											40' - 24" RCP 240' - 18" RCP	385,850 77,200 463,050	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
											830' - 48" RCP 550' - 42" RCP 570' - 36" RCP	457,650	Relief system on Sans Souci Street L7.1C to L7.1D
											285' - 30" RCP 280' - 24" RCP 280' - 18" RCP	457,650 91,500 549,200	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
											230' - 42" RCP 930' - 36" RCP 270' - 30" RCP	359,900	Relief system on Mt. Pleasant Street L7.1A to L7.1B
											1360' - 24" RCP 80' - 18" RCP	359,900 72,000 431,900	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

Heriot Street

The Heriot Street watershed drains 80.4 acres of commercial and industrial development located between King Street Extension on the east and I-26 on the west. The existing drainage facilities consists of a pipe conduit system which runs along the west side of I-26 from Heriot Street northward to the discharge point under Mechanic Street. This existing system is inadequate and a replacement system of 30" RCP, 36" RCP, and 42" RCP is recommended.

Peachtree Street

The Peachtree Street watershed drains 87 acres of residential development located along either side of Peachtree Street. The existing 15" VCP outfall provides less than 2 percent of the required capacity. Recommended improvements include three relief systems, located on Mt. Pleasant Street, Sans Souci Street and Peachtree Street which outlet to the Ashley River. The three systems will require excavation in the marsh to provide a free outlet and will require South Carolina Coastal Council permits.

TABLE 32A

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (C.F.S.)	VELOCITY (FPS.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
GREENLEAF (M-5, M-6)													
M5.7 to M5.6	32.1	0.5	16.05	28	67	24" RCP	60	(0.0083) -0.006	12	3.8	700'-4' F.B. Channel and 48" RCP	28,400	Parallel system
												28,400	SUBTOTAL
												5,700	UPSTREAM IMPROVEMENTS
												34,100	TOTAL
MILFORD WEST (M-6)													
M6.30 to M6.31	5.6	0.7	3.92	9	24	24" RCP	40	(0.0125) 0.0065	12	3.8	24" RCP	3,200	Parallel pipe
M6.31 to M6.32	2.0	0.7	5.32	10	32	2' F.B. Channel	40	(0.0005) 0.0040	17	1.3	2' F.B. Channel	400	Increase sideslope
M6.32 to M6.33					32	24" RCP	100	0.0037	12	3.8	36" RCP	12,600	Replace 24" RCP
M6.33 to M6.34	2.4	0.7	7.00	11	41	2' F.B. Channel	100	(0.005) 0.017	18	1.4	4' F.B. Channel	900	
M6.34 to M6.35					41	36" RCP	60	(0.0083) 0.0012	22	3.1	36" RCP	8,000	Parallel Pipe
M6.35 to M6.36	4.2	0.7	9.94	12	56	3' F.B. Channel	220	(0.0005) 0.0005	65	1.8		Adequate	
M6.36 to M6.37					56	48" Steel Pipe	200	(0.0527) 0.0005	75	6.0	1100'-4' F.B. Channel and 200'-48" RCP	39,800	24" CMP ties into 48" 48" steel pipe without junction box. Replace 48" steel pipe and ditch to Ashley River.
												64,900	SUBTOTAL
												13,000	UPSTREAM IMPROVEMENTS
												77,900	TOTAL
BRASWELL (M-6, M-7)													
M6.39 to M6.38	2.5	0.7	1.75	5	13	24" RCP	60	(0.0083) 0.0053	12	3.8		Adequate	
M6.38 to M6.42	0.6	0.7	2.17	6	15	2' F.B. Channel	30	(0.0023) 0.0190	31	2.7		Adequate	
M6.42 to M6.43					15	30" RCP	100	(0.0070) 0.0037	24	4.9		Adequate	
M6.40 to M6.41	1.8	0.7	1.26	4	9	24" RCP	40	(0.0125) 0.0073	12	3.8		Adequate	
M6.41 to M7.50	6.1	0.7	7.70	15	40	2' F.B. Channel	1330	(0.0015) 0.0019	16	2.0	3' F.B. Channel	8,650	
M7.50 to M7.51					40	30" RCP	40	(0.0125) 0.0058	24	4.9	30" RCP	3,750	Parallel pipe
M6.44 to M6.45	0.6	0.7	0.42	4	3	24" RCP	60	(0.0017) 0.0017	12	3.8		Adequate	
M6.45 to M6.46	0.5	0.7	0.77	5	6	2' F.B. Channel	120	(0.0013) 0.0013	15	1.8		Adequate	
M6.46 to M6.17					6	24" RCP	40	(0.0055) 0.0055	12	3.8		Adequate	
M6.47 to M6.48	0.3	0.7	0.98	6	7	2' F.B. Channel	40	(0.0028) 0.0028	12	2.7		Adequate	
M6.48 to M6.49					7	24" RCP	40	(0.0033) 0.0033	12	3.8		Adequate	
M6.49 to M7.52	1.8	0.7	2.24	13	12	2' F.B. Channel	900	(0.0005) 0.0003	21	1.4		Adequate	
M7.52 to M7.53					12	24" RCP	60	(0.0083) 0.0060	12	3.8		Adequate	
M7.51 to M7.54	3.9	0.7	12.67	18	62	3' F.B. Channel	250	(0.0005) 0.0034	20	1.3	6' F.B. Channel	2,500	
M7.54 to M7.55					62	36" RCP	230	(0.0097) 0.0028	38	5.4	36" RCP	25,950	Parallel pipe
												40,900	SUBTOTAL
												8,200	UPSTREAM IMPROVEMENTS
												49,100	TOTAL

Greenleaf

The Greenleaf watershed is located in the neck area of the Peninsular City and drains 32 acres located along the south side of Greenleaf Street. The area is dominated by industrial development, the major portion of which is the Exxon Oil Company property.

Existing drainage facilities consist of a roadside ditch and driveway culverts running along the south side of Greenleaf Street and discharging to the Cooper River via 24" RCP under the railroad. Recommended improvements consist of placing a 48" RCP parallel to the 24" RCP and 700 feet of 4 foot flat bottom ditch from the crossing to Greenleaf Street.

Milford West

The Milford West watershed drains 14 acres of industrial development located along either side of Milford Street and lying west of Interstate 26. Existing drainage facilities consist of a ditch and driveway culvert system along the south side of Milford Street which discharges into the Ashley River. All of the existing system is inadequate and either replacing the roadway culverts or placing parallel culverts is recommended.

Braswell

The Braswell watershed drains 18 acres of industrial development along the access road to the Braswell Shipyard. Existing drainage facilities consist of a roadside ditch on either side of the road which conveys runoff westward from I-26 to the Ashley River. The majority of the existing drainage facilities are adequate with the exception of the 36" RCP which discharges to the Ashley River and the 30" RCP (M7.50 to M7.51) located along the south side of the access road. For these two locations parallel pipe culverts are recommended. A low area is located above the inlet to the 36" RCP outlet pipe and serves as a retention area. During final design, the effect of this area should be analyzed and the proposed pipe size adjusted if necessary.

TABLE 33

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN)	DISCHARGE (CFS)	EXISTING SYSTEM	LENGTH	SLOPE (FT./FT.)	CAPACITY (CFS)	VELOCITY (FPS)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
ELGIN STREET (M-6,N-6)													
M6.81 to M6.80	9.8	0.7	6.86	13	38	24"RCP	60'	(0.0083) -0.0032	12	3.8	60' - 36" RCP	9,600	Replace 24" RCP
M6.80 to M6.79	1.7	0.7	8.05	14	43	3' F.B. Channel	40'	(0.0005) 0.003	11	1.2	40' - 36" RCP	7,400	Fill existing channel
M6.79 to M6.77					43	24" RCP	200'	(0.0043) 0.0044	13	4.1	200' - 36" RCP	24,850	Replace 24" RCP
M6.77 to M6.83	0.8	0.7	8.61	16	44	24" RCP	265'	(0.0043) 0.0044	13	4.1	265' - 36" RCP	32,000	Replace 24" RCP
M6.83 to M6.84	4.3	0.7	11.62	18	57	3' F.B. Channel	30'	(0.0003) 0.0193	5	0.8	30' - 42" RCP	7,000	Fill existing channel
M6.84 to M6.85					57	24" RCP	50'	(0.0440) 0.0222	14	4.5	50' - 42" RCP	9,800	Replace 24" RCP
M6.85 to M6.71	0.6	0.7	12.04	19	58	6' F.B. Channel	25'	(0.0004) 0.0840	60	1.7		1,200	Clean existing channel
M6.71 to M6.72					58	24" RCP	110'	(0.0139) 0.0143	14	4.5	110' - 42" RCP	106,450	Parallel system
M6.64 to M6.65	3.4 7.9	0.7 0.45	5.94	9	37	24" RCP	345'	(0.0043)	13	4.1	345' - 36" RCP	42,600	Upstream improve- ments needed
M6.66 to M6.67	5.1	0.7	3.57	11	21	24" RCP	130'	(0.0066)	16	5.1	120' - 30" RCP	15,250	Replace 24" RCP
M6.65 to M6.68	1.5	0.7	10.56	12	59	24" RCP	175'	(0.0066)	16	5.1	190' - 42" RCP	25,650	Replace 24" RCP
M6.74 to M6.73	1.1	0.7	0.77	2	6	24" RCP	180'		22	7.0		Adequate	
M6.76 to M6.75	1.2	0.7	0.84	2	6	24" RCP	80'		22	7.0		Adequate	
M6.73 to M6.68	16.6	0.7	13.23	5	98	5' F.B. Channel	550'	(0.0032) 0.0037	192	4.8		Adequate	
M6.68 to M6.69	2.4	0.7	25.47	15	132	4' F.B. Channel	410'	(0.0032) 0.0099	188	4.7		Adequate	
M6.69 to M6.70					132	48" RCP	120'	0.00	78	8.0	120' - 42" RCP	58,000	Parallel pipe
M6.70 to M6.70A	66.5	0.7	72.02	22	331	Marsh	1300'					Adequate	
					331	Bridge						Adequate	
												339,800 68,000 407,800	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
ST. LAWRENCE (L-6)													
L6.32 to L6.33	30.7	0.25	7.68	25	34	6.3'x4.0' R.A.	100'	(0.0029) -0.0125	121	5.1		Adequate	

Elgin Street

The Elgin Street watershed drains 122.9 acres of predominantly industrial development and is bounded by Milford Avenue on the south, Meeting Street on the west, Pittsburgh Avenue on the north and the Cooper River on the east. The existing drainage facilities are divided into two branches. Each branch crosses the Seaboard Systems Railroad prior to discharge to the Cooper River. An existing system of open channels and roadway culverts make up the existing systems, which are inadequate.

Recommended improvements include replacing the existing system between Elgin Street and the Seaboard Systems Railroad with a line of 36" RCP and 42" RCP. The other branch is adequate with the exception of a section of the upstream system near Cherry Street which should be replaced with a 42" RCP and 30" RCP. The existing culvert under the Seaboard Systems Railroad is also inadequate and a parallel 42" RCP is recommended.

St. Lawrence

The St. Lawrence watershed is located between Huguenin Avenue and the Cooper River and drains 30.7 acres of the Magnolia and St. Lawrence cemeteries. The runoff from the area discharges into a lake prior to the outlet into the Cooper River via a 6'x4' brick arch which is adequate.

TABLE 34

HYDRAULIC ANALYSIS FOR PENINSULAR AREA													
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN.)	DISCHARGE (C.F.S.)	EXISTING SYSTEM	LENGTH	SLOPE (FT./ FT.)	CAPACITY (C.F.S.)	VELOCITY (F.P.S.)	RECOMMENDED IMPROVEMENTS		COMMENTS
											STORMWATER CONDUIT	COST (DOLLARS)	
DOSCHER AVENUE (M-6)													
M6.22 to M6.21	23.9	0.7	16.73	13	92	24" RCP	60'	(0.0038) 0.0052	12	3.8	60' - 54" RCP	22,700	Replace existing system
M6.21 to M6.20	4.7	0.7	20.02	14	106	24" RCP	70'	(0.0038) 0.0133	12	3.8	95' - 54" RCP	22,600	Replace 24" RCP
M6.20 to M6.19	1.4 4.2	0.7 0.25	22.05	15	115	3' F.B. Channel	25'	(0.0038) -0.0064	134	4.8			Fill existing channel
M6.19 to M6.16					115	36" RCP	100'	(0.0038) 0.0143	36	5.0	100' - 54" RCP	123,400	Replace 36" RCP
M6.16 to M6.13	2.0 2.1	0.9 0.25	24.38	16	124	3'x3' Brick Arch	70'	(0.0038) 0.0071	45	5.0	370' - 60" RCP	174,850	Replace arch
M6.13 to M6.11	1.0 1.8	0.9 0.25	25.73	17	129	36" RCP	210'	(0.0038) 0.0020	36	5.0			Replace 36" RCP
M6.11 to M6.10	2.8	0.25	26.43	18	130	5' F.B. Channel	30'	(0.0038) 0.0080	186	5.2			Fill existing channel
M6.10 to M6.9					130	36" RCP	60'	(0.0038) 0.0018	36	5.0			Replace 36" RCP
M6.9 to M6.8	4.0 1.3	0.7 0.25	29.56	19	142	7' F.B. Channel	110'	(0.0038) 0.0017	241	5.5		Adequate	
M6.8 to M6.7					142	36" RCP	60'	(0.0043) 0.0062	38	5.4	60' - 60" RCP	20,300	Replace 36" RCP
M6.29 to M6.28	1.6	0.7	1.12	5	8	24" RCP	110'	(0.0079) 0.0099	17	5.5		Adequate	
M6.28 to M6.27	3.9	0.7	3.85	6	27	24" RCP	110'	(0.0079) 0.0088	17	5.5	110' - 24" RCP	10,200	Parallel pipe
M6.27 to M6.25					27	36" RCP	30'	(0.0079) -0.0013	42	5.9		Adequate	
M6.26 to M6.25	2.0	0.7	1.40	3	10	24" RCP	50'	(0.0032) 0.0084	11	3.5		Adequate	
M6.25 to M6.24			5.25	7	35	36" RCP	230'	(0.0052) 0.0055	42	5.9		Adequate	
M6.24 to M6.23	1.9	0.7	6.58	9	41	36" RCP	140'	(0.0052) 0.0052	42	5.9		Adequate	
M6.23 to M6.7	1.2	0.7	7.42	10	45	36" RCP	130'	(0.0052) 0.0092	42	5.9		Adequate	With available head
M6.7 to M6.6	0.35	0.25	37.07	20	178	36" RCP	60'	(0.0043) 0.0068	38	5.4	60' - Dual 54" RCP	26,050	Replace 36" RCP
M6.6 to M6.5	1.0	0.7	37.77	21	178	7' F.B. Channel	130'	(0.0043) 0.0061	256	5.8		Adequate	
M6.5 to M6.2					178	36" RCP	100'	(0.0192) 0.0061	36	6.9	100' - Dual 48" RCP	38,900	Parallel pipe
M6.4 to M6.3	1.9	0.35	0.67	5	5	24" RCP	90'		20	6.4		Adequate	
												439,000 87,800 526,800	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
MILFORD STREET (M-5, M-6)													
M6.88 to M5.1	72.4	0.7	50.68	29	210	36" CMP	300'	(0.005) 0.002	17	2.4	360' - 4'x8' Box, 80' - Dual 48" RCP	320,400	Abandon 36" CMP Channel improve- ments needed down- stream
												320,400 64,100 384,500	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

Doscher Avenue

The Doscher Avenue watershed drains 63 acres of commercial and industrial development along either side of the intersection of Elgin Street and Meeting Street. The existing drainage facilities consist of a pipe conduit and open channel system which conveys runoff from the area to the discharge point under Doscher Avenue into the Ashley River marsh. The existing system provides less than 40 percent of the required capacity.

Recommended improvements include replacing the existing system with a series of 54" RCP and 60" RCP from Meeting Street to Doscher Avenue. Upstream improvements along Meeting Street are required to reduce the impact of an existing flooding problem which occurs on Meeting Street during periods of moderate to heavy rainfall.

Milford Street

The Milford Street watershed drains 72.4 acres of industrial development located south of Milford Street. The existing drainage system consist of a 36" CMP culvert under the Seaboard Systems Railroad and is inadequate. Replacing the existing system with a 4'x8' box section is recommended. This will require excavation in the marsh area down stream of the outfall and will require a South Carolina Coastal Council permit.

TABLE 35

HYDRAULIC ANALYSIS FOR PENINSULAR AREA														
LOCATION	DRAINAGE AREA (ACRES)	RUNOFF COEFFICIENT	TOTAL (CA)	TRAVEL TIME (MIN)	DISCHARGE (CFS)	EXISTING SYSTEM	LENGTH	SLOPE (FT / FT)	CAPACITY (CFS)	VELOCITY (FPS)	RECOMMENDED IMPROVEMENTS		COMMENTS	
											STORMWATER CONDUIT	COST (DOLLARS)		
AUSTIN AVENUE (M-6, M-7, N-6, N-7)														
N6.1 to N6.2	9.5 27.9	0.45 0.70	23.81	24	106	36" RCP	65'	(0.009) -0.0612	55	7.8	65' - 36" RCP	45,600	Parallel system	
N6.2 to N6.3					106	36" RCP	40'	(0.009) 0.1223	55	7.8	40' - 36" RCP	27,000	Parallel system	
N6.3 to N6.4	2.4	0.25	24.41	25	107	5' F.B. Channel	20'	(0.005) -0.0028	123	5.1	20' - Dual 36" RCP	27,000	Fill existing channel	
N6.4 to N6.5					107	4'x4' box	45'	(0.0222) 0.0064	105	6.6		Adequate	Available head	
M6.62 to M6.63	0.8 0.3	0.70 0.25	0.64	3	5	24" RCP	140'	(0.0074) 0.0003	15	4.8		Adequate		
M6.63 to N6.9	2.5 2.0	0.7 0.25	2.89	11	17	3' F.B. Channel	1060'	(0.0035) 0.0035	32	3.2		Adequate		
N6.9 to N6.8					17	24" RCP	100'	(0.010) -0.0018	15	4.8		Adequate	Available head	
N6.5 to N6.6	0.93 0.50	0.25 0.9	28.34	26	122	6' F.B. Channel	20'	(0.005) -0.032	143	5.3	75' - 36" RCP	62,050	Fill existing channel	
N6.6 to N6.7					122	36" RCP	55'	(0.0091) 0.010	45	6.4			Parallel system	
N6.7 to N6.10	1.4	0.25	28.69	27	122	7' F.B. Channel	140'	(0.0007) 0.0085	215	2.9		Adequate		
N6.10 to N6.11					122	48" RCP	80'	(0.0125) -0.0055	75	6.5	80' - 48" RCP	13,600	Parallel system	
N6.11 to N6.12	6.2 1.5	0.7 0.25	33.41	28	140	7' F.B. Channel	65'	(0.0015) 0.0005	314	4.2		Adequate		
N6.12 to N6.13					140	36" RCP	120'	(0.0083) 0.0058	53	7.4	120' - Dual 48" RCP	46,200	Parallel system	
N6.15 to N6.13	16.2 2.9	0.7 0.25	12.07	24	54	24" RCP	300'	(0.0133) 0.0258	23	7.2	300' - 30" RCP	27,850	Parallel pipe	
N6.14 to N6.13	1.7	0.25	0.43	4	3	24" RCP	135'	(0.0093) 0.0371	19	6.0	1290' - 13' F.B. Channel, 135' - dual 4'x7' box, & 270' 4'x8' box	272,200	Relief system N6.13 to N6.13A; N6.13A to N6.13B, & N6.13B to N7.9	
N6.13 to N6.17			45.91	29	191	36" RCP	220'	(0.0015) 0.0058	22	3.2		Adequate	Due to relief system	
N6.18 to N6.21	5.4 2.5	0.25 0.45	2.48	6	17	24" RCP	60'	(0.0083) -0.0068	14	4.5		Adequate		
N6.21 to N6.22	1.4	0.25	2.83	7	19	3' F.B. Channel	20'	(0.020) 0.0195	215	10.0		Adequate	Possible channel erosion	
N6.22 to N6.23					19	24" RCP	60'	(0.0083) 0.0017	14	4.5		Adequate		
N6.23 to N6.24			3.11	8	20	3' F.B. Channel	20'	(0.0350) 0.0295	219	12.4		Adequate	Possible channel erosion	
N6.24 to N6.25					20	24" RCP	90'	(0.0056) -0.0039	14	4.5		Adequate	Available head	
N6.25 to N6.26	4.1	0.25	4.14	10	25	9' F.B. Channel	380'	(0.0001) 0.0001	31	0.8		Adequate		
N6.26 to N7.9					25	24" RCP	210'	(0.0186) 0.0305	14	4.5		Adequate	Relief to new system from N6.14	
N6.17 to N7.1	12.4 24.1	0.45 0.25	61.66	31	247	11' F.B. Channel	435'	(0.0015) 0.0000	321	4.1		Adequate		
												521,500 104,300 625,800	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL	

Austin Avenue

The Austin Avenue watershed is located at the northern City boundary near the intersection of Meeting Street and Spruill Avenue. An existing system of pipe conduits, open channels and roadway culverts convey the runoff to the Ashley River. Approximately 60 percent of the existing drainage facilities are adequate, but the systems near the upper reaches of the system are inadequate and require improvement.

Recommended improvements consist of a relief system which will divert the runoff from the existing culvert under I-26, northward to the Austin Avenue bridge, at which point the system will cross under I-26 and run southwestward along the west right-of-way of I-26 to the Ashley River marsh. The relief system consist of a 13 foot flat bottom channel, a 4'x8' box section, and a dual 4'x7' box section. Also included is a new system of culverts under Highway 78 (King Street) and the Southern Railroad.