SECTION B

WEST OF THE ASHLEY AREA

INDEX

WEST ASHLEY AREA WATERSHEDS

WATERSHED	PAGE
Agriculture Station	100
Albemarle I	84
Albemarle II	84
Albemarle III	84
Albemarle Point	84
Ashley Hall Plantation East	117
Ashley Hall Plantation West	117
Ashley Hall Road	115
Ashley Towne Village	119
Blackburn	113
Brighton	113
Brisbane	113
Buckingham Drive	111
Byrnes Downs	88
Charing Cross North	112
Charlestown	103
Citadel Mall East	99
Citadel Mall West	99
Clemson	100
Coburg Dairy Road	86
Colleton Drive	86
Coventry Circle	109
Cresent East	85
Cresent South	84
Cresent West	85
Dowden	106
Dupont North	98
Fifth Avenue	96
Forest Acres	96
Forest Lakes	118
Gamecock Road	108
Harrison Acres North	92
Harrison Acres South	92
Hazelwood Avenue	98
Hickory Hill	120
Highway 17 North	87
Highway 17 South	87
Highway 61 North	123
Indigo Point I	92
Indigo Point II	92
K-Mart	94
Leicester	112
Live Oak	123
Longview	120
Magwood	118
Marvin	101

WATERSHED	PAGE
Merton	108
Millbrook	115
Mueller Drive	111
Mulmar North	107
Mulmar South	107
Northbridge Village	110
Norview	110
Nuffield Drive	108
Orange Grove Creek	110
Orange Grove Road	111
Orleans Road East	98
Orleans Road West	98
Parkshore Drive	109
Parkshore South	103
Parkwood Estates North	91
Parkwood Estates South	91
Parkwood Heights	91
Plantation	102
Poston	113
Riverfront Drive	107
Rotherwood	95
Royal Avenue	101
Royal Palm	103
St. Andrews Boulevard	87
St. Andrews Shopping Center	90
St. Augustine Drive	101
Shadowmoss	122
Shadowmoss North	123
Shadowmoss West	120
Sherwood Forest East	97
Sherwood Forest West	97
Skylark Drive	99
South Hampton Drive	109
South Windemere	85
Southgate	105
Stono Park	95
Town Creek Drive	101
Tudor Place	112
Wappoo Heights	85
Wappoo Shores	95
Wespanee Drive	101
Westwood	88
Winchester	108
Windemere East	86
Windemere West	86
Windsor	113
Windsor East	112
Woodward	87

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

The West Ashley Area is the largest area in the Study Area and is comprised largely of residential development. The commercial development is concentrated along the major traffic arteries of Highway 7, Highway 17, Highway 61, and Highway 171. This area also contains large tracts of undeveloped land west of Highway 61 and along Highway 17, which is expected to develop in the near future.

The existing stormwater drainage facilities consist mainly of open channels with culverts at roadway and driveway crossings. A limited number of pipe conduit systems are in place along the major traffic arteries. The major portion of the existing systems are inadequate and require improvement.

Several of the drainage systems provide drainage for areas which lie outside the City of Charleston boundaries. In the evaluation, the entire drainage area was considered and the recommended improvements are based upon improvement of the entire watershed drainage system. Improvements to drainage facilities that benefit the County, or other governmental entity as well as the City should be approached as a cooperative effort.

The drainage facilities within each watershed, recommended improvements and associated costs are described in the following paragraphs.

TABLE 36

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
ALBEMARLE POINT (I-7, J-7)													
J7.39 to J7.38	4.4	0.7	3.08	5	23	18" RCP	80'	(0.0033) 0.005	7	4.0	80' - 36" RCP	10,300	Replace 18" RCP
J7.38 to J7.46	2.6	0.45	4.25	8	27	2' F.B. Channel	130'	(0.001) 0.0322	30	2.0		Adequate	
J7.46 to J7.47	2.6	0.45	4.25	8	27	24" RCP	120'	(0.0205) 0.0023	14	4.5	120' - 36" RCP	14,600	Replace 24" RCP
												24,900	SUBTOTAL
												5,000	UPSTREAM IMPROVEMENTS
												29,900	TOTAL
ALBEMARLE I (I-7)													
I7.4A	0.9	0.9	0.81	3	6	15" RCP	230	(0.0157)	7	5.7		Adequate	
ALBEMARLE II (I-7)													
I7.3	3.4	0.6	2.04	5	15	15" RCP	180	(0.02)	8	6.4	180' - 30" RCP	15,850	Replace existing
												15,850	SUBTOTAL
												3,200	UPSTREAM IMPROVEMENTS
												19,050	TOTAL
ALBEMARLE III (I-7.													
I7.4	2.4	0.6	1.44	5	11	15" RCP	250	(0.0224)	8	6.8	250' - 24" RCP	18,800	Replace existing
												18,800	SUBTOTAL
												3,800	UPSTREAM IMPROVEMENTS
												22,600	TOTAL
CRESCENT SOUTH (I-7)													
I7.11	6.8	0.35	2.38	12	13	18" RCP	220	(0.01)	9	5.1	220' - 24" RCP	15,200	Replace existing
												15,200	SUBTOTAL
												3,050	UPSTREAM IMPROVEMENTS
												18,250	TOTAL

Albemarle Point

The Albemarle Point watershed is located south of Highway 17 on Albemarle Road and drains 7.0 acres of industrial development. The existing drainage facilities discharge into the Ashley River and provide approximately 50 percent of the recommended capacity. A parallel system of 36" RCP's is recommended to provide adequate capacity.

Albemarle I

The Albemarle I watershed drains the area located between Albemarle Road and Porter Gaud School. Runoff from the area is conveyed to the Ashley River via a 15" RCP which is adequate.

Albemarle II

The Albemarle II watershed drains 3.4 acres along the eastern side of Porter Gaud School. Replacement of the existing 15" RCP with a 30" RCP is recommended for this area.

Albemarle III

The Albemarle III watershed drains 2.4 acres along the southern portion of Porter Gaud School. The existing 15" RCP outfall to the Ashley River is inadequate, and replacement with a 24" RCP is recommended.

Crescent South

The Cresent South watershed drains the southeastern corner of the Cresent Subdivision along the east end of Guerard Road. Existing drainage facilities consist of an 18" RCP from Guerard Road to Wappoo Creek and provide approximately 70 percent of the recommended capacity. Replacing the existing 18" RCP with a 24" RCP is recommended.

TABLE 37

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
SOUTH WINDEMERE (I-7, I-8)													
I7.32 to I7.31	1.24 20.7	0.35 0.45	9.75	20	46	36" CMP	60'	(0.0052) 0.0027	27	3.8	130' - 42" RCP	23,650	Replace 36" CMP
I7.31 to I7.29	0.46	0.45	9.96	21	47	36" CMP	70'	(0.0052) 0.014	27	3.8			
I7.30 to I7.29	14.45	0.35	5.06	14	27	24" RCP	110'	(0.0309)	34	11.0		Adequate	
I7.29 to I7.28	3.7	0.45	16.69	22	77	36" RCP	135'	(0.0065) 0.0044	47	6.6	135' - 36" RCP	26,250	Parallel system
I7.28 to I7.27	6.6	0.45	19.66	23	88	36" RCP	30'	(0.0065) -0.0015	47	6.6	170' - 42" RCP	34,300	Parallel system
I7.27 to I7.25	2.9	0.7	21.69	24	97	36" RCP	140'	(0.003) -0.0015	32	4.5			
I7.25 to I8.3	3.0 16.01	0.7 0.45	30.99	29	130	Marsh					17' F.B. Channel	16,000	Excavation in marsh
I8.3 to I8.5					130	30" RCP & 36" RCP	75'	(0.0052) -0.0036	66	4.9	50' - Dual 42" RCP	18,500	Parallel system
												118,700	SUBTOTAL
												23,750	UPSTREAM IMPROVEMENTS
												142,450	TOTAL
WAPPOO HEIGHTS (I-7)													
I7.18 to I7.19	5.95	0.35	2.08	8	13	24" RCP	440'	(0.0023) 0.0011	9	3.0	440' - 36" RCP	61,350	Replace 24" RCP
I7.19 to I7.20	2.2	0.35	2.85	11	17	24" RCP	120'	(0.0053) 0.0023	14	4.5	120' - 36" RCP	17,300	Replace 24" RCP
I7.20 to I7.24	0.82	0.45	3.22	12	18	24" RCP	190'	(0.0053) 0.004	14	4.5	190' - 36" RCP	25,950	Replace 24" RCP
												104,600	SUBTOTAL
												20,950	UPSTREAM IMPROVEMENTS
												125,550	TOTAL
CRESCENT WEST (I-7)													
I7.15 to I7.16	21 3	0.35 0.9	10.05	16	51	5.3'x6' RCP	90'	0.0027	186	5.8		Adequate	Upstream improvements may be needed. Available storage in lake
I7.13 to I7.14	8 4.3	0.35 0.9	16.72	27	71	30" CMP	85'	(0.0016)	20	4.1		Adequate	Available storage in lake
CRESCENT EAST (I-7)													
I7.12	20.2	0.45	9.09	17	45	18" RCP	250'	(0.0146) -	11	6.2	250' - 36" RCP	32,700	Replace 18" RCP
												32,700	SUBTOTAL
												6,550	UPSTREAM IMPROVEMENTS
												39,250	TOTAL

South Windemere

The South Windemere watershed drains portions of the Windemere and South Windemere subdivisions located at the intersection of Folly Road and Wesley Drive. Existing drainage facilities consist of a stormwater conduit which crosses Folly Road and serves the northern portion of the Crescent subdivision and South Windemere Shopping Center. This system outlets into a tidal channel which discharges through two existing culverts under Locke Lane. The existing system provides approximately 35 percent of the recommended capacity.

To provide adequate capacity, the existing 36" CMP should be replaced with a 42" RCP and a parallel 36" RCP and 42" RCP culvert system placed across Folly Road. This would require that the existing marsh area between Folly Road and Locke Lane be excavated, which will require a South Carolina Coastal Council permit. The final improvement required is a system of dual 48" RCP's parallel to the existing culvert under Locke Lane.

During design, attention should be given to an existing low area on the east side of Folly Road between Yeamans Road and Sayle Road. This area experiences flooding problems on a regular basis. An easement will probably be required for correction of the problem.

Wappoo Heights

The Wappoo Heights watershed is located along Folly Road from Broughton Road to the Wappoo Cut bridge. The existing system consists of a 24" RCP along the west side of Folly Road which discharges into Wappoo Creek at the north end of the Wappoo Cut bridge and provides approximately 80 percent of the recommended capacity. To provide the recommended capacity, the existing 24" RCP needs to be replaced with a 36" RCP.

Crescent West

The Crescent West watershed drains the western portion of the Crescent subdivision. Drainage facilities for this area consists of two culverts which connect two existing lakes. The two lakes provide adequate storage area for the runoff generated and no improvements are required.

Crescent East

The Crescent East watershed is located to the east of the above described watershed and drains the eastern portion of the Crescent subdivision. The existing 18" RCP outfall from Guerard Road to Wappoo Creek provides less than 25 percent of the recommended capacity and should be replaced with a 36" RCP. Upstream improvements are also recommended to relieve the present flooding problems on Cochran Drive.

TABLE 38

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
WINDEMERE EAST (I-7, I-8, J-7, J-8)													
J8.48 to J8.46	40.3	0.45	18.14	11	105	30" RCP	60'	(0.0044)	24	4.8	110' - 36" RCP; 500' - Dual 36" RCP & 180' - 3'x6' Box	197,200	Relief system J8.48A to J8.46A
J8.47 to J8.46	3.25	0.45	1.46	17	7	30" RCP	50'	(0.0044)	24	4.8		Adequate	Remove 30" RCP for relief system
J8.46 to J8.49	0.6	0.45	19.86	18	105	30" RCP	150'	(0.0044)	24	4.8	560' - 11' F.B. Concrete lined channel and 340' - 3'x8' Box	214,800	Abandon 30" RCP J8.46A to I8.14
J8.49 to I8.15	0.2	0.45	19.96	19	105	24" RCP	100'	(0.0044)	13	4.1			Abandon 24" RCP
I8.15 to I8.14	3.9 3.3	0.45 0.7	24.03	20	114	24" RCP	45'	(0.0007) 0.002	5	1.6			Abandon 24" RCP
I8.14 to I8.13	1.8 4.5	0.7 0.45	27.32	21	128	24" RCP	225'	(0.0007)	5	1.6	270' - Dual 3½'x6½' Box	162,250	Remove 24" RCP
I8.13 to I8.12	2.54	0.45	28.46	23	128	24" RCP	45'	(0.0007) -0.0027	5	1.6			Remove 24" RCP
I8.12 to I8.11	2.12 8.32	0.7 0.45	33.68	24	150	24" RCP	225'	(0.0007) 0.0038	5	1.6	275' - Dual 3½'x8' Box	204,800	Remove 24" RCP
I8.11 to I8.10	1.56 4.94	0.7 0.45	36.99	26	159	24" RCP	50'	(0.0007) 0.012	5	1.6			Remove 24" RCP
I8.10 to I8.7	1.24	0.45	37.55	27	160	24" RCP	120'	(0.0007) 0.0024	5	1.6	120' - Dual 3½'x8' Box	106,200	Remove 24" RCP
												885,250	SUBTOTAL
												177,050	UPSTREAM IMPROVEMENTS
												1,062,300	TOTAL
COBURG DAIRY ROAD (I-8)													
I8.34 to I8.35	6.1	0.25	1.53	14	8	24" RCP	65'	(0.0055) 0.0055	14	4.5		Adequate	
COLLETON DRIVE (I-8, J-8)													
I8.33	17.4	0.45	7.83	15	41	18" CMP	190'	(0.0192) -	13	7.1	190' - 36" RCP	24,150	Replace 18" CMP
												24,150	SUBTOTAL
												4,850	UPSTREAM IMPROVEMENTS
												29,000	TOTAL
WINDEMERE WEST (I-8)													
I8.30	14.75	0.45	6.64	14	35	18" RCP	215'	(0.0146)	12	6.7	215' - 30" RCP	18,700	Replace 18" RCP
												18,700	SUBTOTAL
												3,750	UPSTREAM IMPROVEMENTS
												22,450	TOTAL

Windemere East

The Windemere East watershed drains 108 acres of the Windemere section of the City of Charleston. The existing system consist of a 30" RCP which crosses the Seaboard System Railroad and runs along the west side of Locke Lane, discharging into the Wappoo Creek marsh. The existing system provides less than 10 percent of the recommended capacity. Replacement of the system with dual box culverts along Locke Lane is recommended. Upstream improvements are also required on Berkeley Drive and Stocker Road to convey the runoff to the proposed system.

Coburg Dairy Road

The Coburg Dairy Road drainage basis is located on the southern end of Coburg Dairy Road and is part of the Byrnes Down section of the City of Charleston. The drainage system serves only the private property owned by Coburg Dairy. The system is adequate and no improvements are required.

Colleton Drive

The Colleton Drive watershed is located in the Byrnes Down section of the City. The area lies south of the Seaboard Systems Railroad between Nicholson Drive on the east and Coburg Dairy Drive on the west. The existing 18" RCP outfall from Colleton Drive to Wappoo Creek provides less than 35 percent of the recommended capacity. Replacing the existing 18" RCP with a 36" RCP is recommended to provide the required capacity.

Windemere West

The Windemere West drainage basin is located between Tarleton Drive on the north and Jamaica Drive on the south, and drains a portion of the South Windemere subdivision. The existing drainage conduit is a 18" RCP which conveys runoff from the intersection of Lord Ashley Drive and Chadwick Drive into Wappoo Creek. This system provides less than 35 percent of the required capacity and replacement with a 30" RCP to provide adequate capacity is recommended.

During final design, attention should be directed to the two existing outfalls near the intersection of Chadwick Drive and Rebellion Road. The two outfalls are a 12" RCP and a 15" RCP respectively. Residents of this area experience flood problems during most heavy rainfalls. Replacement of the two outfalls with 18" RCP is recommended.

TABLE 39

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
HIGHWAY 17 SOUTH (J-7, J-8)													
J7.24 to J7.26	1.2	0.7	0.84	6	6	24" RCP	1040'	(0.0023) 0.0012	9	3.0		Adequate	
J7.26 to J7.31	3.34	0.7	3.18	13	17	24" RCP	335'	(0.0023) 0.0018	9	3.0	335' - 30" RCP	49,800	Replace existing system
J7.31 to J7.34	1.19	0.7	4.01	15	21	30" RCP	120'	(0.0016)	14	2.9	120' - 24" RCP	17,550	Parallel system
J7.40 to J7.34	14.9	0.45	6.71	23	30	24" RCP	340'	(0.0027) -0.01	10	3.2	340' - 36" RCP	63,550	Replace 24" RCP
J7.34 to J7.35	3.5	0.7	13.17	25	48	30" RCP	210'	(0.0016)	14	2.9	210' - 42" RCP	46,350	Parallel system
J7.35 to J7.37	1.4	0.7	14.15	26	61	30" RCP	250'	(0.0016) 0.0005	14	2.9	250' - 48" RCP	66,250	Parallel system
J7.37 to J7.13	3.9	0.7	16.88	28	71	30" RCP	550'	(0.0088)	33	6.8	550' - 48" RCP	126,800	Parallel system
												370,300	SUBTOTAL
												74,100	UPSTREAM IMPROVEMENTS
												444,400	TOTAL
HIGHWAY 17 NORTH (J-7, J-8)													
J7.21 to J7.18	4.8 6.1	0.7 0.45	6.11	7.0	40	24" RCP	380'	(0.0028) 0.0006	10	3.3	380' - 42" RCP	82,000	Replace 24" RCP
J7.18 to J7.16	2.6	0.7	7.93	10	48	30" RCP	545'	(0.0028) 0.0006	19	3.8	545' - 42" RCP	116,650	Replace 30" RCP
J7.16 to J7.14	2.4	0.7	9.61	14	51	36" RCP	515'	(0.0028) 0.0067	31	4.3	515' - 30" RCP	69,350	Parallel system
												268,000	SUBTOTAL
												53,600	UPSTREAM IMPROVEMENTS
												321,600	TOTAL
WOODWARD (J-7, J-8)													
J7.45 to J7.44	37.9 4.0 4.4	0.45 0.9 0.7	23.74	31	95	30" CMP	80'	(0.0018) 0.04	20	4.1		Adequate	Available storage in lake; upstream improvements may be required
ST. ANDREWS BLVD. (J-7, J-8)													
J7.42 to J7.41	10.6 4.1	0.45 0.7	7.64	14	40	24" RCP	60'	(0.0673) 0.0035	12	37	60' - 36" RCP	10,000	Parallel system
												10,000	SUBTOTAL
												2,000	UPSTREAM IMPROVEMENTS
												12,000	TOTAL

Highway 17 South

The Highway 17 South watershed is located along the south side of Highway 17 and extends from Stocker Road on the west to the Ashley River on the east. The existing drainage facilities consist of two pipe conduits, one on Folly Road and one on Highway 17. These systems join near the intersection of Folly Road and Highway 17 and run eastward before discharging into the Ashley River marsh near the intersection of St. Andrews Boulevard and Highway 17. The existing system provides less than 40 percent of the recommended capacity.

Recommended improvements consist of a parallel system of 42" RCP and 48" RCP along Highway 17 which discharges into the marsh. Construction will require that new sidewalks be built along both Folly Road and Highway 17 and excavation in the marsh which will require a South Carolina Coastal Council permit.

Highway 17 North

The Highway 17 North watershed drains the area along the north side of Highway 17 from Parish Road to the intersection of Folly Road. Existing drainage facilities consist of a pipe conduit running parallel to Highway 17 and discharging into the Ashley River marsh on the north side of St. Andrews Boulevard. An existing capacity of approximately 40 percent of the recommended is available from this system. Replacement with a 42" RCP is recommended to improve the system, and provide the required capacity.

Woodward

Approximately 80 percent of the 46 acres drained by the Woodward watershed is located outside the City of Charleston boundary. The 20 percent which is within the City boundary drains the southern portion of the Westwood subdivision. The runoff from this area goes into a detention pond located between Woodward Road and Sheldon Road prior to discharge into the Ashley River. Due to the available storage provided by the lake, the existing facilities are adequate.

St. Andrews Boulevard

The St. Andrews Boulevard watershed drains approximately 15 acres located along St. Andrews Boulevard. The entire 15 acres are outside the present City of Charleston boundaries. The existing 24" RCP outfall is inadequate to carry the required flow and a parallel 36" RCP from St. Andrews Boulevard to the Ashley River is recommended.

TABLE 40

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
BYRNES DOWNS (J-8)													
J8.9 to J8.11	8.6	0.7	6.02	9	37	30" RCP	100'	(0.026) 0.0135	57	11.7			Adequate with relief system
J8.12 to J8.13	4.7	0.45	8.14	10	49	30" RCP	315'	(0.0023) -0.0014	17	3.5			Adequate with relief system
J8.13 to J8.14	6.3	0.45	10.98	12	61	30" RCP	50'	(0.002) 0.002	16	3.2	910' - 36" RCP	120,150	Relief system J8.13 to J8.13A
J8.14 to J8.15	1.3	0.45	11.57	13	64	30" RCP	300'	(0.0006)	9	1.8			Adequate with relief system
J8.15 to J8.16	2.5	0.45	12.70	15	66	30" RCP	50'	(0.0006) 0.0034	9	1.8			
J8.16 to J8.17	2.0	0.45	13.60	16	69	30" RCP	150'	(0.004) -0.0027	22	4.6	870' - 36" RCP	112,400	Relief system J8.16 to J8.16A
J8.17 to J8.18	7.9	0.45	17.16	17	86	30" RCP	175'	(0.0028) 0.0032	19	3.8			Adequate with relief system
J8.18 to J8.19	0.5	0.45	17.39	18	86	30" RCP	210'	(0.0025) 0.0024	18	3.6			
J8.19 to J8.20	1.2	0.45	17.93	19	86	4.5' F.B. Channel	135'	(0.0025)	54	3.3			
J8.26 to J8.27	60.5 3.9	0.45 0.7	29.96	20	142	36" RCP	120'	(0.0116) 0.0001	62	8.8	450' - 4.5'x8' Box, 560' - 4.5'x6' Box,	865,300	Relief system J8.26A to J8.24
J8.27 to J8.28	2.3	0.45	31.00	21	146	36" RCP	160'	(0.0116) 0.001	62	8.8	180' - Dual 54" RCP, 510' - 54" RCP		Adequate with relief system
J8.28 to J8.29	3.3	0.45	32.49	22	149	36" RCP	30'	(0.0031) -0.0037	32	4.6	870' - 42" RCP 450' - 36" RCP 430' - 30" RCP		
J8.29 to J8.30	2.4	0.45	33.57	23	151	36" RCP	280'	(0.0031) -0.0044	32	4.6			
J8.30 to J8.31	5.1	0.45	35.87	25	158	36" RCP	40'	(0.0015) -0.0005	22	3.2			
J8.31 to J8.32	3.5	0.45	37.45	26	161	36" RCP	170'	(0.0015) 0.0006	22	3.2			
J8.32 to J8.25	2.0	0.45	38.35	27	163	36" RCP	580'	(0.0015) 0.0023	22	3.2			
J8.25 to J8.24	7.5	0.45	41.73	31	167	36" RCP	65'	(0.0015)	22	3.2			
J8.24 to J8.20	0.4	0.25	41.83	32	167	4.5' F.B. Channel	140'	(0.0015)	42	2.5	Change sideslope to 2 vertical to 1 horizontal	2,200	
J8.20 to J8.21	0.6	0.35	59.97	33	234	48" RCP	70'	(0.0025)	58	4.6	70' - Dual 60" RCP	34,050	Parallel system
												1,134,100	SUBTOTAL
												226,850	UPSTREAM IMPROVEMENTS
												1,360,950	TOTAL
WESTWOOD (J-8)													
J8.8 to J8.4	34.6	0.45	15.57	18	76	24" RCP	580'	(0.0005) 0.0005	4	1.4	1090' - 4'x4' Box	270,600	Remove 24" RCP
J8.4 to J8.2	7.9	0.45	19.13	22	88	24" RCP	510'	(0.0046) 0.0002	13	4.2			Remove 24" RCP
J8.2 to J8.1	6.3	0.45	21.97	25	97	24" RCP	40'	(0.0092) 0.0015	19	6.0	140' - 4'x6' Box	60,500	Remove 24" RCP
J8.1 to J8.5	32.2	0.45	36.46	26	157	24" RCP	100'	(0.0092) 0.0035	19	6.0			Remove 24" RCP
J8.5 to J8.6	2.7	0.7	38.35	27	163	36" RCP	100'	(0.0092) 0.0088	55	7.8	100' - 54" RCP	26,900	Parallel system
J8.6 to J8.7	3.0	0.7	40.45	28	170	42" RCP	150'	(0.0092) 0.0024	84	8.7	150' - 54" RCP	30,850	Parallel system
												388,850	SUBTOTAL
												77,800	UPSTREAM IMPROVEMENTS
												466,650	TOTAL

Byrnes Downs

The Byrnes Downs watershed is located along either side of Highway 17 between Campbell Drive on the east and Timmerman Drive on the west and drains a total of 79 acres of which 64 acres is outside the City of Charleston boundary. The existing drainage system is divided into two branches. One system runs from Highway 17 to the Seaboard Systems Railroad and is located between Timmerman Drive and Nicholson Street. The second system also runs from Highway 17 to the Seaboard Systems Railroad and is west of the intersection of Yeadon Avenue and Lyttleton Avenue. The existing systems provide less than 40 percent of the recommended capacity.

Recommended improvements consist of a box section along Nicholson Drive from Highway 17 to the discharge point under the Seaboard Coastline Systems. Also included are new pipe conduits on Highway 17, Yeadon Drive, and Lyttleton Drive. Excavation of marsh area is required at the outfall and will require a South Carolina Coastal Council permit.

The exclusive function of the proposed pipe conduit system on Highway 17 is to provide drainage for those areas which are outside the present City of Charleston boundaries. During final design, the City may option to omit this section unless those areas outside the City wish to provide financial assistance. In the event those areas outside the City decide not to participate in the project the City may also wish to decrease the size of the recommended box section along Nicholson Street if assurances are made that the discharge from the upstream area will not increase in the future.

Westwood

The Westwood drainage basin is located between St. Andrews Boulevard on the north and Highway 17 on the south and drains approximately 87 acres. Existing drainage facilities consist of a pipe conduit between Moore Drive and Riverdale Drive which runs northeast under St. Andrews Boulevard and discharges into the Ashley River. The existing system provides less than 50 percent of the recommended capacity and replacement with a 4'x6' box culvert system from the upstream end of the system to St. Andrews Boulevard and a parallel 54" RCP under St. Andrews Boulevard to the discharge point is recommended.

TABLE 41

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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)	
ST. ANDREWS SHOPPING CENTER (J-8, J-9, K-9)													
J9.126 to J9.129	22	0.45	9.9	23	45	24" RCP	190'	(0.0011) 0.003	24	4.5	190' - 48" RCP	34,750	Replace existing 24" RCP
J9.129 to J9.123	24.42	0.45	20.89	24	93	2.5' F.B. Channel	770'	(0.0013) 0.0016	71	2.7	770' - 3' F.B. Channel	5,900	
J9.123 to J9.122	8.26	0.45	24.61	28	103	24" RCP	80'	(0.0013) 0.0012	14	4.5	80' - Dual 42" RCP	28,350	Parallel pipe
J9.122 to J9.106	1.7	0.45	25.38	29	105	4' F.B. Channel	140'	(0.0013)	48	2.4	140' - 4' F.B. Channel	3,750	
J9.112 to J9.113	6.5 10.6	0.25 0.45	6.4	9	40	30" RCP	70'	(0.0014) -0.006	24	4.9	70' - 30" RCP	14,600	Parallel system
J9.113 to J9.114	4.1	0.45	8.25	10	50	3' F.B. Channel	220'	(0.0014) -0.0053	58	2.6		Adequate	
J9.114 to J9.116	3.8	0.45	9.96	11	58	30" RCP	80'	(0.0014) -0.0012	13	2.7	80' - 48" RCP	23,550	Parallel system
J9.116 to J9.117	3.0	0.45	11.31	12	63	30" RCP	30'	(0.0014) -0.0013	13	2.7	30' - 48" RCP	9,600	Parallel system
J9.117 to J9.118	5.6	0.45	13.83	13	76	4.5' F.B. Channel	250'	(0.0014)	71	2.7		Adequate	Available depth
J9.118 to J9.121	6.6	0.45	16.80	14	89	30" RCP	175'	(0.0014) 0.0011	13	2.7	175' - Dual 48" RCP	71,050	Replace 30" RCP
J9.121 to J9.106	6.8 1.4	0.45 0.25	20.21	15	105	4' F.B. Channel	390'	(0.0012) 0.0014	49	2.4	390' - 4' F.B. Channel	4,150	Regrade and clean channel
J9.106 to J9.107	0.3	0.45	45.73	30	187	36" RCP	90'	(0.0012) 0.002	37	5.2	90' - Dual 48" RCP	47,800	Parallel system
J9.107 to J9.108	0.6	0.45	46.00	31	187	4' F.B. Channel	250'	(0.0012) -0.0015	48	2.4	250' - 8' F.B. Channel	3,250	
J9.111 to J9.110	38.3	0.45	17.24	18	84	24" RCP	80'	(0.0037) -0.0006	14	4.5	80' - 48" RCP	22,350	Parallel system
J9.110 to J9.109					40	3' F.B. Channel	40'	(0.0037) 0.0158	82	4.1		Adequate	
J9.109 to J9.108	4.2	0.45	19.13	19	92	48" RCP	55'	(0.0037) 0.005	75	6.0	55' - 30" RCP	4,950	Parallel system
J9.108 to J9.102			65.13	32	257	2.5' F.B. Channel	165'	(0.0012) 0.0088	55	2.5	Dual - 48" RCP	100,450	Fill existing channel
J9.102 to J9.93	39.9	0.45	83.09	33	324	Dual 36" RCP	430'	(0.0009) 0.0023	35	2.5	3 - 4'x6' box culverts	347,550	Replace existing system
J9.93 to J9.69	25.2	0.45	94.43	36	349	7' F.B. Channel	1420'	(0.0011) -0.0005	139	2.9	1420' - 25' Channel	51,850	Marsh
J9.69 to J9.70	1.3	0.45	95.02	44	349	4'x4.5' Box	40'	(0.0011) -0.0005	62	3.4		See J9.71 to J9.72	
J9.87 to J9.70	12.4	0.7	8.68	5	64	24" RCP	950'	(0.0067) 0.0038	16	5.1	950' - 36" RCP	172,750	Parallel system

(CONTINUED)

TABLE 41

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
ST. ANDREWS SHOPPING CENTER (CONTINUED)													
J9.70 to J9.71	3.1	0.7	105.87	45	349	4'x4' Box	100'	(0.0011) 0.0065	53	3.3		See J9.71 to J9.72	
J9.85 to J9.71	2.4	0.7	1.68	5.0	12	24" RCP	1530'	(0.0044) 0.0056	13	4.1		Adequate	
J9.71 to J9.72	5.1	0.7	111.12	46	361	4'x4' Box	50'	(0.0011) -0.0012	53	3.3	190' - Dual 4'x10' Box Culvert	212,900	Parallel system
J9.72 to J9.73					361	14' F.B. Channel	130'	(0.0011) 0.0018	610	4.3		Adequate	
J9.73 to J9.75	1.1	0.7	111.89	46	364	Dual 48" RCP	65'	(0.0011) 0.0008	150	6	65' - Dual 4'x10' Box Culvert	73,800	Replace dual 48" RCP
J9.75 to J9.63	4.4	0.35	113.43	48	364	17' F.B. Channel	580'	(0.0011) -0.0077	565	4.2		Adequate	
J9.80 to J9.79	3.44 2.0	0.7 0.45	3.31	6	23	24" CMP	70'	(0.0014) 0.0026	13	4.1	70' - 30" RCP	5,700	Replace 24" CMP
J9.79 to J9.78	0.75	0.45	3.65	7	24	2.5' F.B. Channel	210'	(0.0048) 0.0048	22	3.2		Adequate	Available depth
J9.78 to J9.77	1.7	0.45	4.42	8	28	24" CMP	150'	(0.0186) 0.0186	27	8.5	150' - 30" RCP	11,850	Replace 24" CMP
J9.68 to J9.65	69.9	0.45	31.46	40	112	30" RCP	250'	(0.0035) 0.005	21	4.3	250' - 48" RCP	63,150	Parallel system. Drains area outside city limits
J9.65 to J9.63	4.7 2.4 1.1	0.7 0.45 0.9	35.83	42	124	30" RCP	220'	(0.0035) -0.0065	21	4.3	220' - 54" RCP	49,950	Parallel system
J9.63 to J8.41			153.68	51	469	14' F.B. Channel	450'	(0.0011) 0.0042	610	4.4		Adequate	
J8.38 to J8.37	3.3	0.45	1.49	5	11	24" RCP	160'	(0.0038) 0.0009	12	3.8		Adequate	
J8.37 to J8.35	1.2	0.9	2.57	6	18	36" RCP	340'	(0.0038) 0.0014	36	5.0		Adequate	
J8.35 to J8.41	9.3	0.9	10.94	8	70	36" RCP	400'	(0.0038) 0.0048	72	5.0		Adequate	
J8.41 to J9.9	10.1	0.45	169.17	55	491	14' F.B. Channel	150'	(0.0011) 0.0149	610	4.4		Adequate	
J9.9 to J9.10					491	Dual 48" RCP	90'	(0.0009) 0.0032	150	6.0	100' - Dual 8'x10' Box Culvert	50,400	Parallel system
												1,414,400	SUBTOTAL
												282,900	UPSTREAM IMPROVEMENTS
												1,697,300	TOTAL

St. Andrews Shopping Center

The St. Andrews Shopping Center watershed drains a total of 353 acres of which approximately 75 percent is located within the City of Charleston boundaries. Existing drainage facilities consist of an open channel and culvert system which extends northward from the Seaboard Systems Railroad to an abandoned railroad at West Oak Forest Drive. The majority of the existing drainage facilities are inadequate and require improvement.

Recommended improvements include two 4'x10' box culverts parallel to the existing 4'x4' box culvert at the Highway 17 crossing and a 25' flat bottom channel to Keats Road. Also included are two 8'x10' box culverts under the Seaboard Systems Railroad. These may be omitted with permission to construct an open channel through the existing railroad which has been abandoned.

During final design special attention should be given to an existing low area which exists between St. Clair Drive and Sherwood Drive. The existing area is drained by a 24" RCP that is inadequate. Replacement with a 48" RCP is recommended.

The improvements require that excavation take place within existing marsh areas. This work will require permission from the South Carolina Coastal Council.

TABLE 42

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
PARKWOOD ESTATES NORTH (J-9)													
J9.31 to J9.30	1.3 10.1	0.7 0.45	5.46	10	33	24" RCP	90'	(0.0014) 0.0031	14	4.5	90' - 36" RCP	11,250	Replace 24" RCP
J9.30 to J9.26	16.3	0.45	12.80	11	74	3' F.B. Channel	720'	(0.0014) 0.0028	41	2.3	720' - 3' F.B. Channel	4,100	Alter sideslopes
J9.26 to J9.27					74	36" RCP	80'	(0.0074) 0.0000	37	5.6	80' -. 36" RCP	10,100	Parallel system
J9.29 to J9.28	2.7	0.45	1.22	13	7	24" RCP	90'	(0.0053) 0.0011	14	4.5		Adequate	
J9.28 to J9.27	0.9	0.45	1.63	14	9	2' F.B. Channel	740'	(0.0053) 0.0059	59	4.3		Adequate	
J9.27 to J9.21	1.5	0.45	15.11	15	79	3.5' F.B. Channel	200'	(0.0074)	94	5.7		Adequate	
J9.21 to J9.22					79	36" RCP	40'	(0.0074)	50	7.0	260' - 36" RCP	38,050	Parallel system
J9.22 to J9.23	1.1	0.45	15.61	16	80	36" RCP	70'	(0.0032) 0.0027	33	4.6			
J9.23 to J9.24	1.0	0.45	16.06	17	80	36" RCP	110'	(0.0032) 0.0055	33	4.6			
J9.24 to J9.25	1.9	0.45	16.92	18	83	36" RCP	40'	(0.006) -0.0055	45	6.3			
												63,500 12,700 76,200	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
PARKWOOD ESTATES SOUTH (J-9)													
J9.19 to J9.20	19.8	0.45	8.91	23	40	24" RCP	60'	(0.0009) 0.009	14	4.5	60' - 36" RCP	7,600	Parallel system
												7,600 1,500 9,100	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL
PARKWOOD HEIGHTS (J-9)													
J9.18 to J9.14	15.1	0.45	6.80	15	35	24" RCP	190'	(0.0032)	11	3.5	190'-36" RCP	27,150	Replace 24" RCP
J9.14 to J9.13	1.8	0.45	7.61	16	39	30" RCP	50'	(0.002) -0.0013	16	3.2	50'-36" RCP	8,500	Replace 30" RCP
J9.13 to I9.6	1.1	0.45	8.11	17	41	30" RCP	215'	(0.0095) 0.0077	35	7.0	215'-36" RCP	23,850	Replace 30" RCP
												59,500 11,900 71,400	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

Parkwood Estates North

The Parkwood Estates North drainage area is located south of Highway 17 and is bounded on the east by Farmfield Road and on the west by Canterberry Road. The existing drainage facilities are inadequate and consist of an open channel and culvert system which outlets under Canterberry Road into the Wappoo Creek marsh. Recommended improvements include a parallel 36" RCP at the Canterberry Road crossing. Excavation in the marsh may be necessary and will require approval of the South Carolina Coastal Council prior to construction.

Parkwood Estates South

The Parkwood Estates South watershed drains 19.8 acres of the Parkwood Estates subdivision and is located south of the Seaboard Systems Railroad between Cassina Road on the east and Canterberry Road on the west. The existing 24" RCP outfall which crosses Canterberry Road at the intersection of Handel Lane provides less than 35 percent of the recommended capacity. A parallel 36" RCP is recommended for this system.

Parkwood Heights

The Parkwood Heights watershed joins the Parkwood Estates South watershed on the east. Existing drainage facilities consist of a pipe conduit which commences at an existing drainage ditch located between Forestwood Drive and Kensington Drive and runs southward to the outlet into the Wappoo Creek marsh. The existing system provides approximately 75 percent of the recommended capacity. Replacement of the existing system with a 36" RCP is recommended.

TABLE 43

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
HARRISON ACRES NORTH (J-9)													
J9.36 to J9.34	5.6	0.45	2.52	15	13	24" RCP	35'	(0.0086) -0.8	18	5.8		Adequate	
J9.34 to J9.32	1.2	0.45	3.06	16	16	24" RCP	110'	(0.0086) 0.44	18	5.8		Adequate	
J9.37 to J9.35	1.8	0.45	0.81	5	6	24" CMP	35'	(0.0092) -0.9	12	3.9		Adequate	
J9.35 to J9.33	1.1	0.45	1.31	6	9	24" CMP	110'	(0.0092) 0.035	12	3.9		Adequate	
HARRISON ACRES SOUTH (J-9)													
J9.44 to J9.43	7.9	0.45	3.56	11	21	18" RCP & 18" CMP	250'	(0.0016) 0.0009	6	2.1	250' - 36" RCP	38,700	Replace existing system
J9.43 to J9.41	1.4	0.45	4.19	13	23	18" RCP & 24" CMP	230'	(0.0019)	10	1.9	230' - 36" RCP	30,400	Replace existing system
J9.41 to J9.38	2.9	0.45	5.50	15	29	18" RCP & 24" CMP	400'	(0.0019)	10	1.9	400' - 36" RCP	53,200	Replace existing system
												122,300	SUBTOTAL
												24,500	UPSTREAM IMPROVEMENTS
												146,800	TOTAL
INDIGO POINT I (J-9)													
Catch Basin to J9.49	3.8	0.45	1.71	10	10	24" RCP	40'	0.003	11	3.4		Adequate	
INDIGO POINT II (J-9)													
Catch Basin to Outfall	3.6	0.45	1.62	10	10	24" RCP	60'	0.003	11	3.4		Adequate	

Harrison Acres North

The Harrison Acres North watershed drains approximately 10 acres of the Harrison Acres subdivision and is located south of the Seaboard Systems Railroad on the east side of Markfield Drive. The existing 24" RCP and 24" CMP outfall into Vorhees Canal and is adequate. However, Vorhees Canal must be improved (see K-Mart discussion for improvements) to provide adequate capacity for this area.

Harrison Acres South

The Harrison Acres South watershed drains approximately 13 acres of the Harrison Acres subdivision and joins the Harrison Acres North watershed described above. The existing 18" RCP and 24" CMP system which discharges into Vorhees Canal is inadequate. A replacement system of 36" RCP is recommended for this area.

Indigo Point I

The Indigo Point I watershed drains the eastern portion of the Indigo Point Subdivision. The 3.8 acre watershed is drained through a 24" RCP which discharges into the Wappoo Creek marsh. The existing 24" RCP is adequate. Some flooding problems have been experienced in this area but these can be attributed to the channel through the marsh. A South Carolina Coastal Council permit will be required to make improvements to the existing discharge channel.

Indigo Point II

The Indigo Point II watershed joins the Indigo Point I watershed on the west and drains 3.6 acres of the Indigo Point Subdivision. Existing drainage facilities consist of a 24" RCP which discharges to the Wappoo Creek marsh from Eliza Court. The existing pipe has adequate capacity but the discharge channel through the marsh requires improvement which will require a South Carolina Coastal Council permit.

TABLE 44

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
K MART (J-9, J-10, K-9, K-10)													
K10.2 to K10.1	26	0.45	11.70	21	55	24" RCP	80'	(0.0011) 0.0045	14	4.5	80' - Dual 30" RCP	14,250	Parallel system
K10.1 to J10.94	12.4	0.45	17.28	23	78	3' F.B. Channel	250'	(0.0011) 0.0013	84	2.7		Adequate	
J10.94 to J10.95					78	24" RCP	65'	(0.0011) 0.0028	14	4.5	65' - 48" RCP	11,000	Parallel system
J10.95 to J10.70	38.3	0.45	34.52	25	152	3' F.B. Channel	300'	(0.0011) 0.0042	88	2.7	6' F.B. Channel	12,250	
J10.70 to J10.71					152	30" RCP	90'	(0.0011) -0.0021	12	2.4	90' - Dual 60" RCP	42,150	Flow to bypass existing 30" RCP
J9.130 to J9.132	2.1	0.45	0.95	7	6	Dual 18" RCP	60'	-0.0035	15	4.2		Adequate	
J9.132 to J10.71	7.0	0.45	8.27	19	40	5' F.B. Channel	1745'	0.0005 0.0016	39	1.6		Adequate	Available depth
J10.64 to J10.65	39.0	0.45	17.55	22	81	36" RCP	70'	(0.0007) 0.0096	28	4.0	70' - 48" RCP	11,250	Parallel system
J10.65 to J10.66	4.4 21.4	0.7 0.45	30.26	28	127	5.5' F.B. Channel	850'	(0.0007) -0.0006	160	2.6		Adequate	
J10.66 to J10.67					127	30" RCP	110'	(0.0007) 0.0023	18	3.7	110' - Dual 54" RCP	47,200	Remove existing 30" RCP
J10.67 to J10.68	1.25	0.45	30.82	29	128	5.5' F.B. Channel	70'	(0.0007) -0.0039	160	2.6		Adequate	
J10.68 to J10.71					128	30" RCP	70'	-0.0039	20	4.1	70' - Dual 54" RCP	30,400	Remove existing 30" RCP
J10.71 to J10.80	1.2	0.45	74.15	27	315	5' F.B. Channel	290'	(0.0005) 0.0007	109	2.1	2400' - 20' F.B. Channel	241,950	Relief channel J10.71 to J10.92A
J10.80 to J10.78					315	Dual 24" RCP	70'	0.002	26	4.1			Adequate with relief
J10.78 to J10.77	4.5	0.45	76.18	28	320	4' F.B. Channel	150'	(0.0005) -0.0006	84	2.0			
J10.77 to J10.76					320	36" RCP	50'	0.0006	29	4.1			
J10.76 to J10.72	9.3 7.0	0.45 0.70	85.27	29	354	4' F.B. Channel	100'	(0.0005) 0.0053	61	1.8			
J10.72 to J10.74					354	Dual 24" RCP	60'	0.006	26	4.1			
J10.74 to J10.82	4.0	0.45	87.07	30	357	6' F.B. Channel	60'	(0.0005) -0.0008	93	2.0			
J10.82 to J10.84					357	Dual 24" RCP	50'	-0.0024	26	4.1			
J10.84 to J10.86	4.0	0.45	88.87	4	357	6' F.B. Channel	50'	(0.0005) 0.0026	70	1.9			
J10.86 to J10.88					357	Dual 24" RCP	50'	0.0060	26	4.1			
J10.88 to J10.90	4.0	0.45	90.67	32	358	6' F.B. Channel	30'	0.0005 -0.008	67	1.9			
J10.90 to J10.92					358	Dual 24" RCP	70'	0.0066	26	4.1			
J10.92 to J10.50	28.0 28.7	0.7 0.45	123.19	38	443	5' F.B. Channel	760'	(0.0005) 0.002	54	1.7	5' F.B. Paved Channel	124,150	
J10.50 to J10.47					443	Dual 48" RCP	140'	(0.0035) 0.0186	147	5.9	150' - Dual 5'x6' Box Culvert	130,600	Remove 48" RCP on west side
J10.60 to J10.58	4.9 15.4	0.7 0.45	10.36	25	46	24" RCP	685'	(0.0012) 0.0016	7	2.2	685' - 42" RCP	140,550	Parallel system
J10.58 to J10.57	4.4	0.45	12.34	30	51	24" RCP	450'	(0.0012) 0.001	7	2.2	450' - 48" RCP	101,050	Parallel system
J10.57 to J10.55	5.4	0.45	14.77	33	58	30" RCP	1085'	(0.0012) 0.0025	12	2.5	1085' - 48" RCP	238,200	Parallel system

(CONTINUED)

TABLE 44

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
K MART (CONTINUED)													
J10.55 to J10.56	6.6 1.3	0.9 0.45	21.30	40	76	30" CMP	80'	(0.0012) 0.0004	8	1.6	80' - 54" RCP	16,000	Parallel system
J10.56 to J10.52	0.2	0.9	21.48	41	76	30" RCP	475'	(0.0012) 0.0026	12	2.5	475' - 54" RCP	132,750	Parallel system
J10.52 to J10.47	2.3	0.9	23.55	44	79	30" RCP	230'	(0.0012) 0.0109	12	2.5	200' - 54" RCP	59,800	Parallel system
J10.47 to J10.44	12.6	0.7	155.56	45	513	55"x73" CMP	140'	(0.0035) -0.0053	112	4.7	60' - Dual 5'x8' Box Culvert	58,350	Replace 55"x73" CMP
J10.40 to J10.42	1.6	0.9	1.44	5	11	24" RCP	230'	(0.0051) 0.0027	14	4.5		Adequate	
J10.42 to J10.44	2.9	0.9	4.05	7	27	30" RCP	170'	(0.0051) 0.0270	25	5.2		Adequate	Available head
J10.44 to J10.45	0.3	0.7	159.92	46	519	55"x73" CMP	120'	(0.0035) 0.0014	112	4.7	150' - Dual 5'x8' Box Culvert	123,750	Replace 55"x73" CMP
J10.45 to J10.35	2.0	0.45	160.72	48	519	12' F.B. Channel	180'	(0.0006) 0.0005	395	3.1	180' - Dual 5'x8' Box Culvert	143,800	Fill in channel
J10.39 to J10.37	1.7	0.9	1.53	3	11	24" RCP	220'	(0.0071) 0.0033	17	5.2		Adequate	
J10.37 to J10.35	2.3	0.9	3.60	4	27	30" RCP	220'	(0.0071) 0.0076	30	6.1		Adequate	
J10.35 to J10.34	3.5	0.7	166.77	52	519	12" F.B. Channel	570'	(0.0006) 0.0005	395	3.1	330' - Dual 5'x8' Box Culvert and 240' - 26' F.B. Channel	339,750	Fill in part of existing channel J10.35 to J10.35A
J10.33 to J10.34	2.3	0.9	2.07	5	15	24" RCP	40'	(0.0595) -0.042	48	15.2		Adequate	
J10.34 to J9.61	4.5	0.45	170.87	56	519	12' F.B. Channel	430'	(0.0006) 0.0005	395	3.1	26' F.B. Channel	53,800	Marsh
J9.62 to J9.61	2.9	0.9	2.61	5	19	24" RCP	75'	(0.0309) 0.016	34	11.0		Adequate	
J9.61 to J9.59	9.3	0.45	177.67	60	519	12' F.B. Channel	100'	(0.0006) 0.0005	395	3.1	26' F.B. Channel	12,500	
J9.59 to J9.50					519	48" RCP & 54" RCP	100'	0.0110 -0.0013	310	11.2	160' - Dual 5'x9.5' Box Culvert and 70' - 42" RCP	171,000	Remove 54" RCP, 48" RCP and 3-48" RCP (J9.50 - J9.53)
J9.51 to J9.50	14.0	0.7	9.80	21	46	42" RCP	60'	(0.0628) 0.0590	218	22.7		Adequate	
J9.50 to J9.53	2.6	0.7	189.29	61	519	3-48" RCP	80'	(0.0110) 0.0038	392	10.4		Cost under item J9.59 to J9.50	
Voorhees Canal					519	12' F.B. Channel		0.0005	237	2.4	[illegible] F.B. & 800' - 30' F.B. Channel	279,000 2,535,500 507,100 3,042,600	Improvements to Channel SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

K Mart

The K Mart watershed is located along either side of Highway 17 and is bounded on the east by Briarcliff Drive and on the west by Wappoo Road and drains a total of 345 acres including areas of the Ardmore, Forest Acres, and White Oak Forest subdivisions. This area experiences severe flooding on occasion, most notably the area around Tom Parcell Chevrolet and the area between Mulberry Street on the north and the abandoned railroad on the south. Existing drainage facilities consist of a channel which runs northward from the outfall to Vorhees Canal under Markfield Drive to Acacia Street with culverts at roadway and railway crossings. Also there is a pipe conduit system along Highway 17 running westward from the channel. The existing drainage facilities are inadequate and provide less than 50 percent of the required capacity.

Recommended improvements include widening Vorhees Canal, new dual 5'x9½' box culverts to replace the existing 54" RCP and 48" RCP under Markfield Drive and dual 5'x8' box culverts crossing Highway 17. Numerous upstream improvements are also required, and each should be examined during design. The work associated with widening Vorhees Canal will require excavation in the marsh which must be approved by the South Carolina Coastal Council.

TABLE 45

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
STONO PARK (J-10, J-11)													
J10.15 to J10.13	16.5	0.45	7.43	11	43	36" RCP	90'	(0.0002)	9	1.3	60' - 36" RCP	9,300	Parallel system
J10.13 to J10.17	7.6	0.45	10.85	14	58	3' F.B. Channel	410'	(0.0008) 0.0018	61	2.2		Adequate	
J10.16 to J10.17	3.5	0.45	1.58	11	9	30" CMP	270'	(0.012) 0.012	25	5.2		Adequate	
J10.17 to J10.18	11.6	0.45	17.65	17	88	4' F.B. Channel	380'	(0.0008) 0.0018	61	2.2	380' - 4' F.B. Channel	1,750	Alter sideslopes
J10.18 to J10.19					88	36" RCP	80'	(0.0008) 0.0018	37	5.2	80' - 42" RCP	14,000	Parallel system
J10.19 to J10.20	20.0	0.35	24.65	25	108	6' F.B. Channel	1060'	(0.0008)	150	2.7	1,750' - 4.5' F.B. Channel	71,600	Redirect channel J10.19 to J10.19A
J10.20 to J10.21					108	36" CMP	60'	(0.0008)	31	4.4	& 40'-Dual 48" RCP		
J10.63 to J10.62	4.0 19.7	0.9 0.45	12.47	11	72	24" RCP	180'	(0.0128) 0.0043	22	7.0	180' - 48" RCP	28,100	Replace 24" RCP
J10.61 to J10.62	15.5	0.45	6.98	18	34	24" RCP	200'	(0.003) 0.0022	11	3.4	200' - 36" RCP	27,100	Parallel system
J10.62 to J10.21	5.4	0.45	21.88	19	105	30" RCP	1520'	(0.003)	19	4.0	1520'-42" RCP, 590'-48" RCP & 350'-54" RCP	422,250	Replace existing system and add parallel system
J10.21 to J10.27	23.8	0.45	57.24	29	238	36" RCP	550'	(0.0037) 0.0036	35	5.0	240'-48" RCP 1745'-54" RCP	454,650	Replace existing system
J10.27 to J10.28	8.1	0.45	60.89	33	238	36" CMP	70'	(0.0037) 0.0036	23	3.2			Replace existing system
J10.28 to J10.32	1.5	0.45	61.57	34	238	42" CMP	300'	(0.0037) 0.0036	35	3.6			Replace existing system
												1,028,750	SUBTOTAL
												205,750	UPSTREAM IMPROVEMENTS
												1,234,500	TOTAL
ROTHERWOOD (I-10, J-10)													
J10.12 to J10.3	11.5	0.45	5.18	11	30	24" RCP	300'	(0.0047) 0.0002	13	4.3	950' - 30" RCP	91,750	Relief system
J10.3 to J10.5	12.7	0.45	10.9	13	60	24" RCP	70'	(0.0018) -0.0038	30	4.5	70' - Dual 36" RCP	23,300	Replace 24" RCP
J10.5 to J10.7	0.8	0.45	11.26	14	60	4' F.B. Channel	60'	(0.0018) -0.0029	98	3.3		Adequate	
J10.7 to J10.8					60	36" CMP	90'	(0.0018) 0.0016	32	4.5	90' - 42" RCP	21,400	Parallel system
J10.8 to outfall	13.6	0.45	17.38	15	90	3' F.B. Channel	50'	(0.0018)	92	3.3		Adequate	
												136,450	SUBTOTAL
												27,300	UPSTREAM IMPROVEMENTS
												163,750	TOTAL
WAPPOO SHORES (J-10)													
J10.10 to J10.11	14.0	0.45	6.30	14	33	24" RCP	70'	(0.0024) -0.01	14	4.5	70' - 30" RCP	8,400	Parallel system
												8,400	SUBTOTAL
												1,700	UPSTREAM IMPROVEMENTS
												10,100	TOTAL

Stono Park

The Stono Park drainage basin drains 137 acres of residential development located along either side of Wappoo Road. The existing drainage system is separated into two branches, a pipe conduit system along Wappoo Road from Highway 17 to the outfall into Wappoo Creek, and a channel running southwest from the Seaboard Systems Railroad to Wappoo Road. The existing system provides approximately 70 percent of the recommended capacity.

Recommended improvements include a relief channel on the west side of Huntley Drive and culverts at Garden Street. Also included is a dual system of pipe conduits along Wappoo Road, replacing the existing system and extending from Highway 17 to the outfall into the Wappoo Creek marsh.

Rotherwood

The Rotherwood watershed drains approximately 39 acres of the Rotherwood and Wappoo Shores subdivision. Existing drainage facilities consist of a pipe conduit system from Sanford Road to Timothy Street, and a series of culverts and channels to the outfall in Wappoo Creek. The existing system provides 40 to 50 percent of the recommended capacity.

A relief system along Sanford Road, Betsy Road and Timothy Street is recommended. Also included are dual 36" RCP's to replace the existing 24" RCP under Timothy Street and a parallel 42" RCP at the location of an existing 36" RCP. The existing outfall channel is adequate but will require cleaning during construction which will require a South Carolina Coastal Council permit.

Wappoo Shores

The Wappoo Shores watershed is located in the Wappoo Shores subdivision of the West Ashley area. The 14 acre watershed extends northward from Timothy Street to Rotherwood Drive. An existing 24" RCP outfall provides less than 45 percent of the recommended capacity. A 30" RCP parallel with the existing 24" RCP is recommended. The outfall ditch from Timothy Street to Wappoo Creek should also be cleaned during the construction of the new system and will require a South Carolina Coastal Council permit.

TABLE 46

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
FOREST ACRES (K-9, K-10)													
	9.7	0.7						(0.0056)			895' -		
K9.37A to K9.36A	21.5	0.45	16.47	18	81	24" RCP	425'	0.0058	15	4.7	48" RCP	204,600	Replace existing system
K9.36A to K9.31A	1.8	0.7	17.73	31	83	24" RCP	300'	(0.0023) 0.0032	9	3.0			
K9.31A to K9.32A	3.1	0.45	19.13	23	86	36" RCP	50'	(0.0004) 0.0210	37	5.2			
K9.32A to K9.34A	10.1	0.7	26.20	24	117	36" RCP	120'	(0.0087) 0.0003	57	7.6			
K9.34A to K9.29A					117	4' F.B. Channel	75'	(0.0087) 0.0147	75	5.3	75' - 5' F.B. Channel	2,400	
K9.30A to K9.29A	10.0	0.7	7.00	10	42	30" RCP	70'	(0.0043) 0.0043	24	4.9	70' - 30" RCP	8,550	Parallel pipe
	7.2	0.25											
K9.29A to K9.16A	15.6	0.7	45.92	31	184	5' F.B. Channel	1010'	(0.0005)	44	1.6	1010' - 7' F.B. Channel	18,750	
K9.14A to K9.13A	5.9	0.45	2.66	5	20	18"x30" CMP	140'	(0.0179) 0.0088	17	5.4	140' - 30" RCP	12,600	Replace 18"x30" CMP
K9.13A to K9.12A	4.9	0.45	4.87	6	34	24" RCP	40'	(0.0123) 0.0083	22	6.9	165' - 36" RCP	25,150	Replace 24" RCP
K9.12A to K9.11A	1.0	0.45	5.32	7	35	24"x36" CMP	125'	(0.0002) 0.0017	3.3	0.7			Replace 22"x36" CMP
K9.11A to K9.18A	10.9	0.45	10.23	8	65	4' F.B. Channel	580'	(0.0002) 0.0014	11	0.8	580' - 5' F.B. Channel	4,700	
K9.18A to K9.16A	5.3	0.45	12.62	12	71	Dual 30" CMP	70'	(0.0002) 0.0004	40	4.1	70' - Dual 42" RCP	22,700	Replace dual 30" CMP
K9.16A to K9.20A	1.7	0.45	59.31	33	231	5' F.B. Channel	270'	(0.0002)	34	1.1	730' - 12' F.B. Channel	118,800	
K9.20A to K9.26A	39.6	0.45	77.31	36	286	5' F.B. Channel	460'	(0.0002) 0.0023	34	1.1			
K9.26A to K9.27A					286	24" & 36" RCP	135' & 85'	(0.0002) 0.0005	14 37	4.5 5.2	70' - Dual 4'x8' Box	83,650	Replace existing system
K9.27A to Pump Station	22.11	0.45	87.08	42	300	3' F.B. Channel	750'	(0.0027)	208	4.6	750' - 15' F.B.	8,650	
Pump Station					300						3-50,000 gpm pumps & 2,300' 66" Force Main	3,147,000	Rebuild pump station
												3,657,550	SUBTOTAL
												731,500	UPSTREAM IMPROVEMENTS
												4,389,050	TOTAL
FIFTH AVENUE (J-8, J-9, K-8, K-9)													
K9.4A to K9.3A	35.8	0.45	16.11	28	68	36" RCP	100'	(0.0037) -0.0028	37	5.2	100' - 36" RCP	14,650	Parallel system
K9.3A to K9.8A	18.8	0.45	24.57	29	102	9' F.B. Channel	240'	(0.0037) 0.004	283	5.6		Adequate	
K9.8A to K9.6A	8.8	0.7	30.73	30	126	3.5' x 4' Box	150'	(0.0037) 0.0039	81	5.8	200' - Dual 6'x10' Box	266,400	Peak discharge equals 430 CFS; includes discharge from Forest Acres.
K9.6A to K9.5A	2.6	0.7	32.55	31	130	3.5' x 4' Box	50'	(0.0037) -0.0106	81	5.8			
K9.5A to K8.6	4.6	0.45	34.62	32	137	6' F.B. Channel	620'	(0.0037) 0.0003	373	6.0	26' F.B. Channel	60,8950	
K8.6 to K8.5	8.0	0.45	38.22	36	141	36" RCP	75'	(0.0037) 0.008	37	5.2	75' - Dual 6'x10' Box	122,400	Parallel system
												454,300	SUBTOTAL
												92,900	UPSTREAM IMPROVEMENTS
												557,200	TOTAL

Forest Acres

The Forest Acres drainage basin is located on both sides of Highway 61 and is bounded on the east by the Fifth Avenue drainage basin and on the west by the Sherwood Forest and K Mart drainage basins. The basin collects runoff from approximately 170 acres and conveys it through a channel to an existing pump station located at the northeast corner of the intersection of Playground Road and the abandoned Seaboard Systems Railroad.

The existing drainage facilities are inadequate, providing less than 60 percent of the recommended capacity. Proposed improvements include replacement of all existing culverts and pipe conduit and widening of existing channels. Special attention should be given to an existing low area which exists in the apartment complex on Brookwood Circle during design.

Runoff is discharged by a stormwater pumping station and a 48" diameter force main which follows the northern edge of the abandoned railroad bed and discharges into the Ashley River. The pumping station has a design capacity of 20,000 gpm, which is approximately 20 percent of the recommended capacity of 100,000 gpm. Upgrading the existing pump station to a capacity of 100,000 gpm with two 66" diameter force mains is recommended.

Fifth Avenue

The Fifth Avenue drainage basin drains a total of 78.6 acres of residential development of which approximately 90 percent lies outside the City of Charleston boundaries. The area extends from the western boundary of Magnolia Road to the Ashley River. Existing drainage facilities include a channel and culvert system which is inadequate and should be replaced. Recommended improvements include a parallel 60" RCP crossing St. Andrews Boulevard and parallel dual 42" RCP at the Ellsworth Avenue crossing.

TABLE 47

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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)	
SHERWOOD FOREST EAST (K-10)													
K10.15 to K10.16	2.7	0.7	1.89	5	14	24" RCP	120'	(0.0088) 0.0425	18	5.8		Adequate	
K10.16 to K10.14	7.4	0.45	5.22	6	37	3' F.B. Channel	420'	(0.0088) 0.0001	79	5.7		Adequate	Possible channel erosion
K10.12 to K10.14	1.5	0.7	1.05	5	8	24" RCP	95'	(0.007) 0.0195	16	5.2		Adequate	
K10.14 to K10.3	3.6	0.45	7.89	9	49	6' F.B. Channel	210'	(0.007) 0.0049	150	6.2		Adequate	
K10.3 to K10.5	21.9	0.45	17.75	21	83	Dual 18" RCP	70'	(0.007) 0.0009	8	4.3	70' - Dual 36" RCP	16,950	Replace dual 18" RCP
K10.5 to K10.6	17.8	0.45	25.76	22	118	Dual 24" RCP	70'	(0.01) 0.009	40	6.2	70' - Dual 42" RCP	23,200	Replace dual 24" RCP
K10.9 to K10.8	1.6	0.45	0.72	5	5	24" RCP	80'	(0.005) 0.0039	14	4.4		Adequate	
												40,150	SUBTOTAL
												8,050	UPSTREAM IMPROVEMENTS
												48,200	TOTAL
SHERWOOD FOREST WEST (K-10)													
K10.19 to K10.17	25.7	0.45	11.57	21	54	Dual 18" RCP	70'	(0.0035)	28	4.5	70' - Dual 36" RCP	19,400	Replace culverts
K10.17 to K10.21	2.1	0.45	12.52	22	58	3' F.B. Channel	50'	(0.0035)	62	3.7			Adequate
K10.21 to K10.23					58	24" RCP	150'	(0.0035)	12	3.7	150' - 48" RCP	26,350	Replace 24" RCP
K10.23 to outfall	26.2	0.45	24.31	23	109	18" RCP	330'	(0.0035)	5	3.0	330' - Dual 48" RCP	110,500	Replace 18" RCP
												156,250	SUBTOTAL
												31,250	UPSTREAM IMPROVEMENTS
												187,500	TOTAL

Sherwood Forest East

The Sherwood Forest East watershed is located in the northern portion of the Sherwood Forest subdivision and is bounded on the west by Crull Drive and on the east by Locksley Drive. All of the existing drainage structures within the drainage basin are adequate with the exception of the existing dual 24" RCP under Crull Drive which provides less than 35 percent of the recommended capacity. Replacement of the system with dual 42" RCP is recommended.

Sherwood Forest West

The Sherwood Forest West drainage basin drains 54 acres of the Sherwood Forest subdivision. The existing drainage system consist of a drainage channel which commences at King Richard Drive and conveys runoff to a pipe conduit system which crosses Pineview Road and discharges into the Citadel Mall channel. The existing systems are inadequate and should be replaced with larger diameter culverts.

During final design for this area special attention should be given to the area between Robinhood Drive and King Richard Drive which has a continuing problem with flooding. The existing channel from King Richard Drive to Pineview Drive should be improved along with the culverts under Pineview Drive.

TABLE 48

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
HAZELWOOD AVENUE (K-10, K-11, L-10, L-11)													
K11.19 to K11.18	6.8	0.45	3.06	11	18	24" RCP	90'	(0.0066) 0.0019	11	3.5	90' - 30" RCP	8,250	Replace 24" RCP
K11.18 to K11.16	2.2	0.45	4.05	12	23	3' F.B. Channel	100'	(0.0045) 0.0277	38	3.8		Adequate	
K11.17 to K11.16	5.5	0.45	2.48	7	16	Dual 18" RCP	70'	(0.0031) 0.0061	10	2.9	70' - Dual 24" RCP	17,200	Replace dual 18" RCP
K11.16 to K11.14			6.53	13	36	Dual 18" RCP	60'	(0.0128) 0.0027	20	5.8	60' - 30" RCP	13,500	Replace dual 18" RCP
K11.14 to K11.13	2.2	0.45	7.52	14	40	5' F.B. Channel	30'	(0.0128) 0.0027	394	9.8		Adequate	
K11.13 to K11.10					40	30" RCP	60'	(0.0128) 0.0003	40	8.2		Adequate	
K11.2 to K11.3	16.1	0.45	7.25	15	38	36" RCP	280'	(0.0027) 0.0137	30	4.2	280' - 42" RCP	40,500	Replace 36" RCP
K11.3 to K11.7	26.8	0.45	19.31	17	97	Dual 36" RCP	350'	(0.0027) 0.0011	60	4.2	615' - Dual 48" RCP	204,900	Replace dual 36" RCP
K11.7 to K11.10	2.8	0.7	21.27	19	102	Dual 36" RCP	190'	(0.0027) 0.0003	60	4.2			
K11.10 to K11.11			28.79	20	137	Dual 42" RCP	65'	(0.0027) 0.0003	91	4.7			
K11.11 to K11.22	6.8	0.7	33.55	24	149	8.5' F.B. Channel	520'	(0.0018) 0.0027	153	3.6		Adequate	
K11.22 to K11.20					149	Dual 48" RCP	85'	(0.0335) 0.0012	156	6.2		Adequate	
												284,350	SUBTOTAL
												56,900	UPSTREAM IMPROVEMENTS
												341,250	TOTAL
DUPONT NORTH (K-10)													
K11.37 to K11.34	11.8	0.45	5.31	13	29	24" RCP	440'	(0.0038) 0.0013	12	3.8	440' - 36" RCP	51,100	Replace 24" RCP
K11.34 to K11.33	6.8	0.45	8.37	16	43	18"x29" CMP	50'	(0.0038) 0.0052	8	2.5	300' - 42" RCP	49,500	Replace existing system
K11.33 to K11.36	6.0	0.45	11.07	17	55	24" RCP	250'	(0.0038) 0.0019	12	3.8			
												100,600	SUBTOTAL
												20,150	UPSTREAM IMPROVEMENTS
												120,750	TOTAL
ORLEANS ROAD WEST (K-11)													
K11.62 to K11.60	2.3	0.7	1.61	6	11	30" RCP	330'	(0.0021) 0.0032	16	3.3		Adequate	
K11.60 to K11.45	0.9	0.7	2.24	8	14	36" RCP	340'	(0.0083) 0.0033	53	7.4		Adequate	
K11.45 to K11.44	0.65	0.7	2.70	10	16	36" RCP	55'	(0.0083) -0.0047	53	7.4		Adequate	
ORLEANS ROAD EAST (K-11)													
K11.43 to K11.42	3.8	0.7	2.66	5	20	24" RCP	50'	(0.0288) 0.0012	55	17.5		Adequate	

Hazelwood Avenue

This watershed drains a total of 69 acres of which approximately 80 percent is located outside the City of Charleston boundaries. The area is located south of Savage Road and is bounded on the west by Orleans Road and on the south and east by Jaywood Circle. Existing drainage facilities consist of a open channel which runs behind the houses on Jaywood Circle and west to a pipe conduit system which commences at Hazelwood Drive and conveys the runoff to an open channel located east of Orleans Road that discharges into the Citadel Mall channel. The existing system is inadequate and recommended improvements include replacing the existing dual 36" RCP with dual 48" RCP.

Dupont North

The Dupont North watershed is located north of Highway 7 and is bounded on the north by Hazlewood Drive and on the south by the Citadel Mall channel. The existing pipe conduit system which discharges into the Citadel Mall channel provides less than 50 percent of the recommended capacity. Replacement of the system with a new 42" RCP and 36" RCP system is recommended.

Orleans Road West

The Orleans Road West watershed joins the Orleans Road East watershed on the east and drains the west side of Orleans Road. The existing 36" RCP outfall into the Citadel Mall channel is adequate.

Orleans Road East

The Orleans Road East watershed drains the eastern side of Orleans Road from Hazelwood Road to the Citadel Mall channel. The exiting 24" RCP outfall into the Citadel Mall channel is adequate.

TABLE 49

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
SKYLARK DRIVE (J-11, K-11)													
J11.10 to J11.11	3.3	0.45	1.49	11	9	24" RCP	90'	(0.0017) 0.003	8	2.6		Adequate	Available head
J11.11 to J11.12	22.2	0.9	21.47	15	112	24" RCP	110'	(0.0017) 0.0004	8	2.6	110' - Dual 48" RCP	52,500	Parallel system
J11.12 to J11.13	6.3	0.9	27.14	16	138	30" RCP	40'	(0.0017) 0.0073	15	3.0	140' - 4'x6' Box	48,750	Parallel system
J11.13 to J11.14	1.65	0.45	27.88	17	139	42" RCP	100'	(0.0017) 0.0021	36	3.7			
J11.14 to J11.81	18.1	0.7	40.55	18	199	7' F.B. Channel	700'	(0.0017) 0.0008	153	3.6	7' F.B. Channel	9,000	
J11.81 to K11.74	19.0	0.45	49.10	23	221	42" RCP	560'	(0.0017) 0.0027	72	3.7	560' - Dual 6'x10' Box	426,750	Replace system
K11.84 to K11.74	4.8	0.45	2.16	6	15	30" RCP	340'	(0.0079) 0.0036	32	6.4		Adequate	
K11.74 to K11.72	4.8	0.45	53.42	27	227	42" RCP & 48" RCP	270'	(0.0017) 0.0014	87	4.1	270' - Dual 6'x10' Box	157,900	Replace system
												694,900	SUBTOTAL
												139,000	UPSTREAM IMPROVEMENTS
												833,900	TOTAL
CITADEL MALL WEST (K-11)													
K11.57 to K11.56	3.5	0.9	3.15	5	23	24" RCP	100'	(0.001) -0.0019	6	2.0	100' - 36" RCP	17,900	Parallel system
K11.56 to K11.53	1.6	0.9	4.59	6	32	30" RCP	400'	(0.0038) 0.0032	22	4.5	400' - 36" RCP	56,500	Parallel system
K11.53 to K11.51	6.3	0.9	10.26	9	74	42" RCP	170'	(0.0038) -0.0002	54	5.6	170' - 30" RCP	16,300	Parallel system
												90,700	SUBTOTAL
												18,150	UPSTREAM IMPROVEMENTS
												108,850	TOTAL
CITADEL MALL EAST (K-11)													
K11.68 to K11.65	11.7	0.9	10.53	5	78	48" RCP	340'	(0.0021) 0.0025	57	4.5	340' - 30" RCP	Private 32,650	Parallel system
K11.67 to K11.65	1.8	0.9	1.62	5	12	24" RCP	490'	(0.0012) 0.0048	14	4.3		Adequate	
K11.65 to K11.46	4.8	0.9	16.47	8	105	54" RCP	170'	(0.0196) 0.0039	238	15		Adequate	
												32,650	SUBTOTAL
												6,550	UPSTREAM IMPROVEMENTS
												39,200	TOTAL

Skylark Drive

The Skylark Drive watershed is located east of the intersection of Highway 17 and Highway 7 and drains a commercial and residential area including Parker Pontiac. The existing drainage facilities consist of a 48" RCP and 42" RCP which extends from the outfall point in the Citadel Mall channel, across Highway 7 and connects to a channel leading to the drainage structures under Highway 17. This existing system provides less than 50 percent of the recommended capacity. Recommended improvements include replacing the existing system under Highway 17 and Highway 7 with dual 6'x10' box culverts. Improvements to the Citadel Mall outfall channel will also be required (see discussion of Citadel Mall channel for recommended improvements).

Citadel Mall West

The Citadel Mall West drainage basin drains the southern portion of the Citadel Mall development. Existing drainage facilities consist of a pipe conduit which takes runoff from the Citadel Mall parking lot to the Citadel Mall channel. Recommended improvements consist of placing a 30" RCP and 36" RCP parallel to the existing pipe conduit. It should be noted that all of the existing drainage facilities are on private property.

Citadel Mall East

The Citadel Mall East drainage basin drains the eastern portion of the Citadel Mall development. The existing system is adequate except for the branch from K11.68 to K11.65 which provides less than 75 percent of the required capacity. Installation of a 30" RCP parallel to the existing 48" RCP is recommended. As with the Citadel Mall West watershed, all existing drainage systems are located on private property.

TABLE 50

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
CLEMSON (J-13, K-13, K-14)													
J13.5 to J13.6	19.9	0.25	4.98	15	26	24" RCP	80'	0.0018	12	3.8	80' - 36" RCP	10,300	Replace 24" RCP
J13.6 to J13.1					26	4.5' F.B. Channel	700'	(0.0005)	63	1.8		Adequate	
J13.1 to J13.2	17.3	0.25	9.31	19	45	24" RCP	60'	-0.0013	12	3.8	60' - Dual 36" RCP	16,450	Replace 24" RCP
J13.2 to J13.7					45	7.5' F.B. Channel	430'	(0.0005)	189	2.4		Adequate	
J13.7 to J13.8	22.7	0.25	14.99	22	69	30" RCP	110'	0.0062	18	3.7	110' - Dual 42" RCP	32,600	Replace 30" RCP
												59,350	SUBTOTAL
												11,900	UPSTREAM IMPROVEMENTS
												71,250	TOTAL
AGRICULTURAL STATION (K-13, K-14)													
K13.17 to K13.18	55 21	0.25 0.45	23.2	33	90	24" RCP	100'	(0.0013)	14	4.5	100' - Dual 48" RCP	35,050	Replace 24" RCP
K13.18 to K13.4	36	0.25	32.2	34	124	10' F.B. Channel	124'	(0.0013)	357	4.1		Adequate	
K13.4 to K13.1	36	0.25	41.2	43	140	18" RCP & 30" RCP & 36" RCP	100'	(0.0013)	143	14.1		Adequate	
												35,050	SUBTOTAL
												7,050	UPSTREAM IMPROVEMENTS
												42,100	TOTAL

Clemson

The Clemson watershed drains a portion of the Clemson University Experiment Farm located south of Highway 17. Existing drainage facilities consists of a series of drainage ditches with culverts at roadways. The ditches are adequate but the existing culverts are inadequate and will require improvement.

Agriculture Station

The Agriculture Station watershed drains a total of 148 acres which surround the U.S. Department of Agricultural Farm located north of Highway 17. The existing drainage system consist of a roadside ditch which discharges into Long Branch Creek. This existing system is adequate with the exception of the 24" RCP culvert which crosses under the entrance road to the agricultural station and replacement with dual 48" RCP is recommended.

TABLE 51

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
MARVIN (K-9, L-9)													
K9.42 to K9.41	15.8	0.45	7.11	22	33	27" x 43" CMP	80'	(0.0097) 0.0038	37	5.3		Adequate	
K9.41 to K9.46	3.9	0.45	8.87	23	40	36" RCP	150'	(0.0007) 0.008	57	8.1		Adequate	
K9.46 to K9.52	1.7	0.7	10.06	24	45	36" RCP	340'	(0.0097) 0.0068	57	8.1		Adequate	
K9.47 to K9.48	4.5	0.45	2.03	18	10	24" RCP	30'	(0.015) -0.0033	24	7.6		Adequate	
K9.48 to K9.52	11.6	0.45	7.25	19	35	24" RCP	170'	(0.015) 0.0153	24	7.6	170' - 30" RCP	27,000	Replace existing
K9.52 to K9.53	4.7	0.7	20.06	26	89	48" RCP	40'	(0.015) -0.02	152	12.1		Adequate	
K9.53 to Marsh					89	5' F.B. Channel	200'	(0.015)	609	11.6		Adequate	
												27,000	SUBTOTAL
												5,400	UPSTREAM IMPROVEMENTS
												32,400	TOTAL
TOWN CREEK DRIVE (K-9)													
K9.60 to K9.59	23.3	0.45	10.49	12	59	24" RCP	175'	(0.011) 0.0039	21	6.6	175' - 42" RCP	25,950	Parallel system
												25,950	SUBTOTAL
												5,200	UPSTREAM IMPROVEMENTS
												31,150	TOTAL
WESPANEE DRIVE (K-9)													
K9.57 to K9.54	4.7	0.45	2.12	5	16	24" RCP	120'	(0.0318) -0.0053	35	11.1		Adequate	
ST. AUGUSTINE DRIVE (K-9)													
K9.58	4.8	0.45	2.16	5	16	18" RCP	160'	(0.0259)	15	8.3		Adequate	Available head
ROYAL AVENUE (L-9, M-9)													
K9.64 to K9.63	3.7	0.45	1.67	7	11	24" RCP	170'	(0.007) 0.0070	14	4.5		Adequate	

Marvin

The Marvin watershed drains a total of 42 acres of the Lenevar and Old Town Acres subdivisions and is located along the west side of Highway 171 and extends from the southern boundary of Bamboo Drive to the northern boundary of Camelot Drive. The existing drainage system is adequate with the exception of one segment, manhole number K9.48 to K9.52 which provides only 69 percent of the recommended capacity. A 36" RCP is recommended which will replace the existing 24" RCP.

Town Creek Drive

The Town Creek Drive watershed drains 23.3 acres of the Wespanee subdivision. Runoff from the area is conveyed by a series of small roadside pipe conduits to a lake located between Town Creek Drive and Fort Royal Court. Adequate storage area is provided by the lake prior to discharge into the Ashley River and no improvements are recommended.

Wespanee Drive

The Wespanee Drive watershed drains a 4.7 acre area around the intersection of Wespanee Drive and St. Augustine Drive in the Wespanee subdivision. The existing 24" RCP outfall to the Ashley River is adequate.

St. Augustine Drive

The St. Augustine Drive watershed bounds the Wespanee Drive watershed on the west and drains the east end of St. Augustine Drive. The existing 18" RCP outfall is adequate.

Royal Avenue

The Royal Avenue watershed drains the area on either side of Royal Avenue between Wespanee Drive and Town Creek Drive. The existing 24" RCP outfall is adequate. A low area outside of the Royal Avenue watershed at the end of Fort Royal Court experiences flooding due to the low elevations in the area and the capacity of the existing 18" RCP outfall is limited by tidal influence.

TABLE 52

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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)	
PLANTATION (K-9)													
K9.35 to K9.39	56.1	0.35	19.64	40	70	48" RCP	820'	(0.003) 0.0028	68	5.4		Adequate	
K9,39 to K9,21	5.9	0.35	21.71	49	70	48" RCP	780'	(0.003) 0.0016	68	5.4		Adequate	
K9.21 to Junction	7.3	0.35	24.27	54	70	48" RCP	200'	(0.003) 0.0016	68	5.4		Adequate	
K9.32 to K9.30	2.4	0.45	1.08	5	8	Dual 24" RCP	80'	(0.0009) 0.0024	28	4.5		Adequate	
K9.30 to K9.29	4.3	0.45	3.02	6	21	3.5' F.B. Channel	480'	(0.0009) 0.0001	40	2.0		Adequate	
K9.29 to K9.28					21	30" RCP	100'	(0.0009) 0.0000	24	4.9		Adequate	
K9.28 to K9.27	4.3	0.45	4.96	9	31	4' F.B. Channel	40'	(0.0009) 0.0115	139	2.8		Adequate	
K9.27 to K9.26	6.9	0.45	8.07	10	48	36" RCP	220'	(0.0009) 0.0014	17	2.5	220' - 54" RCP	47,800	Replace 36" RCP
K9.26 to Junction	9.8	0.45	12.48	11	72	36" RCP	440'	(0.0022)	27	3.8	440' - 54" RCP	102,200	Replace 36" RCP
Junction to K9.18	3.3	0.7	2.31	5	17	42" RCP	240'	(0.002)	78	4.0		Adequate	Carries part of flow from junction to K9,5,2
K9.16 to K9.14	10.4	0.45	4.68	11	27	30" CMP	215'	(0.0065) 0.0077	19	3.8	215' - 30" RCP	28,600	Remove 30" CMP
K9.14 to K9.18	3.7	0.7	7.27	12	41	36" CMP	240'	(0.0011)	12	1.8	240' - 48" RCP	48,150	Remove 36" CMP
K9.18 to K9.11	2.7	0.7	11.47	14	61	Dual 42" RCP	400'	(0.002)	78	4.0		Adequate	
K9.11 to K9.8	11.3	0.7	19.38	17	97	42" RCP	150'	(0.0027)	45	4.7	530' - 48" RCP	104,000	Parallel systems from K912 to K9.9
K9.8 to K9.3	5.2	0.7	23.02	18	113	42" RCP & 36" RCP	420'	(0.0104)	148	9.2		Adequate	
K9.3 to K9.4	2.0	0.7	24.42	21	115	42" RCP	50'	(0.0104) 0.0048	178	9.2		Adequate	
Junction to K9.5.2			43.68	35	166	54" RCP	1235'	(0.0028) 0.0013	90	5.7		Adequate	
K9.24.1 to K9.24.2	8.8	0.45	3.96	12	22	24" RCP	50'	(0.0081)	18	5.6		Adequate	Available head
K9.24.2 to K9.24	8.1 20.1	0.45 0.7	21,68	13	119	24" RCP	210'	(0.0081) 0,0155	18	5,6	210' - 54" RCP	49,100	Replace 24" RCP
K9,24 to K9.5.2	11.0	0.7	29.38	14	156	36" RCP	370'	(0.0109)	60	8,5	200' - 54" RCP	47,050	Replace 36" RCP
K9.5.2 to K9.5	1.2	0.9	74.14	43	252	72" RCP	250'	(0.0109)	383	13.5		Adequate	
												426,900	SUBTOTAL
												85,400	UPSTREAM IMPROVEMENTS
												512,300	TOTAL

Plantation

The Plantation drainage basin is located adjacent to Highway 171 in the West Ashley area. It is bounded on the south by Highway 61 and the Forest Acres drainage basin, on the west by Ashley Hall Road, and on the north by the Marvin drainage basin. The watershed drains approximately 185 acres of predominately residential development, the majority of which lies within the Old Town Acres, Murray Hill, and Heathwood subdivisions. The major drainage system along Carriage Lane is adequate, with improvements recommended in the upper reaches of the watershed and the existing system along Highway 61 from Winston Drive to Carriage Lane.

TABLE 53

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
CHARLESTOWNE (L-8, L-9)													
L9.11 to L9.10	7.8 28.6	0.7 0.45	18.33	26	79	24" RCP	80'	(0.0063) 0.0024	16	5.0	80' - 48" RCP	18,750	Replace 24" RCP
L9.14 to L9.10	2.5	0.45	1.13	8	7	24" RCP	45'	(0.0063) 0.0044	16	5.0		Adequate	
L9.10 to L9.9	4.0	0.45	21.26	27	90	40"x65" CMP	135'	(0.0063) 0.0113	88	5.5		Adequate	Available head
L9.9 to L9.15	13.9	0.45	27.52	35	105	Lake							
L9.15 to L9.17					105	36" CMP & 18" RCP	175'	(0.0122) 0.0085	52	4.5		Adequate	Available storage in lake
												18,750	SUBTOTAL
												3,750	UPSTREAM IMPROVEMENTS
												22,500	TOTAL
ROYAL PALM (L-9, M-9)													
M9.82 to M9.83	1.8 4.0	0.45 0.6	3.21	11	19	24" RCP	140'	(0.0036) 0.0053	12	3.7	520' - 30" RCP	Private	Replace Existing 24" RCP
M9.83 to L9.84	0.8	0.6	3.69	12	21	24" RCP	150'	(0.0033) 0.0072	11	3.6			
L9.84 to L9.85	1.1	0.6	4.35	13	24	24" RCP	230'	(0.0043) 0.0031	13	4.1			
L9.85 to L9.86	8.9 14.5	0.45 0.6	17.06	15	89	30" CMP	130'	(0.0457) 0.0136	49	10.1	130' - 42" RCP	18,150	Replace 30" CMP
												18,150	SUBTOTAL
												3,650	UPSTREAM IMPROVEMENTS
												21,800	TOTAL
PARKSHORE SOUTH (L-9, M-9)													
L9.89 to M9.90	3.1 11.2	0.6 0.45	6.90	12	39	24" RCP	150'	(0.0154) 0.0117	24	7.7	250' - 24" RCP	30,550	Parallel system
												30,550	SUBTOTAL
												6,100	UPSTREAM IMPROVEMENTS
												36,650	TOTAL

Charlestowne

The Charlestowne drainage basin is located between the Ashley River on the east, Southgate Drive on the north, Highway 171 on the west, and Old Towne Plantation Road on the south, and drains 56.8 acres of the Charlestowne Estates I subdivision through a system of roadside ditches and culverts. The existing system discharges into a lake between Donahue Drive and Old Towne Plantation Road prior to discharge into the Ashley River marsh, and is adequate, with the exception of the culvert which crosses Donahue Drive at Candy Lane. The existing 24" RCP at this location should be replaced with a 48" RCP culvert.

Royal Palm

The Royal Palm watershed drains 31.1 acres of the area around the Palms Apartments. The existing drainage facilities consist of a pipe conduit system which conveys runoff from the parking lot of the Palms Apartments to an outfall channel to the Ashley River. The existing system is inadequate and should be replaced with a new system of 30" RCP and 42" RCP.

Parkshore South

The Parkshore South drainage basin drains the area around the intersection of Parkshore Drive and Cecilia Drive. Approximately 50 percent of the area lies outside the City of Charleston boundaries. The existing 24" RCP outfall from Cecilia Drive to the Ashley River marsh is inadequate and a parallel 24" RCP is recommended.

TABLE 54

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
SOUTHGATE (L-8, L-9, M-8, M-9)													
L9.8 to L9.7	2.3 3.1	0.9 0.45	3.47	11	20	24" RCP	50'	(0.0043) 0.0040	14	4.5	130' - 30" RCP	16,500	Replace ditch and culvert system
L9.7 to L9.6	1.2	0.45	4.01	12	22	2' F.B. Channel	40'	(0.0043) -0.0476	31	3.4			
L9.6 to L9.5					22	24" RCP	40'	(0.0043) 0.0030	14	4.5			
L9.5 to L9.4	1.8	0.45	4.82	13	27	2' F.B. Channel	30'	(0.0043) 0.001	31	3.4	355' - 36" RCP	57,200	Replace ditch and culvert system
L9.4 to L9.3					27	24" RCP	50'	(0.0043) -0.0034	14	4.5			
L9.3 to L9.2	2.1	0.45	5.77	14	31	2' F.B. Channel	70'	(0.0043) -0.0057	71	4.2			
L9.2 to L9.1					31	24" RCP	45'	(0.0043) 0.0067	14	4.5			
L9.1 to L8.35	0.7	0.45	6.09	15	32	2' F.B. Channel	60'	(0.0036) -0.0010	65	3.9			
L8.35 to L8.34					32	24" RCP	60'	(0.0036) 0.0045	14	4.5			
L8.34 to L8.33	1.9	0.45	6.95	16	35	2' F.B. Channel	40'	(0.0036) 0.0025	121	4.3			
L8.33 to L8.32					35	24" RCP	70'	(0.0085) 0.0019	14	4.5	290' - 36" RCP	46,450	Replace ditch and culvert system
L8.32 to L8.30	2.0	0.45	7.85	7	39	2' F.B. Channel	110'	(0.0085) -0.0005	158	6.6			
L8.30 to L8.29					39	24" RCP	60'	(0.0085) 0.0022	14	4.5			
L8.29 to L8.27	0.4	0.45	8.03	18	39	2.5' F.B. Channel	50'	(0.0085) 0.0092	105	6.0			
L8.27 to L8.26					39	24" RCP	80'	(0.0085) 0.0028	14	4.5	220' - 36" RCP	35,350	Replace ditch and culvert system
L8.26 to L8.25	4.1	0.45	9.88	19	47	3' F.B. Channel	90'	(0.0085) 0.0041	180	6.8			
L8.25 to L8.24					47	24" RCP	50'	(0.0085) -0.0002	14	4.5			

(CONTINUED)

TABLE 54

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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)	
SOUTHGATE (CONTINUED)													
L8.31 to L8.28	2.1	0.45	0.95	14	5	24" RCP	265'	(0.0064) -0.0023	16	5.0		Adequate	
L8.28 to L8.23	3.0	0.45	2.30	16	12	3' F.B. Channel	60'	(0.0061) 0.0097	38	4.2		Adequate	
L8.23 to L8.19					12	24" RCP	225'	(0.0061) 0.0059	45	6.4		Adequate	
L8.24 to L8.18	1.3	0.45	12.77	21	60	3' F.B. Channel	350'	(0.0061) 0.0083	170	6.0		Adequate	
L8.18 to L8.15					60	36" RCP	250'	(0.0061) 0.0126	45	6.4	250' - 30" RCP	29,600	Parallel system
L8.15 to L8.7	3.1	0.45	14.17	24	63	36" RCP	350'	(0.0061) 0.0123	45	6.4	350' - 30" RCP	38,850	Parallel system
L8.7 to L8.4	1.0	0.45	14.62	26	63	36" RCP	70'	(0.0041) 0.0066	37	5.2	70' - 36" RCP	11,300	Parallel system
L8.6 to L8.5	5.3	0.45	2.39	17	12	24" RCP	50'	(0.0041) 0.0202	13	4.0		Adequate	
L8.37 to L8.38	3.0 47.6	0.9 0.45	24.12	22	111	30" RCP	60'	(0.0035) 0.0175	21	4.9	60' - 54" RCP	13,000	Parallel system
L8.38 to L8.8	2.3 16.2	0.9 0.45	50.49	27	215	5' F.B. Channel	610'	(0.0035) 0.0013	220	5.2		Adequate	
L8.8 to L8.10					215	Dual 48" RCP	50'	(0.0041) -0.0074	150	6.0	50' - 48" RCP	14,250	Parallel system
												262,500	SUBTOTAL
												52,500	UPSTREAM IMPROVEMENTS
												315,000	TOTAL

Southgate

The Southgate watershed drains 104.5 acres of the Northbridge Terrace and Charles Towne Estates I subdivisions. The existing drainage facilities are inadequate and are divided into two branches. The first branch is a tributary of Orange Grove Creek which extends northward from Dumbarton Drive to Summerset Circle. The existing 5 foot flat bottom channel is adequate, however, the culvert at Northbridge Road needs to be improved by the placement of a parallel 54" RCP. Improvements to the channel will involve excavation in the marsh and will require a South Carolina Coastal Council permit. The second branch consist of a series of pipe conduits, roadside ditches, and culverts which extend from the Orange Grove Creek outfall to Highway 171. Replacing the system with a 30" RCP and 36" RCP is recommended.

TABLE 55

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
DOWDEN (K-9, L-9)													
K9.44 to K9.43	0.83	0.45	0.37	4	3	24" RCP	115'	(0.0019) 0.003	14	4.5		Adequate	
K9.43 to L9.30	41.1	0.45	18.87	22	87	3.5' F.B. Channel	730'	(0.0019)	64	3.0		5,650	Clean channel and regrade sideslope to 2 horizontal to 1 vertical.
L9.30 to L9.29	15.3	0.45	25.76	27	109	24" RCP 27" x 43" CMP	90'	(0.0019) 0.0039	44	4.5	90' - Dual 42" RCP	31,700	Replace existng pipes
L9.29 to L9.34	11.8	0.45	31.07	33	121	4.5' F.B. Channel	375'	(0.0019) 0.0024	129	3.6		Adequate	
L9.34 to L9.33					121	24" RCP 27" x 43" CMP	70'	(0.0019) 0.0114	44	4.5	70' - Dual 48" RCP	16,950	Replace existing pipes
L9.33 to A	10.0	0.45	35.57	38	128	5' F.B. Channel	610'	(0.0019)	184	3.9		Adequate	
A to C	7.5 21.0	0.7 0.45	50.27	43	171	5' F.B. Channel	570'	(0.0019)	184	3.9	Revise Channel 2:1 sideslope	2,550	Clean channel and regrade sideslope to 2 horizontal to 1 vertical
L9.58 to L9.57	8.7	0.45	3.92	13	22	24" RCP	80'	(0.0046) 0.0054	13	4.2	80' - 24" RCP	8,050	Parallel pipe
L9.54 to L9.56	9.4	0.45	4.23	13	23	24" RCP	150'	(0.0122) 0.0065	22	6.9		Adequate	
L9.57 to C	2.3 9.5	0.9 0.45	14.50	20	69	2.5' F.B. Channel	1040'	(0.0046)	153	5.2		Adequate	
L9.47 to L9.49	13.8	0.9	12.42	12	70	36" RCP	65'	(0.0065) 0.0052	47	6.6	65' - 30" RCP	10,200	Parallel pipe
L9.49 to L9.50	5.5	0.45	14.90	14	79	3' F.B. Channel	250'	(0.0065) 0.007	187	6.3		Adequate	
L9.50 to L9.52					79	22"x36" CMP 27"x43" CMP	60'	(0.0065) 0.0207	49	4.3	60' - Dual 36" RCP	19,000	Replace pipes
L9.52 to L9.53	3.1	0.45	16.30	15	85	48" CMP	70'	(0.0056) -0.0007	61	4.8	70' - 30" RCP	6,850	Parallel pipe
L9.53 to C	1.8	0.45	17.11	17	86	5' F.B. Channel	280'	(0.0056)	980	9.1		Adequate	
C to L9.27			81.88	53	237	8.5' F.B. Channel	380'	(0.0056)	1230	9.2		Adequate	
L9.39 to L9.27	26.5 3.0	0.9 0.45	25.20	18	123	36" RCP	1030'	(0.0093)	56	7.9	1030' - 42" RCP	156,850	Parallel pipe
L9.27 to L9.21	2.2 7.4	0.7 0.45	111.95	54	325	2-42" RCP; 2-30" RCP; 48" RCP	130'	(0.0056) 0.0165	277	7.4		Adequate 257,800 51,600 309,400	Available head SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

Dowden

The Dowden drainage basin lies within the triangle formed by Highway 7, Highway 171 and Marvin Avenue and drains portions of the Charlestowne Estates II and Lenevar subdivisions. This includes residential areas and a large regional shopping mall, Ashley Plaza Mall.

The existing drainage facilities consist of drainage ditches with culverts at roadway crossings. Approximately 50 percent of the existing drainage facilities are adequate. The systems which require improvement are the roadway culverts at Joshua Drive, Raymond Way, Dunnes Lane, Charlestowne Drive and Dowden Street plus a parallel system of 42" RCP along Highway 171 from Ashley Plaza Mall to the culverts crossing under Highway 171 at Old Towne Plantation Road.

TABLE 56

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
RIVERFRONT DRIVE (L-9)													
L9.81 to L9.80	28.3	0.45	12.74	16	65	18"x29" CMP	75'	(0.0013) 0.0037	11	3.5	75' - Dual 36" RCP	23,900	Replace 18"x29" CMP
L9.80 to L9.73	29.0	0.45	25.79	17	129	3' F.B. Channel	435'	(0.0013) 0.0023	43	2.4	3' F.B. Channel	11,800	Additional easement required
L9.73 to L9.77					129	24" RCP & 18" RCP	90'	(0.0213) 0.0012	42	9.1	90' - Dual 48" RCP	34,600	Replace existing 24" RCP & 18" RCP
L9.77 to L9.98	14.9	0.45	32.50	20	154	2.5' F.B. Channel	330'	(0.0213) 0.0232	126	8.8	3' F.B. Channel	10,950	Additional easement required
L9.98 to L9.97					154	Dual 24" RCP	70'	(0.0043) 0.0006	28	4.5	70' - Dual 48" RCP	28,200	Replace existing dual 24" RCP
L9.97 to L9.91	13.6	0.45	38.62	23	174	2.5' F.B. Channel	370'	(0.0043) 0.005	59	4.1	3' F.B. Channel	11,050	Additional easement required
L9.91 to L9.92	1.2 1.7	0.6 0.45	40.11	25	176	36" CMP	90'	(0.0053) 0.0014	27	3.9	90' - Dual 48" RCP	31,950	Replace 36" CMP
L9.92 to L9.95	2.7	0.45	41.33	26	178	36" RCP	330'	(0.0053)	42	6.0	330' - Dual 48" RCP	111,250	Relief system
L9.95 to L9.96					178	42" RCP	100'	(0.0053)	63	6.6	100' - Dual 42" RCP	31,200	Parallel system
												294,900	SUBTOTAL
												59,000	UPSTREAM IMPROVEMENTS
												353,900	TOTAL
MULMAR NORTH (L-9, L-10)													
L10.1 to L10.7	7.1	0.6	4.26	15	22	24" RCP	150'	(0.0131) 0.0089	22	7.1		Adequate	
L10.7 to L10.8					22	2' F.B. Channel	30'	(0.0131) 0.02	40	5.7		Adequate	
L10.8 to L10.9					22	24" RCP	85'	(0.0131) 0.0065	14	4.5	85' - 24" RCP	5,650	Parallel pipe
												5,650	SUBTOTAL
												1,150	UPSTREAM IMPROVEMENTS
												6,800	TOTAL
MULMAR SOUTH (L-9, L-10)													
L10.2 to L10.3	3.5	0.45	1.58	12	9	24" RCP	50'	(0.019) 0.0052	14	4.5		Adequate	
L10.3 to L10.4	0.2	0.45	1.67	13	9	2' F.B. Channel	20'	(0.019) 0.0535	56	7.0		Adequate	
L10.4 to L10.5					9	24" RCP	50'	0.0058	14	4.5		Adequate	

Riverfront Drive

The Riverfront Drive drainage basin is bounded on the south by Highway 7, on the east by Amberly Road, on the west by Downing Street and on the north by Cecilia Drive. The watershed drains a total of 91.4 acres, of which, 57.3 acres are in the City of Charleston boundaries.

The existing drainage facilities consist of a ditch and culvert system which extends from Highway 7 to the outfall into a small lake. The lake functions as a detention pond storing the runoff prior to discharge into the Ashley River. The existing systems are inadequate, providing less than 40 percent of the required capacity.

Replacement of the existing system with a new system consisting of a 3 foot flat bottom channel with dual culverts at roadway crossings is recommended. The lake at the end of the drainage system provides adequate storage capacity for runoff generated from the area.

Mulmar North

The Mulmar North drainage basin is located north of Orange Grove Road and drains the area along the east side of Mulmar Street from Orange Grove Road to the Ashley River. Existing drainage facilities consist of a channel with culverts at driveway crossings. All of the existing systems are adequate with the exception of the last culvert prior to discharge into the Ashley River which should be improved by the installation of a parallel 24" RCP.

Mulmar South

The Mulmar South drainage basin drains the area along the south side of Mulmar Street from Orange Grove Road to the Ashley River. Existing drainage facilities consist of a roadside channel with culverts at driveway crossings and is adequate.

TABLE 57

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
GAMECOCK ROAD (L-9, M-8, M-9)													
M9.46 to M9.45	10.6	0.70	7.42	11	43	24" RCP	70'	(0.006) 0.0246	15	4.8	70' - 36" RCP	14,400	Replace 24" RCP
M9.45 to M9.44	3.6	0.9	10.66	14	56	30" RCP	100'	(0.006)	28	5.6	110' - 36" RCP	57,400	Parallel system
M9.44 to M9.40	29.9	0.7	31.59	32	125	30" RCP	195'	(0.006)	28	5.6	195' - 54" RCP	47,800	Parallel system
M9.59 to M9.56	4.3	0.70	3.01	2	22	24" RCP	295'	(0.0051) 0.0044	14	4.5	290' - 24" RCP	25,700	Parallel system
M9.56 to M9.53	2.3	0.70	4.62	4	34	24" RCP	140'	(0.0064) 0.0076	16	5.0	140' - 24" RCP	13,450	Parallel system
M9.53 to M9.52	2.7	0.70	6.51	5	48	24" RCP	150'	(0.006) 0.0079	15	4.8	150' - 36" RCP	20,900	Parallel system
M9.52 to M9.50	4.2	0.70	9.45	6	66	24" RCP	170'	(0.0106) 0.0155	20	6.4	170' - 36" RCP	29,650	Parallel system
M9.50 to M9.47	2.0	0.70	10.85	7	72	24" RCP	235'	(0.0065) 0.0033	16	5.0	235' - 42" RCP	31,100	Replace 24" RCP
M9.47 to M9.42	1.4	0.70	11.83	9	73	3' F.B. Channel	170'	(0.0065)	175	6.2		Adequate	Potential channel erosion
M9.42 to M9.40	1.2	0.45	12.37	10	74	24" RCP	165'	(0.0065)	16	5.0	165' - 42" RCP	21,850	Replace 24" RCP
M9.40 to M9.32	5.1	0.45	46.26	33	180	30" RCP	245'	(0.0107)	36	7.3	245' - Dual 48" RCP	87,750	Replace 30" RCP
M9.32 to M9.35	6.5	0.45	49.19	35	187	27"x43" CMP	310'	(0.0106)	39	5.5	310' - Dual 48" RCP	101,650	Replace 27"x43" CMP
M9.35 to M9.37	7.2	0.45	52.43	37	191	27"x43" CMP	370'	(0.005) 0.0057	27	3.8	370' - 4'x6' box	104,650	Replace 27"x43" CMP
												556,300	SUBTOTAL
												111,300	UPSTREAM IMPROVEMENTS
												667,600	TOTAL
NUFFIELD DRIVE (L-9, M-9)													
M9.18 to M9.16	30.8	0.45	13.86	23	62	24" RCP	110'	(0.0018) 0.0012	8	2.6	110' - 48" RCP	26,550	Replace 24" RCP
M9.16 to M9.14	8.7	0.45	17.78	24	78	24" CMP	240'	(0.0217) 0.0109	19	6.0	240' - 48" RCP	42,000	Replace 24" CMP
												68,550	SUBTOTAL
												13,700	UPSTREAM IMPROVEMENTS
												82,250	TOTAL
MERTON (M-9)													
M9.26 to M9.24	10.4	0.45	4.68	11	27	24" RCP	135'	(0.0133) 0.0114	23	7.2		Adequate	Available head
WINCHESTER (M-9)													
M9.23 to M9.21	5.7	0.45	2.57	12	14	24" RCP	150'	(0.0113) 0.0091	21	6.6		Adequate	
M9.21 to M9.20	2.8	0.45	3.83	13	21	24" RCP	140'	(0.0179) -0.0001	26	8.3		Adequate	

Gamecock Road

The Gamecock Road watershed drains 81 acres of commercial development along Highway 7 and a portion of the Sandhurst subdivision. Approximately 75 percent of the area is zoned for commercial development. This area experiences surface flooding during periods of moderate to heavy rainfall with the downstream portion of the drainage area experiencing the majority of the problems.

Existing drainage facilities consist of a pipe conduit which extends southward from the outfall into the Ashley River marsh to the intersection of Winchester Drive and Westminster Road. Near this point the system splits into two branches, one running east and crossing Highway 7 and one running south to Gamecock Road.

Recommended improvements include replacing the existing outfall from the intersection of Winchester Drive and Westminister Road with dual 48" RCP's and 370' of 4'x6' box culvert. Other improvements include parallel pipes along each branch of the system to provide design capacity. The installation of the recommended improvements requires excavation in the marsh and a South Carolina Coastal Council permit will be required.

Nuffield Drive

The Nuffield Drive watershed drains a total of 39.5 acres in the Sandhurst subdivision and is located along Orange Grove Road between Winchester Drive and Manchester Road. Existing drainage facilities consist of a series of 24" CMP and 24" RCP which transport runoff from Nuffield Drive into the lake between Merton Road and Keble Road. The system provides less than 25 percent of the design capacity and replacing the system with a 48" RCP is recommended.

Merton

The Merton watershed drains a total of 10.4 acres of the Sandhurst subdivision, and is located between Merton Road on the north, Keble Road on the south and Rugby Road on the east. The existing 24" RCP outfall into a lake located between Winchester Drive and Sussex Road is adequate.

Winchester

The Winchester drainage basin is located along both sides of Winchester Drive and extends northwest from Orange Grove Road to the lake in the Merton watershed. The existing outfall consist of a 24" RCP which conveys runoff from Winchester Drive to the lake and is adequate.

TABLE 58

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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)	
COVENTRY CIRCLE (M-9)													
M9.7 to M9.5	3.7	0.45	1.67	8	22	24" RCP	250'	(0.0206) 0.003	28	8.9		Adequate	
SOUTH HAMPTON DRIVE (M-9)													
M9.3 to M9.1	7.3	0.45	3.29	10	20	24" RCP	170'	(0.0402) 0.0258	39	12.5		Adequate	
PARKSHORE DRIVE (M-9)													
M9.9	4.8	0.45	2.16	8	14	24" CMP	200'	(0.0255)	20	6.5		Adequate	

Coventry Circle

The Coventry Circle watershed is located along the northern end of South Hampton Drive and drains 3.7 acres of the Huntington Woods East subdivision. The existing 24" RCP outfall conveys water from South Hampton Drive to the Ashley River marsh and is adequate.

South Hampton Drive

The South Hampton Drive watershed drains the area located between South Hampton Drive and Orange Grove Elementary School through a 24" RCP from South Hampton Drive to the Ashley River marsh. The system is adequate and no improvements are required.

Parkshore Drive

The Parkshore Drive drainage basin drains 4.8 acres along the northern end of Parkshore Drive. An existing 24" CMP conveys runoff from Parkshore Drive to the Ashley River marsh and is adequate.

TABLE 59

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
ORANGE GROVE CREEK (M-8)													
M8.16 to M8.13	12.7	0.45	5.72	14	30	24" RCP	70'	(0.0068)	16	5.1	70' - 24" RCP	11,650	Parallel system
M8.13 to M8.12	3.76	0.45	7.41	15	39	30" VCP	230'	(0.0068) 0.0045	29	6.0	230' - 24" RCP	14,050	Parallel system
												25,700	SUBTOTAL
												5,150	UPSTREAM IMPROVEMENTS
												30,850	TOTAL
NORTHBRIDGE VILLAGE (M-8)													
M8.17	7.2	0.45	3.24	7	21	18" RCP	330'	(0.008)	8	4.6	330' - 36" RCP	42,250	Replace 18" RCP
												42,250	SUBTOTAL
												8,450	UPSTREAM IMPROVEMENTS
												50,700	TOTAL
NORVIEW (L-8, M-8)													
L8.43 to L8.42	10.6	0.45	4.77	11	28	24" RCP	135'	(0.0104) 0.0170	20	6.4	135' - 24" RCP	12,750	Parallel system
L8.42 to L8.41	3.1	0.45	6.17	12	35	24" RCP	50'	(0.0079) -0.0022	17	5.5	190' - 24" RCP	18,600	Parallel system
L8.41 to L8.40	4.6	0.45	8.24	13	45	30" RCP	140'	(0.0079) 0.0119	32	6.4			
L8.40 to L8.39					45	36" RCP	85'	(0.0064) 0.0109	46	6.5		Adequate	
												31,350	SUBTOTAL
												6,300	UPSTREAM IMPROVEMENTS
												37,650	TOTAL

Orange Grove Creek

The Orange Grove Creek watershed is located south of Orange Grove Road in the Parkshore I subdivision and is bounded on the west by Orange Grove Creek and on the south and east by the Ashley River. The existing drainage facilities are inadequate and consist of a 24" RCP which conveys runoff southwestward from Broadman Road to Orange Grove Creek. Installing a parallel 24" RCP is recommended to provide the design capacity.

Northbridge Village

The Northbridge Village drainage basin joins the Orange Grove Creek watershed on the east and drains 7.2 acres of the Parkshore I subdivision. The existing 18" RCP outfall is inadequate and a parallel 18" RCP is recommended.

Norview

The Norview watershed is located south of Orange Grove Road and drains portions of the Norview and Northbridge Terrace subdivisions. Existing drainage facilities consists of a pipe conduit system which runs from Norview Drive northeastward to the discharge point in Orange Grove Creek. The existing system provides less than 75 percent of the design capacity and a parallel 24" RCP is recommended.

TABLE 60

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
ORANGE GROVE ROAD (M-8, M-9)													
M8.40 to M8.38	3.9	0.7	2.73	12	15	30" CMP	85'	(0.0074) 0.0015	20	4.1		Adequate	
M8.38 to M8.37	2.4	0.7	4.41	13	24	5' F.B. Channel	70'	(0.0074) 0.0174	107	5.7		Adequate	
M8.37 to M8.35					24	30" CMP	90'	(0.0074) 0.0073	20	4.2	90' - 18" RCP	Private	Parallel system
M8.35 to M8.33	1.5	0.7	5.46	14	29	5' F.B. Channel	80'	(0.0088) 0.0138	219	7.4		Adequate	
M8.33 to M8.31					29	30" CMP	115'	(0.0088) 0.0026	22	4.4	115' - 18" RCP	Private	Parallel system
M8.31 to M8.30	2.1	0.45	6.41	16	33	6' F.B. Channel	190'	(0.0116) 0.0056	512	10.0		Adequate	
M8.30 to M8.24					33	36" CMP	440'	(0.0116) 0.0094	41	5.7		Adequate	
M8.28 to M8.27	0.9	0.45	0.41	4	3	18"x29" CMP	60'	(0.0103) 0.0045	13	4.1		Adequate	
M8.27 to M8.24	2.0	0.45	1.31	5	10	18"x29" CMP	190'	(0.0103) 0.0041	13	4.1		Adequate	
M8.24 to M8.22	4.7	0.45	9.84	19	47	31"x50" CMP	190'	(0.0103) 0.0053	58	6.0		Adequate	
M8.22 to M8.11	0.9	0.45	10.25	20	49	31"x50" CMP	100'	(0.0103)	58	6.0		Adequate	
MUELLER DRIVE (L-9, M-8, M-9)													
M8.1 to M8.2	10.3	0.45	4.64	19	22	24" RCP	80'	(0.0144) 0.0036	14	4.5	80' - 30" RCP	8,200	Replace 24" RCP
M8.2 to M8.3	0.6	0.45	4.91	20	23	2' F.B. Channel	35'	(0.0144) 0.0103	49	6.1		Adequate	
M8.3 to M8.4					23	24" RCP	60'	(0.0144) 0.0012	14	4.5	60' - 30" RCP	5,900	Replace 24" RCP
M8.8 to M8.7	2.5	0.45	1.13	7	7	24" RCP	50'	(0.0424) 0.0220	14	4.5		Adequate	
M8.4 to M8.5	0.7	0.45	6.36	22	29	2' F.B. Channel	25'	(0.0144) 0.0464	49	6.1		Adequate	
M8.5 to M8.9	1.2	0.45	6.90	24	31	24" RCP	400'	(0.0144) 0.0084	24	7.5	400' - 30" RCP	33,600	Replace 24" RCP
												28,800	Downstream channel improvements
												76,500	SUBTOTAL
												15,300	UPSTREAM IMPROVEMENTS
												91,800	TOTAL
BUCKINGHAM DRIVE (M-8)													
M8.21	4.4	0.45	1.98	7	13	16"x25" CMP	130'	(0.0213)	9	4.9	130' - 18" RCP	8,350	Parallel system
												8,350	SUBTOTAL
												1,700	UPSTREAM IMPROVEMENTS
												10,050	TOTAL

Orange Grove Road

The Orange Grove Road watershed drains an area along the north side of Orange Grove Road and extends from Highway 7 to Brisbane Drive. The existing drainage facilities consist of a pipe conduit system from the outfall into the Ashley River to an open channel located west of Beardsley Road which continues westward toward Highway 7 with culverts at several roadway crossings. This existing system is adequate.

Mueller Drive

The Mueller Drive watershed drains a total of 15.3 acres and is located along the south side of Orange Grove Road extending eastward from Highway 7 to Charlyn Drive. The existing drainage facilities consist of a roadside ditch along the south side of Orange Grove Road, driveway culverts, and a 24" RCP which crosses Orange Grove Road east of Brisbane Drive conveying the runoff to the Ashley River. The existing system provides 60 to 75 percent of the design capacity. Replacing the 24" RCP outfall with a 30" RCP outfall is recommended. Also included in the project cost for this area is improvement of the existing outfall channel which will require excavation within marsh areas and will necessitate obtaining a South Carolina Coastal Council permit.

Buckingham Drive

The Buckingham Drive watershed is located on either side of Buckingham Drive in the Parkshore II subdivision. The existing 16"x25" CMP outfall to the Ashley River is inadequate and should be improved with a parallel 18" RCP.

TABLE 61

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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)	
TUDOR PLACE (M-8)													
M8.62 to M8.61	1.9	0.45	0.86	3	6	24" RCP	250'	(0.0142) 0.0034	23	7.4		Adequate	
LEICESTER (M-8)													
M8.60 to M8.58	2.8	0.45	1.26	7	8	24" RCP	175'	0.0042	19	6.0		Adequate	
CHARING CROSS NORTH (M-8)													
M8.72 to M8.70	2.3	0.45	1.04	5	8	24" RCP	235'	(0.0074) 0.0034	17	5.4		Adequate	
WINDSOR EAST (M-8)													
M8.68 to M8.66	3.9	0.45	1.76	5	13	24" RCP	230'	(0.008) 0.0038	18	5.6		Adequate	

Tudor Place

The Tudor Place watershed joins the Windsor East watershed on the east and drains the area around the intersection of Windsor Drive and Leicester Avenue. The existing 24" RCP outfall is adequate.

Leicester

The Leicester watershed drains a 2.8 acre area along Leicester Avenue in the Parkshore III subdivision. The existing 24" RCP outfall to the Ashley River is adequate.

Charing Cross North

The Charing Cross North watershed drains the area along the northern end of Charing Cross Road in the Parkshore III subdivision. The existing 24" RCP outfall is adequate.

Windsor East

The Windsor East watershed drains a 3.9 acre area around the intersection of Windsor Drive and Charing Cross Road. The existing 24" RCP outfall is adequate.

TABLE 62

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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)	
POSTON (M-8, M-9)													
M8.74 to M8.73	7.8	0.45	3.51	15	18	36" RCP	110'	(0.0166) 0.0048	37	5.2		Adequate	
M8.73 to M8.75	2.0 1.9	0.9 0.25	5.79	16	30	3' F.B. Channel	190'	(0.0166) 0.0082	155	8.6		Adequate	
M8.75 to M8.77					30	30" RCP	200'	(0.0166)	24	4.5	200' - 24" RCP	62,200	Parallel system
												62,200	SUBTOTAL
												12,450	UPSTREAM IMPROVEMENTS
												74,650	TOTAL
WINDSOR (M-8)													
M8.53 to M8.56	8.7	0.45	3.92	9	24	24" RCP	300'	(0.003) 0.0057	11	3.4	300' - 24" RCP	24,750	Parallel system
M8.56 50 M8.57	6.7	0.45	6.94	11	40	24" RCP	230'	(0.0145) 0.0019	24	7.5	230' - 30" RCP	17,900	Parallel system
												42,650	SUBTOTAL
												8,550	UPSTREAM IMPROVEMENTS
												51,200	TOTAL
BLACKBURN (M-8)													
M8.47 to M8.45	3.0	0.45	1.35	4	10	18"x29" CMP	200'	(0.0082) 0.0062	12	3.7		Adequate	
BRIGHTON (M-8)													
M8.51 to M8.48	5.8	0.45	2.61	6	18	24" RCP	300'	(0.0115) 0.0056	21	6.7		Adequate	
BRISBANE (M-8)													
M8.43 to M8.41	5.4	0.45	2.43	5	18	27"x43" CMP	180	(0.023) 0.0057	57	8.1		Adequate	

Poston

The Poston watershed is located parallel to Highway 7 and drains 11.7 acres of the Parkshore III subdivision. The existing drainage facilities consist of a roadside ditch running parallel to the Frontage Road along Highway 7, a 36" RCP culvert under Poston Road, and a 30" RCP crossing Highway 7. The existing culvert under Highway 7 is inadequate and a parallel 24" RCP is recommended.

Windsor

The Windsor watershed drains an area located on either side of Poston Road. Existing drainage facilities consist of a 24" RCP which conveys runoff from Windsor Drive southeastward to the Ashley River marsh. The existing system provides less than 60 percent of the design capacity and a parallel system of 24" RCP and 30" RCP is recommended.

Blackburn

The Blackburn watershed drains a portion of the Parkshore II subdivision. A 18"x29" CMP serves as the outfall to the Ashley River and is adequate.

Brighton

The Brighton watershed is located in the Parkshore II subdivision adjacent to Brisbane Drive. The existing 24" RCP outfall to the Ashley River is adequate.

Brisbane

The Brisbane watershed joins the Brighton watershed on the east and drains a total of 5.4 acres located along Brisbane Drive. The existing 27"x43" CMP outfall is adequate.

TABLE 63

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
ASHLEY HALL ROAD (K-9, K-10, L-9, L-10, L-11)													
L9.67 to L9.70	12.4	0.7	8.68	9	54	24" RCP	300'	(0.0017) -0.0001	8	2.6	300' - 48" RCP	54,850	Replace 24" RCP
L9.70 to L9.63	9.8	0.45	13.09	11	76	3' F.B. Channel	110'	(0.0017) 0.0198	45	2.7	3' F.B. Channel	600	Revise side slope
L9.63 to L10.28					76	36" RCP	470'	(0.0029)	31	4.4	470' - 42" RCP	85,300	Parallel system
L10.28 to L10.27	7.8	0.7	18.55	14	98	36" RCP	100'	(0.002)	26	3.7	100' - Dual 42" RCP	22,200	Replace 36" RCP
L10.27 to L10.101	5.8	0.7	22.61	15	118	42" RCP	580'	(0.0089)	82	8.5	580' - 42" RCP	114,400	Parallel system
L10.101 to L10.23	9.3 38.5	0.7 0.45	46.45	19	223	48" RCP	300'	(0.0089)	117	9.3	300' - 60" RCP	100,500	Parallel system
L10.23 to L10.22					223	5' F.B. Channel	210'	(0.0089) 0.0124	760	10.2		Adequate	
L10.22 to L10.21					223	48" RCP	70'	(0.0089) -0.002	117	9.3	145' - 60" RCP	56,100	Parallel system
L10.21 to L10.20	8.9	0.9	54.46	23	245	48" RCP	75'	(0.0089) -0.0015	117	9.3			
L10.20 to L10.18					245	5' F.B. Channel	320'	(0.0089) 0.0091	443	8.9		Adequate	Parallel system
L10.18 to L10.17					245	48" RCP	70'	(0.0089)	117	9.3	70' - 60" RCP	27,900	Parallel pipe
L10.11 to L10.17	48.7	0.45	21.92	33	85	30" RCP	250'	(0.0007)	9	1.9	250' - Dual 42" RCP	75,000	Replace 30" RCP
L10.17 to L10.49	18.9 4.0	0.9 0.7	96.19	35	366	54" RCP	570'	(0.006)	132	8.3	1510' - 6'x6' Box	600,000	Relief system L10.17 to L10.17A
L10.49 to L10.52	5.1 10.8	0.7 0.45	104.62	39	377	60" RCP	570'	(0.0027)	117	6.0			Adequate with relief
L10.52 to L10.55	10.6	0.7	112.04	43	381	60" RCP	330'	(0.01) 0.0054	226	11.5			
L10.55 to L10.56	1.5	0.7	113.09	45	381	10' F.B. Channel	30'	(0.0043) -0.0097	650	7.4			
L10.56 to L10.57					381	60" RCP	80'	(0.0043) 0.0044	148	7.5			
L10.57 to L10.58					381	10' F.B. Channel	40'	(0.0043) 0.0175	650	7.4			
L11.52 to L11.50	19.4 50.1	0.7 0.45	36.13	35	137	30" RCP	515'	(0.0057) 0.0032	27	5.5	515' - 60" RCP	162,150	Replace 30" RCP
L11.50 to L11.47	100.3	0.45	81.27	54	236	60" RCP	380'	(0.0057) 0.0107	170	8.7	960' - 42" RCP	205,350	Parallel system
L11.47 to L10.78	5.8	0.7	85.33	57	239	60" RCP	490'	(0.0062) 0.0031	178	9.0			
L10.78 to L10.79	6.2	0.7	89.67	60	242	60" RCP	90'	(0.0062) 0.0062	178	9.0			

(CONTINUED)

TABLE 63

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
ASHLEY HALL ROAD (CONTINUED)													
L10.86 to L10.83	3.4	0.45	1.53	11	9	24" RCP	285'	(0.0021) 0.0036	9	2.9		Adequate	
L10.83 to L10.80	6.4	0.45	4.41	13	24	24" x 36" CMP	240'	(0.0221) 0.0093	34	7.0		Adequate	
L10.90 to L10.88	8.3	0.45	3.74	16	19	24" x 36" CMP	180'	(0.0217) 0.0078	34	7.0		Adequate	
L10.93 to L10.92	5.3	0.45	2.39	5	18	18" x 30" CMP	130'	(0.0185) 0.0042	17	5.5		Adequate	
L10.40 to L10.43	10.5	0.7	7.35	11	43	32" x 50" CMP	320'	(0.0025) 0.0036	28	3.0	320' - 42" RCP	50,900	Replace 32"x50" CMP
L10.46 to L10.43	5.0 22.7	0.9 0.7	20.39	33	80	42" x 64" CMP	165'	(0.0067) 0.0092	91	5.7		Adequate	
L10.43 to L10.45	2.5	0.7	29.49	34	114	42" x 64" CMP	40'	(0.0112) 0.0218	118	7.4		Adequate	Available head
L10.45 to L10.58					114	6' F.B. Channel	220'	(0.0112)	677	10.4		Adequate	
L10.58 to L10.61	18.9 41.4	0.9 0.45	306.08	116	490	36" RCP	70'	(0.0043) 0.0073	84	4.0	70' - dual 4½'x8' Box	46,050	Parallel system
												1,601,300	SUBTOTAL
												320,300	UPSTREAM IMPROVEMENTS
												1,921,600	TOTAL
MILLBROOK (L-10)													
L10.69 to L10.68	5.3	0.45	2.39	15	12	24" RCP	170'	(0.0005) 0.0079	14	4.4		Adequate	
L10.68 to L10.67	2.5	0.6	3.89	17	19	3' F.B. Channel	100'	(0.0003) 0.0019	30	1.3		Adequate	
L10.67 to L10.66					19	30" RCP	90'	(0.0056) 0.0019	20	4.1		Adequate	
L10.66 to L10.64	37.1	0.45	20.59	22	95	3' F.B. Channel	720'	(0.0023) 0.0046	84	3.5	3' F.B. Channel	2,300	Alter side slopes
L10.64 to L10.65					95	36" RCP	90'	(0.0056)	30	4.2	90' - Dual 42" RCP	42,900	Parallel pipe
												45,200	SUBTOTAL
												9,050	UPSTREAM IMPROVEMENTS
												54,250	TOTAL

Ashley Hall Road

The Ashley Hall Road watershed drains a total of 498.3 acres of which approximately 70 percent is outside the City of Charleston. This is a rapidly developing area and in recent years the area along Ashley Hall Road has seen the development of several apartment complexes with more under construction or in the planning stage. This development combined with work associated with the Highway 61 Expressway, which should result in commercial development along Highway 61, has caused a major drainage problem in this area. The area around the Village Apartments has experienced severe drainage problems in recent years. The existing system of pipe conduits, roadside ditches, roadway culverts and channels is inadequate. One of the major problem areas is the existing pipe conduit system which runs along the west side of Ashley Hall Road. This system provides less than 40 percent of the design capacity and should be improved by installing a parallel 6'x6' box culvert along Ashley Hall Road to the outfall.

The runoff from the area around Highway 61, Millbrook Boulevard and Ivyhall Road discharges into a lake prior to discharge into the Ashley River marsh. The lake provides some storage capacity but was considered insignificant and was not taken into account in sizing of the new system shown in the associated table for this area.

The first priority for this area is improvement of the existing system which crosses Ashley Hall Road. A dual 4½'x8' box culvert is recommended. This will require excavation in the marsh and will require a South Carolina Coastal Council permit.

Millbrook

The Millbrook watershed drains the area along either side of Millbrook Boulevard from Manigault Place to Ashley Hall Road. Of the 44.9 acres drained by the system, approximately 60 percent is outside the City of Charleston.

The existing system consist of a roadside channel along the south side of Millbrook Boulevard with culverts at driveway crossings which is inadequate at the Ashley Hall Road crossing. Recommended improvements for the system consist of enlarging the ditch section along Millbrook Avenue and installing parallel 42" RCP culverts across Ashley Hall Road. This installation will require excavation in marsh areas and will require a South Carolina Coastal Council permit.

TABLE 64

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
ASHLEY HALL PLANTATION WEST (L-10, L-11, M-10, M-11)													
L10.75 to L10.74	0.1	0.9	0.09	1	1	24" RCP	60'	(0.0003) 0.0085	3	1.1		Adequate	
L10.74 to L10.73	0.6 0.6	0.9 0.35	0.84	10	5	5' F.B. Channel	30'	(0.0003) -0.0133	17	1.0		Adequate	
L10.73 to L10.72					5	24" RCP	80'	(0.0003) 0.0023	12	3.8		Adequate	
L10.97 to L10.98	5.3 12.2	0.6 0.35	7.45	10	45	27" x 36" CMP	140'	(0.0005)	5	1.1	140' - 42" RCP	21,400	Replace existing system. Outfalls into marsh.
L11.44 to L11.43	6.0 6.4	0.35 0.6	5.94	21	28	36" RCP	40'	(0.0025) -0.0068	29	4.1		Adequate	
L10.72 to L11.42	2.7 8.0 16.1	0.15 0.35 0.6	27.10	25	119	6' F.B. Channel	550'	(0.0003) 0.0025	28	1.2	7' F.B. Channel	9,900	
L11.42 to L11.41					119	36" RCP	100'	(0.0003) -0.0012	29	4.1	100' - Dual 48" RCP	35,050	Parallel system
L11.41 to L11.20	17.3 7.4	0.6 0.7	42.66	32	169	7' F.B. Channel	875'	(0.0003) 0.0015	38	1.3	7' F.B. Channel	18,400	
L11.20 to L11.19					169	36" RCP	90'	(0.0003) -0.0032	29	4.1	90' - Triple 48" RCP	49,100	Replace 36" RCP
L11.22 to L11.23	1.7	0.25	0.43	1	3	36" RCP	100'	(0.0051) 0.0078	41	5.8		Adequate	
L11.12 to L11.10	2.2	0.35	0.77	7	5	24" RCP	320'	(0.0027) 0.0044	10	3.2		Adequate	
L11.10 to L11.9	2.7	0.35	1.72	9	11	30" RCP	70'	(0.0027) 0.0061	18	3.8		Adequate	
L11.9 to L11.6	3.2	0.35	2.84	10	17	9' F.B. Channel	75'	(0.0027) 0.0020	250	4.8		Adequate	
L11.6 to L11.8					17	36" RCP	230'	(0.0027) 0.0016	30	4.2		Adequate	
L11.19 to L11.5	25.2 15.2	0.7 0.35	68.89	45	227	3' F.B. Channel	1880'	(0.0003) -0.0001	28	1.3	8' F.B. Channel	37,800	
L11.5 to L11.3					227	48" CMP	110'	(0.0003) -0.0024	65	5.2	110' - Dual 54" RCP	51,700	Parallel system
L11.3 to L11.1	8.4	0.6	73.93	47	237	13' F.B. Channel	235'	(0.0003) 0.0049	135	1.8	13' F.B. Channel	4,900	
L11.1 to L11.2					237	42" RCP	90'	(0.0003) 0.0052	38	3.9	90' - Dual 4'x6' Box	52,450	Remove 42" RCP
M10.13 to M10.14	1.9	0.35	0.67	2	5	24" CMP	145'	(0.0015) 0.0036	5	1.6		Adequate	
M10.14 to M10.15	0.9	0.35	0.99	3	7	24" CMP	65'	(0.0015)	5	1.6		Adequate	
L11.37 to L11.38	4.3	0.35	1.51	8	10	24" CMP	90'	(0.0018) 0.0053	5	1.7		Adequate	Available head
L11.38 to L11.40	1.1	0.35	1.90	9	12	27" x 43" CMP	150'	(0.0018) 0.0023	16	2.3		Adequate	

(CONTINUED)

80.7 acres

TABLE 64

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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)	
ASHLEY HALL PLANTATION WEST (CONTINUED)													
L11.24 to L11.25	1.3	0.35	0.46	3	3	22" x 36" CMP	175'	(0.0006) 0.0014	6	1.2		Adequate	
L11.25 to L11.27	1.5	0.35	0.99	4	7	22" x 36" CMP	305'	(0.0006) 0.0024	6	1.2		Adequate	
L11.27 to L11.28	1.4	0.35	1.48	6	10	24" RCP	120'	(0.0006) -0.0065	5	1.5	120' - 24" RCP	9,600	Parallel system
L11.29 to L11.30	1.9	0.35	0.67	3	5	24" CMP	250'	(0.0074) 0.0017	11	3.5		Adequate	
L11.36 to L11.34	8.2	0.35	2.87	8	18	24" CMP	200'	(0.0071) 0.0044	11	3.4	290' - 30" RCP	30,800	Replace 24" CMP
L11.34 to L11.33	1.4	0.35	3.36	9	21	24" CMP	90'	(0.0071) 0.0092	11	3.4			
L11.33 to M11.4	33.7 50.6	0.15 0.35	32.05	10	192	Marsh	320'	(0.0006)				Adequate	Available storage
M11.4					192	25' Bridge	30'	(0.0006)	429	3.0		Adequate	
M11.7 to M11.6	3.2	0.35	1.12	6	8	24" RCP	180'	(0.0081)	18	5.6		Adequate	
M11.6 to M11.5	0.6	0.20	1.24	7	8	24" RCP	130'	(0.0081) -0.0042	18	5.6		Adequate	
M11.5 to M11.3	0.2	0.2	1.28	8	8	24" RCP	50'	(0.0081) 0.0072	18	5.6		Adequate	
M11.4 to M11.8	15.2 22.7	0.35 0.15	115.99	56	331	Marsh	1375'						Available storage
M11.8 to M11.9					331	4' x 6' Box	250'	(0.0003) -0.0003	90	3.8			Available storage
												321,100	SUBTOTAL
												64,250	UPSTREAM IMPROVEMENTS
												385,350	TOTAL
ASHLEY HALL PLANTATION EAST (M-10)													
M10.12 to M10.11	1.8	0.35	0.63	5	5	30" RCP	120'	0.0023	4	0.7			Pipe System Adequate With Improvement to M10.6-M10.7 Due to Increased Hydraulic Slope
M10.11 to M10.10	1.0	0.35	0.98	6	7	30" RCP	230'	0.0023	4	0.7			
M10.10 to M10.1	1.9	0.35	1.65	8	11	30" RCP	325'	0.0003	4	0.7			
M10.1 to M10.2	5.2	0.35	3.47	10	21	36" RCP	130'	0.0033	6	0.8			
M10.2 to M10.3	5.3	0.35	5.33	11	31	36" RCP	180'	0.0027	6	0.8			
M10.3 to M10.4	4.1	0.35	6.77	12	38	48" RCP	80'	0.0079	12	1.0			
M10.4 to M10.6	6.2	0.35	8.94	13	49	6' F.B. Channel	120'	-0.0304	48	1.9			
M10.6 to M10.7					49	42" CMP	65'		52	4.9	65' - 48" RCP	11,400	Replace 42" CMP
												11,400	SUBTOTAL
												2,300	UPSTREAM IMPROVEMENTS
												13,700	TOTAL

Ashley Hall Plantation West

The Ashley Hall Plantation West drainage basin is located along the east side of Highway 61 and is bounded on the south by Millbrook Boulevard and on the north by the Mark Clark Expressway. Of the 291 acres drained approximately 60 percent falls within the City of Charleston.

The existing drainage facilities are divided into two sections. The first being a channel section with roadway culverts which runs southeast from Ashley Hall Plantation Road to Millbrook Boulevard. The second branch is an area of marsh which extends southeastward from the existing bridge on Ashley Hall Plantation Road. Several existing drainage systems discharge into this marsh area from the Ashley Hall Plantation subdivision.

The majority of the existing systems are adequate with the exception of the western branch. The western branch requires new culverts at all of the roadway crossings and a new channel section from William Kennerty Boulevard to Ashley Hall Plantation Road.

Ashley Hall Plantation East

The Ashley Hall Plantation East watershed drains a portion of the Ashley Hall Plantation subdivision. The area lies to the east of Hobonny Lane and extends to the Ashley River marsh. The existing drainage system consist of a pipe system which conveys water from Hobonny Lane to the Ashley River marsh and is inadequate due to the restriction created by an existing 42" CMP. By replacing the 42" CMP with a 48" RCP, the upstream portion of the system will be adequate.

TABLE 65

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
FOREST LAKES (L-12, M-12)													
M12.1 to M12.2	8.3	0.45	3.74	8	24	24" CMP	480'	(0.0026) 0.0022	7	2.1	480' - 30" RCP	40,500	Remove 24" CMP
M12.2 to M12.3	8.8	0.45	7.70	11	45	27"x43" CMP	500'	(0.0026) 0.0051	19	2.7	870' - 42" RCP	119,850	Remove 27"x43" CMP
M12.3 to L12.1	6.4	0.45	10.58	14	56	27"x43" CMP	370'	(0.0026) 0.0069	19	2.7			
L12.1 to L12.4	9.0	0.45	14.63	16	75	27"x43" CMP	210'	(0.0026) 0.0041	19	2.7	210' - 48" RCP	40,500	Remove 27"x43" CMP
												200,850	SUBTOTAL
												40,200	UPSTREAM IMPROVEMENTS
												241,050	TOTAL
MAGWOOD (L-11, L-12, M-11, M-12)													
M12.6 to M12.5	164.1	0.35	57.44	42	198	36" & 42" RCP	50	(0.010)	72	4.2	3-48" RCP	25,700	Parallel system
M11.13 to M11.12	36.7	0.35	12.85	22	59	24" RCP	50	(0.010)	12	3.8	2-36" RCP	12,600	Parallel system
M12.5 to M11.11	70 129	0.6 0.4	163.89	85	344	5' F.B. Channel	5200	(0.0005)	64	1.8	32' F.B. Channel	266,400	Divert flow to L11.53A
M11.11 to M11.10					344	30" RCP	50	(0.010)	21	4.3		Adequate	Flow diverted from this location
M11.10 to L11.53	150.8 100.6	0.4 0.6	284.57	100	512	5' F.B. Channel	1850	(0.0005)	47	1.6	50 Ac-Ft Detention	1,032,600	
L11.53 to L11.54					512	42" RCP & 4'x4' Box	50	(0.010)	112	4.4	Dual 4'x8' Box Culvert		Parallel system
												1,337,300	SUBTOTAL
												267,500	UPSTREAM IMPROVEMENTS
												1,604,800	TOTAL

Forest Lakes

The Forest Lakes watershed drains 32.5 acres of the Forest Lakes subdivision through a system of 24" CMP and 27"x43" CMP which commences at Overrun Street and runs southwest down Forest Lakes Boulevard to the outlet into Church Creek. The existing system is inadequate and replacement with a line of 30" RCP, 42" RCP, and 48" RCP is recommended.

Magwood

The Magwood watershed is located along the western side of Highway 61 and extends from Able Street on the south to Woodland Road on the north. Of the 751 acres drained by the watershed, approximately 80 percent is located outside the City of Charleston. The majority of the area which lies within the City boundary is presently undeveloped. With the opening of the Mark Clark Expressway, this area should see rapid development.

The existing 4'x4' box culvert and 48" RCP under Highway 61 are inadequate. To provide design capacity a 78 acre-foot detention basin should be provided west of Highway 61 as well as improvement to the existing highway crossing by placing dual 4'x8' box culverts parallel to the existing system.

TABLE 66

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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)	
ASHLEY TOWNE VILLAGE (N-12)													
N12.1 to N12.3	7.9	0.45	3.56	19	17	24" RCP	210'	(0.0024) 0.0058	10	3.1	210' - 24" RCP	13,450	Parallel system
N12.3 to N12.8	18.3	0.45	11.80	23	53	10' F.B. Channel	380'	(0.0005) 0.0028	170	2.3		Adequate	
N12.5 to N12.6	2.1	0.45	0.95	4	7	30" RCP	290'	(0.0005) 0.0021	8	1.6		Adequate	
N12.6 to N12.8	3.5	0.45	2.53	6	18	36" RCP	180'	(0.0005) 0.0026	13	1.8		Adequate	With available head
N12.8 to N12.9	16.8	0.45	21.89	26	94	10' F.B. Channel	370'	(0.0005) -0.0071	233	2.5		Adequate	
N12.14 to N12.11	3.6	0.45	1.62	4	12	24" RCP	160'	(0.0069) 0.0069	16	5.2		Adequate	
N12.9 to N12.12			23.51	26	101	Dual 36" RCP	140'	(0.0236) 0.0236	76	5.4		Adequate	With available head
												13,450	SUBTOTAL
												2,700	UPSTREAM IMPROVEMENTS
												16,150	TOTAL

Ashley Towne Village

The Ashley Towne Village watershed drains the Ashley Towne Landing subdivision and is located along the east side of Highway 61 between the Seaboard Systems Railroad on the north and Church Creek on the south. Existing drainage facilities consist of an open channel with culverts at roadway crossings, and is adequate for the projected flow conditions.

TABLE 67

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
LONGVIEW (N-14)													
N14.46 to N14.45	5.4	0.45	2.43	9	15	24" RCP	160'	(0.002) -0.0002	9	2.8	685' - 24" RCP	55,750	Parallel system
N14.45 to N14.40	3.0	0.45	3.78	10	23	30" RCP	525'	(0.002) 0.0037	16	3.2			
N14.40 to N14.38	5.8	0.45	6.39	14	34	36" RCP	290'	(0.0041) 0.0025	37	5.2		Adequate	
N14.38 to N14.39	4.2	0.45	8.28	16	42	42" RCP	150'	(0.0218) 0.0043	129	13.4		Adequate	
												55,750	SUBTOTAL
												11,150	UPSTREAM IMPROVEMENTS
												66,900	TOTAL
HICKORY HILL (N-13, N-14)													
N14.28	48.8 97.7	0.35 0.25	170.05	123	268	8' F.B. Channel	4200	0.0005	144	2.2	18' F.B. Channel	78,500	Total CA includes 132.54 from Shadowmoss Watershed.
												78,500	SUBTOTAL
												15,700	UPSTREAM IMPROVEMENTS
												94,200	TOTAL
SHADOWMOSS WEST (N-14, O-14)													
N14.54	35.2 105.6	0.35 0.25	38.72	36	142	16' F.B. Channel	3100	(0.0005)	198	2.2		Adequate	

Longview

The Longview watershed is located north of Bees Ferry Road and drains a portion of the Hickory Hill Plantation subdivision. A line of pipe extending from Foxhill Road to Church Creek serves as the outfall and is adequate with the exception of the first two sections of the pipe line. A parallel system of 24" RCP is recommended to upgrade this system to provide the required capacity.

Hickory Hill

The Hickory Hill watershed drains a total of 146.5 acres which includes a portion of the Shadowmoss Golf Course and the Hickory Hill Subdivision. Of the total area drained, approximately two-thirds is presently undeveloped. Those areas which have been developed consist of a portion of the Hickory Hill Subdivision and is predominately low to medium density residential.

The existing drainage facilities consist of a 8 foot flat bottom channel which conveys the runoff from this area, and the Shadowmoss watershed, to Church Creek. The existing channel requires enlargement to a 18 foot flat bottom width. In addition, elimination of the existing constriction on Church Creek is required for the system to function properly.

Shadowmoss West

The Shadowmoss West watershed drains a total of 140 acres surrounding and including the Shadowmoss Golf Course. At the present time, approximately 75 percent of the area is undeveloped. Future development of the area will most likely consist of medium to high density residential type units.

The existing drainage facilities consist of a series of open channels and roadway culverts which provide drainage for the golf course. This existing system discharges into Church Creek, and its capacity is affected by the present constriction of Church Creek at the Seaboard System Railroad (refer to discussion of Church Creek drainage basin).

No recommended improvements have been made for this watershed because all development will be the responsibility of the property owner. However, prior to development, the proposed drainage plan should be reviewed by the City of Charleston. Proposed improvements should adhere to the recommended floodplain management plan within this report.

TABLE 68

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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)	
SHADOWMOSS (N-13, N-14, O-13, O-14)													
O14.2 to O14.5	5.9	0.45	2.66	11	15	24" CMP	330'	(0.0039) 0.0054	8	2.5		Adequate	Available head
O14.5 to N14.3	4.6	0.45	4.73	13	26	36" CMP	320'	(0.0039) 0.0074	24	3.3		Adequate	Available head
N14.3 to N14.4	5.7	0.45	7.30	15	38	36" CMP	280'	(0.0039) 0.0037	24	3.3	280' - 30" RCP	25,150	Parallel system
N14.7 to N14.4	7.1	0.45	3.20	13	18	42" CMP	140'	(0.0036) 0.0038	34	3.5		Adequate	
N14.4 to N14.6	2.8	0.45	11.76	17	59	54" CMP	190'	(0.0039) 0.0052	69	4.4		Adequate	
N14.11 to N14.6	6.4	0.45	2.88	14	15	24" CMP	140'	(0.0036) 0.0049	8	2.4	140' - 30" RCP	15,550	Parallel system
N14.6 to N13.62	1.9	0.45	15.50	18	76	60" CMP	200'	(0.0039) 0.0038	92	4.7		Adequate	
N13.62 to N13.57	2.8	0.45	16.76	19	80	60" CMP	120'	(0.0039) 0.0023	92	4.7		Adequate	
N13.56 to N13.55	20.0	0.45	9.00	18	44	42" CMP	125'	(0.0058) 0.002	43	4.5		Adequate	Available head
N13.57 to N13.51	52.8	0.45	49.52	33	193	20' F.B. Channel	850'	(0.0002)	194	1.6		Adequate	
N13.51 to N13.54					193	60" CMP	160'	(0.0031)	280	14.3		Adequate	
O13.49 to O13.48	8.5	0.45	3.83	10	23	36" CMP	290'	(0.0025) 0.0035	19	2.7		Adequate	Existing ponding problem behind houses Available head

(CONTINUED)

TABLE 68

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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)	
SHADOWMOSS (CONTINUED)													
O13.48 to O13.46	3.5	0.45	5.41	12	30	36" CMP	65'	(0.0025)	19	2.7	55' - 30" RCP	11,000	Parallel system
N13.36 to N13.40	7.1	0.45	3.20	8	20	42" CMP	155'	(0.0054) 0.0032	42	4.3		Adequate	
N13.40 to N13.41	2.3	0.45	4.24	9	26	42" CMP	145'	(0.0054) 0.0013	42	4.3		Adequate	
N13.41 to N13.46	11.1	0.45	9.24	10	55	7' F.B. Channel	840'	(0.0054)	331	6.6		Adequate	
O13.46 to N13.43			14.65	15	76	Dual 40"x65" CMP	230'	(0.0025) 0.007	112	3.5		Adequate	
N13.29 to N13.30	9.7	0.45	4.37	13	24	30" CMP	130'	(0.0148) 0.0072	28	5.7		Adequate	
N13.54 to N13.66	100.0 37.6	0.25 0.45	110.46	73	265	20' F.B. Channel	2450'	(0.0002) 0.0001	162	1.4		Adequate	Available storage
N13.66 to N13.64					265	Dual 48" RCP	100'	(0.005) 0.0022	100	4.0	2200' - 16' F.B. Channel 120' - Dual 60" RCP	153,700	Relief N13.17 to N13.1A
N13.64 to N13.21	79.9	0.25	130.44	98	265	20' F.B. Channel	1550'	(0.0002) -0.0001	162	1.4			Adequate with relief
N13.21 to N13.19					265	Dual 48" RCP	85'	(0.0187) -0.0002	100	4.0			
N13.19 to N13.13	7.8	0.25	132.39	99	265	20' F.B. Channel	200'	(0.0002) 0.0095	162	1.4			
N13.13 to N13.11					265	Dual 48" RCP	75'	-0.0043	100	4.0			
N13.11 to N13.7	0.6	0.25	132.54	100	265	20' F.B. Channel	50'	(0.0002) -0.0014	162	1.4			
N13.7 to N13.9					265	Dual 36" RCP	75'	(0.0067) 0.002	56	4.0			
												205,400 41,100 246,500	SUBTOTAL UPSTREAM IMPROVEMENTS TOTAL

Shadowmoss

The Shadowmoss watershed drains the area around the Shadowmoss Golf Course including the residential area which joins the golf course on the east. The existing drainage facilities consist of a series of open channels, roadway culverts, pipe conduit systems and lakes. The majority of these systems are adequate, provided the channels are cleaned.

The major improvement that should be made is the improvement of an existing channel which presently bisects the golf course from the Number 5 fairway to the Number 3 fairway and connects to a ditch which leads to Church Creek. This project would divert flow from the existing culverts under Bees Ferry Road which will make them adequate to handle the expected flow. The cost associated with this work would conceivably be the responsibility of the Shadowmoss Golf Course since the entire project is on private property and serves only the golf course and associated subdivision.

TABLE 69

HYDRAULIC ANALYSIS FOR WEST OF THE ASHLEY 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: STORMWATER CONDUIT	RECOMMENDED IMPROVEMENTS: COST (DOLLARS)	COMMENTS
SHADOWMOSS NORTH (N-14,O-14)													
O14.12 to O14.11	50.6	0.25	12.65	32	50	24" CMP	60	(0.0023) 0.0042	9	2.9		Private	
O14.11 to O14.10	4.3	0.25	13.73	36	51	4' F.B. Channel	490	(0.0023) 0.0021	39	1.8		Private	
O14.10 to O14.9					51	24" CMP	260	(0.0024 0.0024	5	1.6		Private	
O14.9 to N14.61A	12.6	0.25	16.88	45	56	4' F.B. Channel	1100	(0.0020) 0.0024	36	2.6		Private	
N14.60 to N14.61	21.0	0.25	5.25	24	23	24" CMP	180	(0.0003) -0.0025	6	1.9		Private	
N14.61 to N14.61A					23	4' F.B. Channel	160	(0.0003) 0.0037	14	1		Private	
N14.61A to Outfall			22.13	45	73	4' F.B. Channel	460	0.0003	14	1		Private	
HIGHWAY 61 NORTH (O-13,O-14)													
O14.8 to O14.7	139.1	0.35	48.69	48	156	4'x4' Box	120	-0.0004	80	5.0	120' - 48" RCP	26,100	Parallel system
												26,100	SUBTOTAL
												5,250	UPSTREAM IMPROVEMENTS
												31,350	TOTAL
LIVE OAK (O-13)													
O13.5 to O13.6	16.7 20.4	0.35 0.25	10.95	38	39	24" RCP	110	0.0042	14	4.5	110' - 36" RCP	19,600	Parallel system
												19,600	SUBTOTAL
												3,950	UPSTREAM IMPROVEMENTS
												23,550	TOTAL

Shadowmoss North

The Shadowmoss North watershed drains 88.5 acres surrounding the Shadowmoss Golf Course and is presently undeveloped, with the exception of the golf course. Those areas which are undeveloped are expected to be developed for medium density residential in the near future.

The existing drainage facilities consist of a series of open channels and roadway culverts which convey the runoff from the golf course to Church Creek. No recommended improvements have been made for this area, since all development will be the responsibility of the property owner.

Highway 61 North

The Highway 61 North watershed drains a presently undeveloped area north of the Live Oak watershed along the west side of Highway 61. It outlets through an existing 4'x4' box culvert into a lake along the east side of Highway 61 prior to discharge into the Ashley River. A parallel 48" RCP under Highway 61 or a detention pond prior to the crossing will be required once the land is developed.

Live Oak

The Live Oak watershed drains the Live Oak Memorial Gardens Cemetery and a portion of the Shadowmoss subdivision located adjacent to Highway 61. The existing drainage facilities consist of a 24" RCP culvert under Highway 61 which outlets into Keivling Creek. A parallel 36" RCP is recommended to provide recommended capacity.