SHONEYS (#8611-08) FIRST VA BANK (#8610-45)

OUTFALL THRU FORT LEE

STORM DRAINAGE

PROPOSED AND FUTURE DEVELOPMENT No 3 of 3

LOCATION: SHONEYS SOUTH (LEE PLAZA)

DATE: 3-18-86 CALC. [illegible] CHKD. P.N. 86-16-45 / 86-11-08 REV. APRIL 10, 87

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$h_j = 0.35(V_2^2/2g)$ – EXPANSION LOSS
$h_j = 0.25(V_2^2/2g)$ – CONTRACTION LOSS
$h_j = K(V_2^2/2g)$ – BEND LOSS
$h_j = h_e + h_f + h_b$ – TOTAL JUNCTION LOSS

THE ENERGY LOSS FOR THE INITIAL INLET OF A STORM SEWER SYSTEM IS 0.3 $(V_2^2/2g)$

WHEN MORE THAN ONE LINE ENTERS AN INLET DETERMINE LINE OVERTIONS GREATEST MOMENTUM (OV) FOR h_j

USE LINE WITH GREATEST "A" VALUE FOR DETERMINING h_j

IF INLET WINGWALL IS USED REDUCE "h_j" BY 50%

IF SURFACE INFLOW OCCURS INCREASE "h_j" BY 50%

BEGIN HYDRAULIC GRADE LINE AT PIPE OUTFALL USING 0.8 PIPE DIA. OR TW WHICHEVER IS GREATER

IN SPECIAL CONDITIONS REQUIRING USE OF CORRUGATED METAL PIPE

n = { CONCRETE OR V.C. - 0.013; PLAIN W FULLY CONTRD - 0.024; PIPED RIVETT (60%) - 0.028; FIELD BOLTED - 0.015; FULLY RIVED - 0.015 }

n = { 0.05 BARE EARTH; 0.05 GRASS W/ MATE WEEN; 0.05 RIPRAP } PROTECTIVE LINING

INLETS (CURB INLET W/LOCAL DEP.)

SLOPE: $L_T = 60 \cdot S^{0.3}(1/n\,S_x)^{0.6}$ 100%; $E = 1-(1-L/L_T)^{2.3}$; $S_e = S_x + S_w E_o$; $E_o = 1.33 + .471 h (W/T)$ 1/4 1:1; $E_o = 1.26 + .46 (h/(W/T))$ 1/2 1:1

SAG (WEIR): $d = (0/12.3 L)^{2/3}$; $L = 60 d^{1/2}$ 1/2.3:1; $Q = C L d^{3/2}$; $L_s = (200\,d)$; $T = d/S_x$

STREET OR LOCATION	STRUCT. NO.	DROP INLET TYPE	DROP INLET L	AREA NO.	A (ACRES)	C	CA Δ	CA Σ	CA TRIB	CA TOT	OVER-LAND L	OVER-LAND S₀	CHANNEL L	CHANNEL S₀	CHANNEL Tc	CHANNEL Tc	PIPE TOTAL Tc	I (IN/HR)	Q cfs Δ	Q cfs Σ	CARRY OVER Q	TOTAL Q
21-22	21			26	.43						100 / .5	10.0 / .5					17		4.4	1.6		
22-23	22			27	.53								110 / .5	10.4 / .5			18.3		4.8	3.4		
23-24	23			28	.51								120 / .5	10.7 / .5			19.0		4.6	6.8		
	24			29	1.25																	
25-26	25	DI 1		30	1.87						200 / .5	10.0 / .5					20.5		7.5	5.6		
26-24	26																					
	24																					
24-27	27			31	1.25								190 / .5	10.7			22.0		4.4	7.2		
27-28	28			32	.40								190 / .5	10.7			21.8		4.4	18.4		
28-29					0.24															18.9		
30-31 10+70 R/S	30	DI 3B	6	33	.35											7	16		2.0			
				34	.35						6	5.0 / .5	3	9			6.3					
31-32 6+70 L/S	31	DI 3B	6	35	.26								200 / .5	10.7			9.4		3 / 6.2	4.8		
32-34 18+70 L/S	32	DI 3B	6	36	.32								190 / .5	10.7		10	20.7		3 / 6.0	6.0		
	33			37	.87																	
34-29 19+60 L/S	34	DI 3B	4	38	.25											10.9	10.9		3 / 2.8	11.7		
				39	.12																	
					0.56																	
	35	DI 3B	12	41	1.81						100 / .5	10.0	160 / .5	10.4			20.5		3 / 6.4	3.04 / 4.4		
20+50 29-36	29	DI 3C	6	40	.20												20.5		3 / 6.4	.63 / 3.23	.06	.69
					0.21																	
				42	.32																	
36-37	36	DI 3C	6	43	.60								154 / 1.0	10.4		10.9	20.9		3 / 4.4	1.60 / 3.5	.10	1.70
37-38	PG. 5A				11.49														4.4	3.5		
LEE PLAZA S2 INT 26+80	40A 40			44	4.28											15	15.5		6.5 / 2.14	11		
40-41 26+50	40	DI 3A	2.5	45	.15											5	5.0		3 / 2.1	4.2 / 1.95		16.95
41-41A	41	DI 3A	1.5	46	.15												5.0		3 / 2.1	4.2 / 1.95		13
	42			47	2.26						100 / 1.0	10.0	120 / 3.5	10.2		9	19.2		6.5	11.5		
COMFORT INN AREA INCLUDED IN OUTFALL ACROSS RT 36																						
01-1	13 / 3			48	1.6														3	8.7		
7+31 -15	14 / 5	DI 3B		49															3	1.5		
2-10 2-12	17	A		53															3	1.61		
	4			5							200 / .5	10.0				15.5			4.3	6.1		
	8															22.5			4.3	18.4		
5+70 L/S	9 / 10	DI 3A		52	.13											15	15.5		3 / 4.3	.35 / 18.9		
11+ L/S	11 / 12	DI 3B	6	53	.27											15	22.5		3 / 4.2	.66 / 19.6		
5-5 1+20	13	DI 4B	6	54	.22											22.5	22.5		3 / 4.2	.60 / 19.4		
1+32 R/S	14 / 15	DI 3B Mod	4	55	.22														3	.87		
				56	.16														3	.82		
				57	.32														3	.57		
	17																		3			

STREET OR LOCATION	I (IN/HR)	HYDRAULIC GRADE LINE Δ HL	Σ HL	PIPE D	L	S_o	V_o	WATER SURFACE ELEV. INL	WATER SURFACE ELEV. OUT	PULL FLOW Q	CULVERT HEADWATER COMPUTATION	CHANNEL	REMARKS
21-22				12"	39					2.5			
				.013	.5			70.33	89.68	3.2			
22-23				15"	110					4.0			
				.013	.5			81.43	88.88	3.7			
23-24				18"	120					7.5			
				.013	.5			86.63	87.28	7.2			
25-26				18	10					7.5			
				.013	.5			89.00	88.95	7.0			
26-24				18	110					7.0			
				.013	.5			88.8	87.95	6.7			
24-27				24	190					20.0			
				.013	1.0			81.30	80.80	7.2			
27-28				24	190					7.0			
				.013	1.28			85.70	83.27	7.2			
28-29				24	30					2.5			
				.013	.50			83.[illegible]	8[illegible]	[illegible]			
30-31 10+70 R/S				.013	.87					1.7			
31-32 6+70 L/S				15"	100					7.9			
				.013	1.50				84.93	6.5			
32-34 18+70 L/S				18"	150					7.3			
				.013	.5			85.68	85.[illegible]	[illegible]			
34-29 19+60 L/S				24"	190					16.3			
				.013	0.5			83.33	82.85	5.1			
35-36				15"	100					7.8			
				.013	.60			86.00	83.60	6.4			
20+50 29-36				30	154					16.3			
				.013	.83			86.94	82.45	[illegible]			
36-37				30	208					[illegible]			
				.013	1.84			81.85	77.01	[illegible]			
37-38													
LEE PLAZA S2 INT 26+80				18	8					1.9			
				.013	.5			82.82	86.70	1.3			
40-41 26+50				18	80					11.7			
				.013	1.25			88.70	87.70	6.6			
41-41A				18	4					11.7			
				.013	1.25			[illegible]	8.45	6.6			
				18"	190					16.9			
				.013	.50			80.4	81.5	1.3			
01-1				15"	22					1.5			
				.013	.5			90.[illegible]	88.67	1.2			
7+31 -15													
2-10 2-12													
5+70 L/S				15"	35					1.5			
				.013	.5			89.[illegible]	83.50	1.2			
11+ L/S				15"	20					1.9			
				.013	.50			93.[illegible]	[illegible]	1.9			
5-5 1+20				15"	5					1.8			
				.013	0.5			[illegible]	[illegible]	1.8			
1+32 R/S				15"	10					1.9			
				.013	.5			83.59	83.50	1.92			

STREET OR LOCATION	CHANNEL	REMARKS
21-22		
22-23		
23-24		
25-26		
26-24		
24-27		
27-28		
28-29		
30-31 10+70 R/S		
31-32 6+70 L/S		INLET KNOWN
32-34 18+70 L/S		
34-29 19+60 L/S		34
35-36		
20+50 29-36		
36-37		
37-38	OUTFALL DITCH THRU FORT LEE	Per FCI T, S & Q; Mod: 1.25
LEE PLAZA S2 INT 26+80		
40-41 26+50		
41-41A		
01-1		
7+31 -15		
2-10 2-12		
5+70 L/S		
11+ L/S		
5-5 1+20		
1+32 R/S		

RELEASED FOR CONSTRUCTION
April 14 1987

8/7/85