HIGHGROVE PLACE (SOUTH) 6-18-96 SUBMITTED: 6-18-96 FILENAME: 95067DS -1

UPP STR	LOW STR	L	DIA	UPPER FL LN	LOWER FL LN	PS	UPPER ST EL	DEPTH HY GR	UPPER HY EL	LOWER HY EL	HYDR GRADE	FR HEAD	VEL	VEL HEAD	JUNC LOSS	TURN LOSS	CURVE LOSS	STR GRADE	INL CAP	DR AREA	PI	Q	TQ	PIPE CAP		REMARKS
DSS2	FES1	60	54	470.50	470.00	0.85	477.00	0.85	476.15	474.50	.00440	0.26	8.20	1.04	1.29	0.00	0.00		0.00	0.00	0.00	0.00	120.42	179.52	1	P.F.V.=5.21fps
DSS76	FES75	41	18	495.00	494.00	2.44	497.50	1.58	495.92	495.50	.00360	0.15	3.56	0.20	0.27	0.00	0.00		0.00	0.00	0.00	0.00	6.29	18.41	2	P.F.V.=1.53fps
DSN2	FEN1	95	21	475.00	456.00	20.00	478.80	1.29	477.52	457.75	.10700	10.16	21.55	7.21	9.61	0.00	0.00		0.00	0.00	0.00	0.00	51.83	70.86	3	P.F.V.=13.65fps
DSN50	FEN49	104	15	482.00	468.00	13.46	486.10	3.34	482.76	469.25	.06680	6.94	13.60	2.87	3.83	0.00	0.00		0.00	0.00	0.00	0.00	16.69	23.70	4	P.F.V.=8.36fps

(Inside Top Pipe (Typical)

STATE OF MISSOURI HAROLD J. BARTCH NUMBER E-17751 REGISTERED PROFESSIONAL ENGINEER

1/5/96

CIN25	CIN24	34	15	481.29	480.95	1.00	486.00	4.06	481.94	481.92	.00020	0.01	0.67	0.01	0.01	0.00	0.00	LOW	4.00	0.31	2.64	0.82	0.82	6.46	38	
CIN24	CIN23	109	15	480.75	479.66	1.00	486.00	4.08	481.92	481.02	.00570	0.62	3.98	0.25	0.22	0.05	0.00	LOW	4.00	0.24	2.64	0.67	4.88	6.46	39	
CIN23	CIN22	34	15	479.46	479.12	1.00	486.20	7.17	481.03	480.51	.00789	0.27	4.66	0.24	0.17	0.08	0.00	2%	1.93	0.32	2.64	0.84	5.72	6.46	40	
CIN22	CIN7	121	18	478.92	477.71	1.00	488.29	7.78	480.51	479.99	.00390	0.47	3.71	0.21	-0.06	0.11	0.00	2%	1.93	0.32	2.64	0.84	6.56	10.50	41	
AIN21	AIN20	177	12	500.00	491.16	4.99	504.40	4.08	500.32	491.82	.00230	0.41	2.19	0.07	0.09	0.00	0.00	3%	8.25	0.85	2.64	1.72	1.72	7.96	42	
AIN20	AIN19	265	15	490.96	488.31	1.00	495.00	3.18	491.82	490.16	.00510	1.34	3.75	0.22	0.26	0.06	0.00	4%	11.00	1.09	2.64	2.80	4.60	6.46	47	
AIN19	CIN18	115	18	488.11	486.96	1.00	495.00	4.84	490.16	488.77	.00710	0.81	4.99	0.39	0.37	0.21	0.00	4%	11.00	1.60	2.64	4.22	5.82	10.50	44	
CIN18	CIN17	34	18	486.76	486.42	1.00	494.18	5.41	488.77	488.22	.00920	0.31	5.71	0.51	0.25	0.00	0.00	LOW	4.00	0.48	2.64	1.27	10.09	10.50	45	
CIN17	MHN16	121	21	486.22	485.01	1.00	494.18	5.95	488.23	487.61	.00510	0.62	4.72	0.35	0.00	0.00	0.00	LOW	4.00	0.48	2.64	1.27	11.36	15.85	46	
MHN16	AIN15	21	21	485.01	484.80	1.00	489.00	1.39	487.61	487.30	.00510	0.11	4.72	0.35	0.00	0.20	0.00		0.00	0.00	0.00	0.00	11.36	15.85	47	
AIN15	CIN14	148	21	484.80	483.32	1.00	490.40	3.10	487.30	485.51	.00820	1.21	5.95	0.55	0.36	0.22	0.00	3%	8.25	1.12	2.64	2.96	14.32	15.84	48	
CIN14	CIN13	54	21	483.32	482.78	1.00	490.34	4.83	485.51	484.54	.00970	0.52	6.48	0.65	0.19	0.26	0.00	2%	1.93	0.48	2.64	1.27	15.59	15.85	49	
CIN13	AIN12	120	24	482.78	481.58	1.00	491.97	7.43	484.54	483.63	.00580	0.70	5.49	0.47	-0.09	0.30	0.00	2%	1.93	0.63	2.64	1.66	17.25	22.62	50	
AIN12	AIN11	185	24	481.58	478.72	1.00	487.10	3.47	483.63	482.09	.00620	1.15	5.68	0.50	0.06	0.33	0.00	3%	8.25	0.22	2.64	0.58	17.83	22.62	51	
AIN11	AIN10	133	24	479.73	478.40	1.00	485.80	3.71	482.09	480.53	.00840	1.11	6.58	0.67	0.32	0.13	0.00	4%	11.00	1.08	2.64	2.85	20.68	22.62	52	
AIN10	MHN9	186	36	478.40	477.07	0.50	487.40	6.87	480.53	480.31	.00120	0.12	3.23	0.16	-0.33	0.43	0.00	4%	11.00	0.82	2.64	2.16	22.84	47.16	53	
MHN9	CIN8	37	36	477.07	477.68	0.51	487.30	6.99	480.31	480.17	.00120	0.04	3.23	0.16	0.00	0.10	0.00		0.00	0.00	0.00	0.00	22.84	47.80	54	
CIN8	CIN7	34	36	477.68	477.51	0.50	486.58	6.41	480.17	479.99	.00120	0.04	3.40	0.18	0.04	0.10	0.00	LOW	4.00	0.45	2.64	1.19	24.03	47.16	55	
CIN7	AIN6	127	36	477.51	476.88	0.50	486.58	6.59	479.99	479.30	.00230	0.29	4.50	0.31	0.17	0.23	0.00	LOW	4.00	0.46	2.64	1.21	31.80	46.98	56	
AIN6	FEN5	39	36	476.88	476.69	0.49	484.70	5.40	479.30	479.03	.00260	0.30	4.84	0.36	0.10	0.07	0.00	4%	11.00	0.91	2.64	2.40	34.20	46.55	57	P.F.V.= 3.07fps
											25 Yr. H.W.															
CIN4	FEN3	54	12	479.54	479.00	1.00	484.55	4.47	480.08	479.03	.00320	0.17	2.56	0.10	0.13	0.00	0.00	LOW	4.00	0.76	2.64	2.01	2.01	3.56	58	P.F.V.= 1.37fps
											25 Yr. H.W.															

STATE OF MISSOURI HAROLD J. BARTCH NUMBER E-17751 REGISTERED PROFESSIONAL ENGINEER

1/5/96

Highgrove Place (North) ~~(South)~~ 7-5-96 SUBMITTED: FILENAME: 95067N -10

UPP STR	LOW STR	L	DIA	UPPER FL LN	LOWER FL LN	PS	UPPER ST EL	DEPTH HY GR	UPPER HY EL	LOWER HY EL	HYDR GRADE	FR HEAD	VEL	VEL HEAD	JUNC LOSS	TURN LOSS	CURVE LOSS	STR GRADE	INL CAP	DR AREA	PI	Q	TQ	PIPE CAP		REMARKS
AIN68	CIN67	128	12	491.54	490.26	1.00	496.20	4.28	491.92	490.76	.00680	0.87	3.33	0.22	0.29	0.00	0.00	4%	11.00	1.11	2.64	2.93	2.93	3.56	1	
CIN67	CIN66	102	12	490.26	489.24	1.00	496.26	5.50	490.76	489.52	.00860	0.90	4.27	0.28	0.12	0.22	0.00	2%	1.93	0.16	2.64	0.42	3.35	3.56	2	
CIN66	CIN65	34	15	489.24	488.90	1.00	494.87	5.35	489.52	489.34	.00380	0.13	3.24	0.16	-0.06	0.11	0.00	2%	1.93	0.24	2.64	0.63	3.98	6.46	3	
CIN65	AIN64	121	15	488.90	487.69	1.00	494.87	5.53	489.34	488.62	.00490	0.59	3.68	0.21	0.09	0.04	0.00	2%	1.93	0.20	2.64	0.53	4.51	6.46	4	
AIN64	CIN63	49	15	487.69	487.21	1.00	492.79	4.08	488.62	488.00	.00720	0.35	4.47	0.31	0.18	0.09	0.00	3%	8.25	0.37	2.64	0.98	5.49	6.46	5	
CIN63	CIN62	34	18	487.21	486.87	1.00	491.53	3.53	488.00	487.66	.00470	0.16	4.09	0.26	0.03	0.15	0.00	LOW	4.00	0.66	2.64	1.74	7.23	10.50	6	
CIN62	MHN61	108	18	486.87	485.79	1.00	491.53	3.87	487.66	486.58	.00750	0.81	5.15	0.41	0.27	0.00	0.00	LOW	4.00	0.71	2.64	1.87	9.10	10.50	7	
MHN61	FEN60	19	18	485.79	485.60	1.00	489.40	2.82	486.58	486.33	.00750	0.14	5.15	0.41	0.00	0.11	0.00		0.00	0.00	0.00	0.00	9.10	10.50	8	P.F.V.= 3.71fps
											25 Yr. H.W.															
CIN59	CIN58	34	15	500.00	499.66	1.00	505.10	4.83	500.28	499.87	.00010	0.00	0.56	0.00	0.00	0.00	0.00	2%	1.93	0.26	2.64	0.69	0.69	6.46	9	
CIN58	CIN57	132	12	499.46	497.88	1.20	505.10	5.23	499.87	498.96	.00150	0.20	1.76	0.05	0.07	0.00	0.00	2%	1.93	0.26	2.64	0.69	1.38	3.90	10	
CIN57	CIN56	135	12	497.68	494.17	2.60	502.01	3.96	498.06	494.44	.00250	0.34	2.27	0.08	0.05	0.02	0.00	2%	1.93	0.15	2.64	0.40	1.78	5.74	11	
CIN56	CIN55	34	12	493.97	493.63	1.00	499.06	4.43	494.44	494.19	.00370	0.13	2.78	0.12	0.07	0.05	0.00	2%	1.93	0.15	2.64	0.40	2.18	3.56	12	
CIN55	CIN54	64	15	493.43	492.79	1.00	499.05	5.54	493.51	493.03	.00420	0.27	3.43	0.18	0.16	0.05	0.00	2%	1.93	0.77	2.64	2.03	4.21	6.46	13	
CIN54	CIN53	34	15	492.59	492.25	1.00	498.12	5.09	493.03	492.62	.00600	0.20	4.07	0.26	0.14	0.07	0.00	LOW	4.00	0.30	2.64	0.79	5.00	6.46	14	
CIN53	MHN52	125	15	492.05	486.23	4.31	498.12	5.50	492.62	486.53	.00740	1.00	4.52	0.32	0.11	0.02	0.00	LOW	4.00	0.21	2.64	0.55	5.55	13.41	15	
MHN52	FEN51	15	15	486.03	485.60	2.87	490.00	3.47	486.53	486.33	.00740	0.11	4.52	0.32	0.00	0.09	0.00		0.00	0.00	0.00	0.00	5.55	10.94	16	P.F.V.=2.28fps
											25 Yr. H.W.															
AIN48	MHN47	109	12	486.00	484.91	1.00	490.10	3.52	486.58	485.01	.00420	0.45	2.93	0.13	0.17	0.00	0.00	4%	11.00	0.87	2.64	2.30	2.30	3.56	17	
MHN47	CIN46	61	12	484.71	484.10	1.00	491.40	6.39	485.01	484.68	.00420	0.25	2.93	0.13	0.00	0.08	0.00		0.00	0.00	0.00	0.00	2.30	3.56	18	
CIN46	CIN45	34	15	483.90	483.56	1.00	490.28	6.21	484.07	483.83	.00300	0.10	2.88	0.12	0.06	0.08	0.00	LOW	4.00	0.47	2.64	1.24	3.54	6.46	19	
CIN45	MHN44	119	15	483.36	475.72	6.42	490.28	6.45	483.83	476.09	.00600	0.71	4.07	0.26	0.22	0.00	0.00	LOW	4.00	0.55	2.64	1.45	4.99	16.37	20	
MHN44	MHN43	60	15	475.52	473.48	3.40	480.00	3.91	476.09	474.05	.00600	0.36	4.07	0.26	0.00	0.18	0.00		0.00	0.00	0.00	0.00	4.99	11.91	21	
MHN43	FEN42	77	15	470.53	460.50	13.03	478.00	7.07	470.93	461.75	.00600	0.46	4.07	0.26	0.00	0.15	0.00		0.00	0.00	0.00	0.00	4.99	23.31	22	
											Top Inside Pipe															
AIN41	MHN40	286	12	479.34	473.62	2.00	485.40	5.59	479.81	475.88	.00410	1.18	2.92	0.13	0.17	0.00	0.00	3%	8.25	0.87	2.64	2.29	2.29	5.04	23	
MHN40	MHN28	76	12	473.42	472.66	1.00	477.80	1.92	475.88	475.55	.00410	0.31	2.92	0.13	0.00	0.02	0.00		0.00	0.00	0.00	0.00	2.29	3.56	24	
DCIN37	MHN29	125	15	475.50	474.25	1.00	480.25	2.39	477.86	476.08	.00980	1.22	5.21	0.42	0.56	0.00	0.00	LOW	10.00	2.42	2.64	6.39	6.39	6.46	25	
AIN38	AIN30	206	12	479.52	474.37	2.50	484.40	4.49	479.91	476.42	.00280	0.57	2.38	0.09	0.12	0.00	0.00	3%	8.25	0.71	2.64	1.87	1.87	5.63	26	
CIN39	AIN35	115	12	482.05	480.90	1.00	486.25	3.75	482.50	481.34	.00180	0.20	1.91	0.06	0.08	0.00	0.00	LOW	4.00	0.57	2.64	1.50	1.50	3.56	27	
AIN36	AIN35	130	12	482.00	480.70	1.00	486.00	3.74	482.26	481.34	.00530	0.69	3.30	0.17	0.23	0.00	0.00	4%	11.00	0.98	2.64	2.59	2.59	3.56	28	
AIN35	AIN34	154	12	480.70	476.08	3.00	486.00	4.66	481.34	477.47	.01650	2.53	5.82	0.53	0.55	0.06	0.00	3%	8.25	0.18	2.64	0.48	4.57	6.17	29	
AIN34	AIN33	100	18	476.08	475.08	1.00	481.00	5.53	477.47	476.65	.00660	0.66	4.84	0.36	0.10	0.08	0.00	3%	8.25	1.51	2.64	3.99	8.56	10.50	30	
AIN33	CIN32	29	36	475.08	474.93	0.52	481.10	6.47	476.63	476.59	.00030	0.01	1.75	0.05	-0.15	0.18	0.00	3%	8.25	1.18	2.64	3.12	12.39	47.97	31	1.10 CFS
CIN32	CIN31	34	36	474.93	474.76	0.50	489.65	4.86	476.59	476.53	.00040	0.02	1.99	0.06	0.02	0.02	0.00	LOW	4.00	0.48	2.64	1.27	14.06	47.16	32	
CIN31	AIN30	118	36	474.76	474.17	0.50	480.65	4.12	476.53	476.42	.00060	0.07	2.25	0.08	0.04	0.00	0.00	LOW	4.00	0.69	2.64	1.82	15.88	47.16	33	
AIN30	MHN29	213	36	474.17	473.11	0.50	480.40	3.98	476.42	476.08	.00090	0.20	2.89	0.13	0.08	0.06	0.00	3%	8.25	1.01	2.64	2.67	20.42	47.05	34	
MHN29	MHN28	131	36	473.11	472.46	0.50	479.50	3.42	476.08	475.55	.00180	0.21	3.79	0.22	0.03	0.29	0.00		0.00	0.00	0.00	0.00	26.81	46.98	35	
MHN28	FEN27	31	36	472.46	472.30	0.52	478.10	2.55	475.55	475.30	.00190	0.06	4.12	0.26	0.06	0.13	0.00		0.00	0.00	0.00	0.00	29.10	47.92	36	P.F.V.= 2.33fps
											Top Inside Pipe															
AIN26	CIN24	45	15	481.40	480.95	1.00	486.40	4.19	482.21	481.92	.00280	0.13	2.80	0.12	0.16	0.00	0.00	4%	11.00	1.30	2.64	3.43	3.43	6.46	37	