Storm Water Hydraulic Calculations

for

Kingsmill Crossing

FE 102 through MH 107.1 and
FE 129 through CI 139

Prepared By:

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ZPS Project # 96119
May 18, 2006

STATE OF MISSOURI
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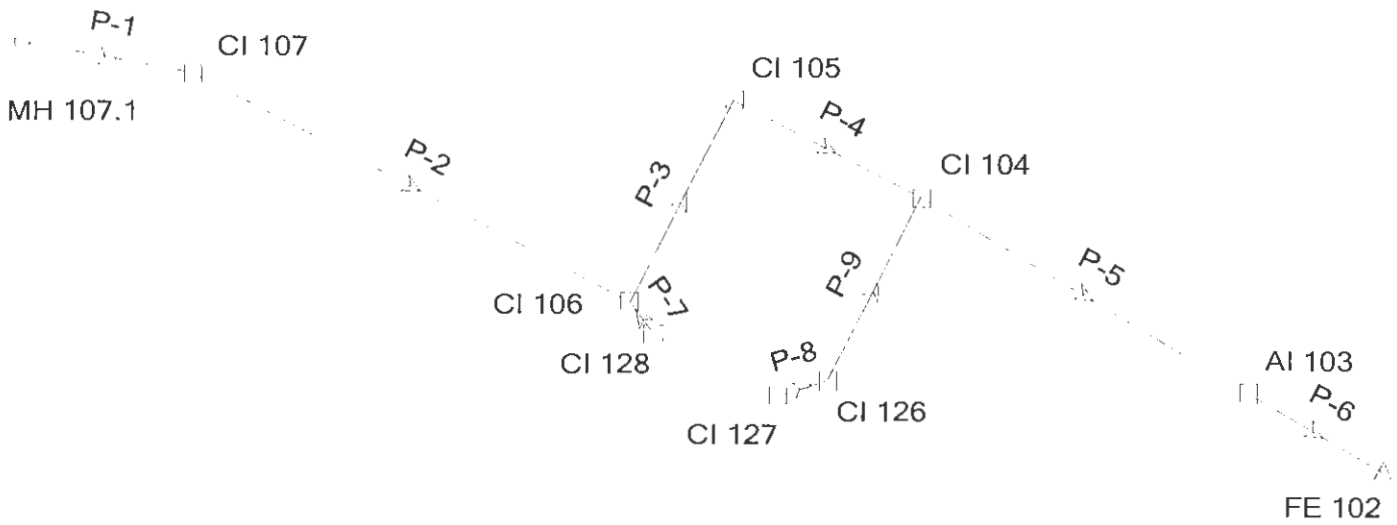
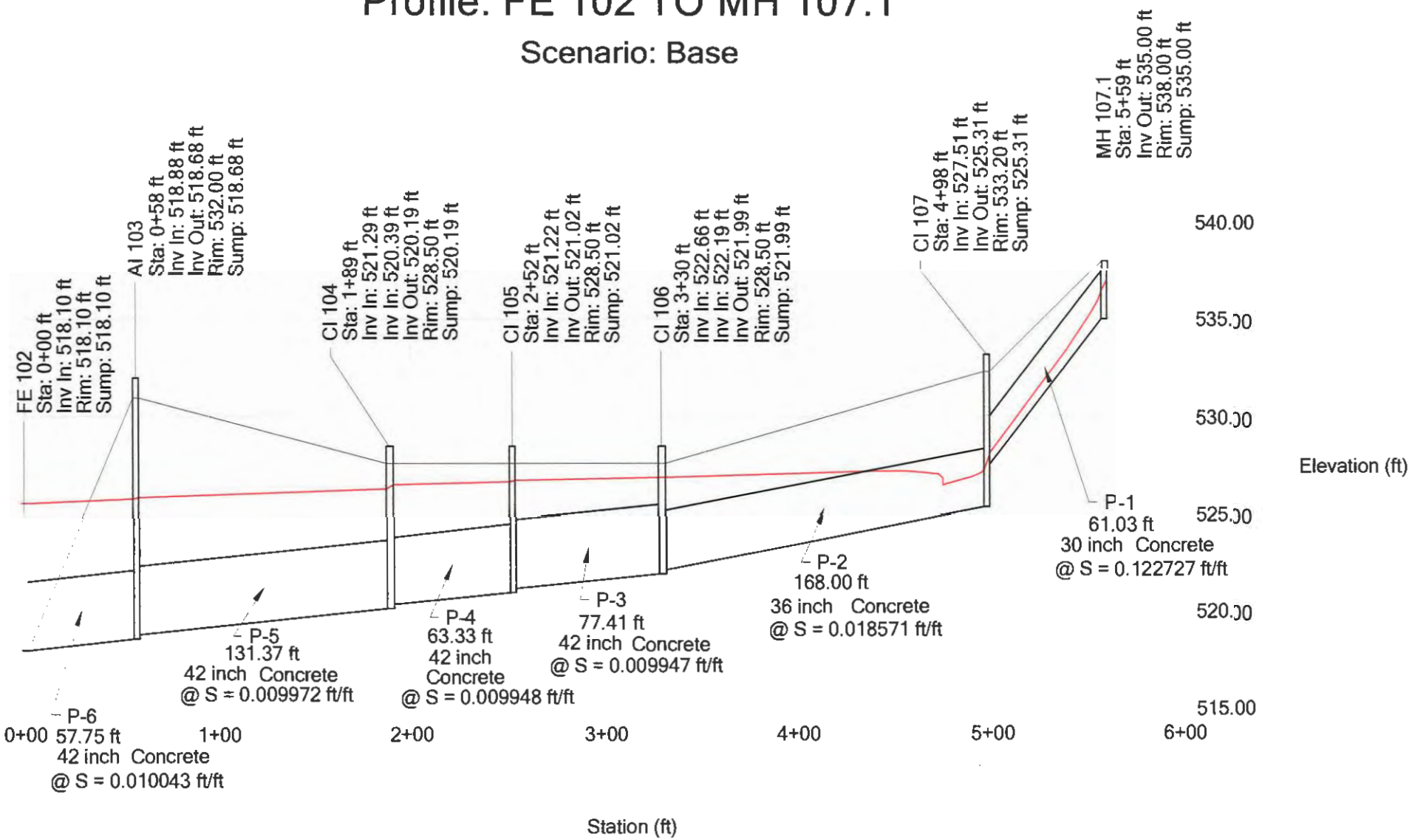
Scenario: Base



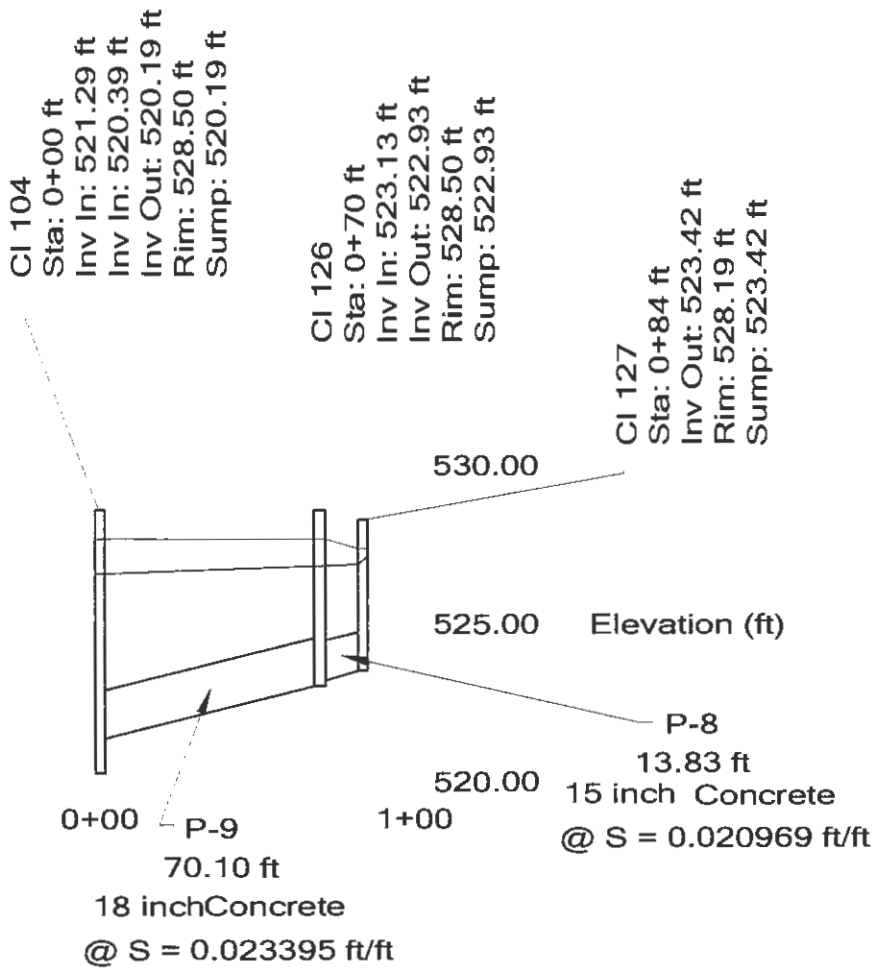
Profile: FE 102 TO MH 107.1

Scenario: Base



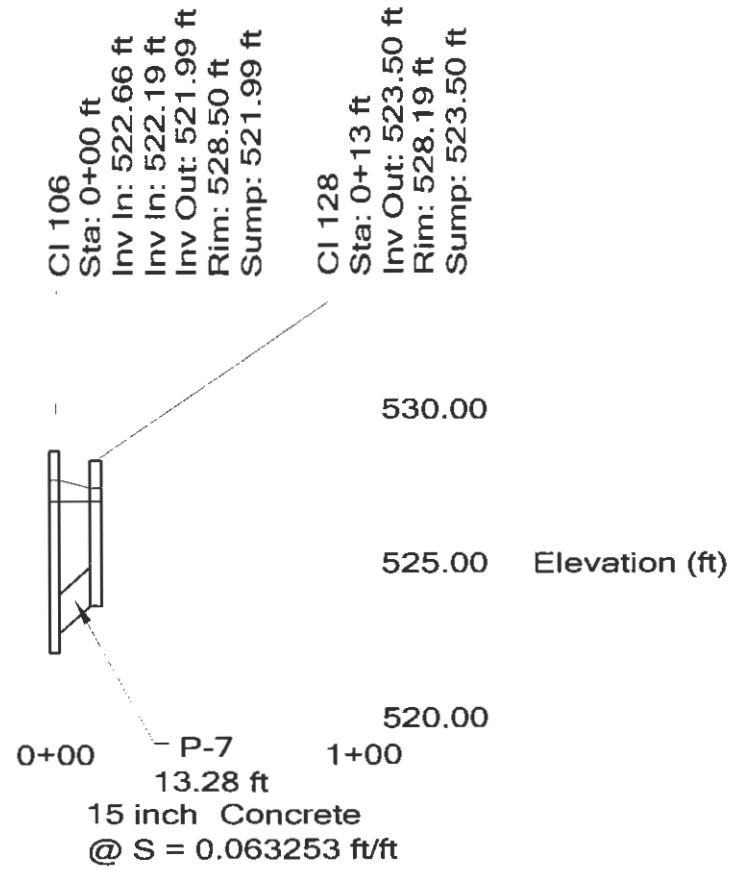
Profile: CI 104 TO CI 127

Scenario: Base



Profile: CI 106 TO CI 128

Scenario: Base



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Calculation Results Summary

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Scenario: Base

>>>> Info: Subsurface Network Rooted by: FE 102
>>>> Info: Subsurface Analysis iterations: 2
>>>> Info: Convergence was achieved.

CALCULATION SUMMARY FOR SURFACE NETWORKS

Label	Inlet Type	Inlet	Total Intercepted Flow (cfs)	Total Bypassed Flow (cfs)	Capture Efficiency (%)	Gutter Spread (ft)	Gutter Depth (ft)
AI 103	Generic Inlet	Generic Default 100%	3.53	0.00	100.0	0.00	0.00
CI 104	Generic Inlet	Generic Default 100%	1.59	0.00	100.0	0.00	0.00
CI 105	Generic Inlet	Generic Default 100%	4.50	0.00	100.0	0.00	0.00
CI 106	Generic Inlet	Generic Default 100%	11.33	0.00	100.0	0.00	0.00
CI 107	Generic Inlet	Generic Default 100%	16.61	0.00	100.0	0.00	0.00
CI 128	Generic Inlet	Generic Default 100%	1.13	0.00	100.0	0.00	0.00
CI 126	Generic Inlet	Generic Default 100%	1.86	0.00	100.0	0.00	0.00
CI 127	Generic Inlet	Generic Default 100%	4.50	0.00	100.0	0.00	0.00
MH 107.1	Generic Inlet	Generic Default 100%	0.00	0.00	100.0	0.00	0.00

CALCULATION SUMMARY FOR SUBSURFACE NETWORK WITH ROOT: FE 102

Label	Number of Sections	Section Size	Section Shape	Length (ft)	Total System Flow (cfs)	Average Velocity (ft/s)	Hydraulic Grade Upstream (ft)	Hydraulic Grade Downstream (ft)
P-6	1	42 inch	Circular	57.75	63.19	6.57	525.79	525.56
P-5	1	42 inch	Circular	131.37	59.65	6.20	526.32	525.86
P-9	1	18 inch	Circular	70.10	6.36	3.60	526.73	526.47
P-4	1	42 inch	Circular	63.33	51.70	5.37	526.64	526.47
P-8	1	15 inch	Circular	13.83	4.50	3.67	526.80	526.73
P-3	1	42 inch	Circular	77.41	47.20	4.91	526.88	526.71
P-2	1	36 inch	Circular	168.00	34.74	12.00	527.23	526.88
P-7	1	15 inch	Circular	13.28	1.13	0.92	526.89	526.88
P-1	1	30 inch	Circular	61.03	18.13	20.03	536.44	528.14

Calculation Results Summary

Label	Total System Flow (cfs)	Ground Elevation (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
FE 102	63.19	518.10	525.56	525.56
AI 103	63.19	531.00	525.86	525.79
CI 104	59.65	527.60	526.47	526.32
CI 126	6.36	527.60	526.73	526.73
CI 105	51.70	527.60	526.71	526.64
CI 127	4.50	527.29	527.00	526.80
CI 106	47.20	527.60	526.88	526.88
CI 107	34.74	532.30	528.05	527.23
CI 128	1.13	527.29	526.90	526.89
MH 107.1	18.13	538.00	537.04	536.44

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Scenario: Base

Combined Pipe\Node Report

Label	Upstream Node	Downstream Node	Length (ft)	Section Size	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	Upstream Inlet Rational Flow (cfs)	Full Capacity (cfs)	Average Velocity (ft/s)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Description
P-1	MH 107.1	CI 107	61.03	30 inch	0.00	0.00	0.00	0.00	0.00	143.68	20.03	535.00	527.51	0.122727	
P-2	CI 107	CI 106	168.00	36 inch	4.28	1.00	4.28	4.28	16.61	90.89	12.00	525.31	522.19	0.018571	
P-3	CI 106	CI 105	77.41	42 inch	2.92	1.00	2.92	7.49	11.33	100.34	4.91	521.99	521.22	0.009947	
P-4	CI 105	CI 104	63.33	42 inch	1.16	1.00	1.16	8.65	4.50	100.34	5.37	521.02	520.39	0.009948	
P-5	CI 104	AI 103	131.37	42 inch	0.41	1.00	0.41	10.70	1.59	100.46	6.20	520.19	518.88	0.009972	
P-6	AI 103	FE 102	57.75	42 inch	0.91	1.00	0.91	11.61	3.53	100.82	6.57	518.68	518.10	0.010043	
P-7	CI 128	CI 106	13.28	15 inch	0.29	1.00	0.29	0.29	1.13	16.25	0.92	523.50	522.66	0.063253	
P-8	CI 127	CI 126	13.83	15 inch	1.16	1.00	1.16	1.16	4.50	9.35	3.67	523.42	523.13	0.020969	
P-9	CI 126	CI 104	70.10	18 inch	0.48	1.00	0.48	1.64	1.86	16.07	3.60	522.93	521.29	0.023395	

Scenario: Base

DOT Report

Label	-Node- Upstream Downstream	Upstream Inlet Area (acres)	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	-Ground- Upstream Downstream (ft)	-HGL- Upstream Downstream (ft)	Section Discharge Capacity (cfs)	-Section- Shape Size	Length (ft)	Average Velocity (ft/s)	Description
P-1	MH 107.1	0.00	0.00	0.00	538.00	536.44	18.13	Circular	61.03	20.03	
	CI 107				532.30	528.14	143.68	30 inch			
P-2	CI 107	4.28	4.28	4.28	532.30	527.23	34.74	Circular	168.00	12.00	
	CI 106				527.60	526.88	90.89	36 inch			
P-3	CI 106	2.92	2.92	7.49	527.60	526.88	47.20	Circular	77.41	4.91	
	CI 105				527.60	526.71	100.34	42 inch			
P-4	CI 105	1.16	1.16	8.65	527.60	526.64	51.70	Circular	63.33	5.37	
	CI 104				527.60	526.47	100.34	42 inch			
P-5	CI 104	0.41	0.41	10.70	527.60	526.32	59.65	Circular	131.37	6.20	
	AI 103				531.00	525.86	100.46	42 inch			
P-6	AI 103	0.91	0.91	11.61	531.00	525.79	63.19	Circular	57.75	6.57	
	FE 102				518.10	525.56	100.82	42 inch			
P-7	CI 128	0.29	0.29	0.29	527.29	526.89	1.13	Circular	13.28	0.92	
	CI 106				527.60	526.88	16.25	15 inch			
P-8	CI 127	1.16	1.16	1.16	527.29	526.80	4.50	Circular	13.83	3.67	
	CI 126				527.60	526.73	9.35	15 inch			
P-9	CI 126	0.48	0.48	1.64	527.60	526.73	6.36	Circular	70.10	3.60	
	CI 104				527.60	526.47	16.07	18 inch			

Scenario: Base

Outlet Report

Label	Station (ft)	Ground Elevation (ft)	Set Rim Equal to Ground Elevation?	Rim Elevation (ft)	Sump Elevation (ft)	Tailwater Condition	Tailwater Elevation (ft)	Description
FE 102	0+00	518.10	false	518.10	518.10	User-Specifie	525.56	

Scenario: Base

Pipe Report

Upstream Node	Label	Downstream Node	Length (ft)	Section Size	Total System Flow (cfs)	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Mannings n	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	System Intensity (in/hr)	Constructed Slope (ft/ft)	Full Capacity (cfs)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)
MH 107.1	P-1	CI 107	61.03	30 inch	18.13	0.00	0.00	0.013	535.00	527.51	0.00	0.00	0.00	0.122727	143.68	538.00	532.30
CI 107	P-2	CI 106	168.00	36 inch	34.74	4.28	1.00	0.013	525.31	522.19	4.28	4.28	3.85	0.018571	90.89	532.30	527.60
CI 106	P-3	CI 105	77.41	42 inch	47.20	2.92	1.00	0.013	521.99	521.22	2.92	7.49	3.85	0.009947	100.34	527.60	527.60
CI 105	P-4	CI 104	63.33	42 inch	51.70	1.16	1.00	0.013	521.02	520.39	1.16	8.65	3.85	0.009948	100.34	527.60	527.60
CI 104	P-5	AI 103	131.37	42 inch	59.65	0.41	1.00	0.013	520.19	518.88	0.41	10.70	3.85	0.009972	100.46	527.60	531.00
AI 103	P-6	FE 102	57.75	42 inch	63.19	0.91	1.00	0.013	518.68	518.10	0.91	11.61	3.85	0.010043	100.82	531.00	518.10
CI 128	P-7	CI 106	13.28	15 inch	1.13	0.29	1.00	0.013	523.50	522.66	0.29	0.29	3.85	0.063253	16.25	527.29	527.60
CI 127	P-8	CI 126	13.83	15 inch	4.50	1.16	1.00	0.013	523.42	523.13	1.16	1.16	3.85	0.020969	9.35	527.29	527.60
CI 126	P-9	CI 104	70.10	18 inch	6.36	0.48	1.00	0.013	522.93	521.29	0.48	1.64	3.85	0.023395	16.07	527.60	527.60

Scenario: Base

Pipe Report

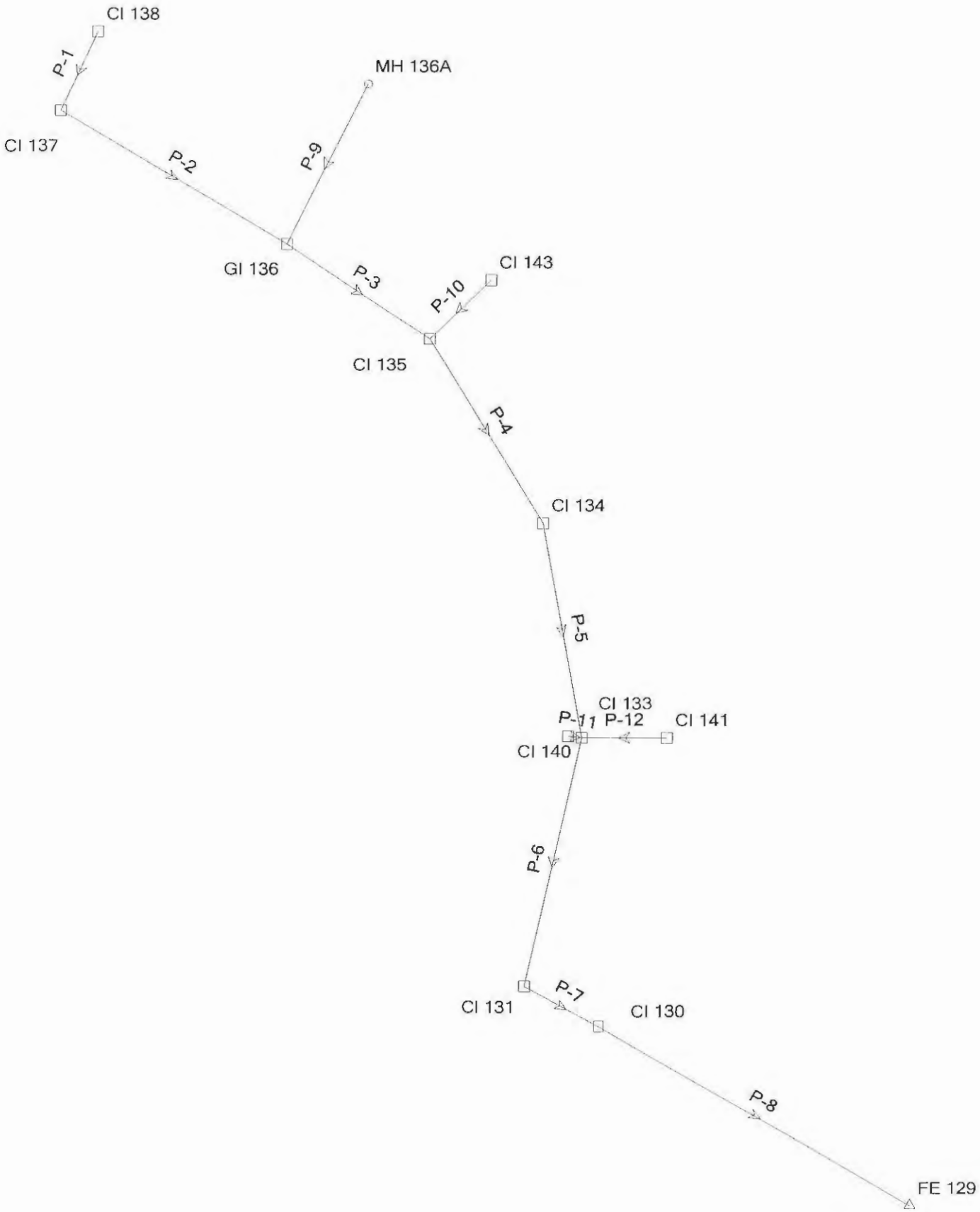
Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Description	Flow / Full Capacity (%)
0.50	2.29	536.44	528.14		12.6
3.99	2.41	527.23	526.88		38.2
2.11	2.88	526.88	526.71		47.0
3.08	3.71	526.64	526.47		51.5
3.91	8.62	526.32	525.86		59.4
8.82	-3.50	525.79	525.56		62.7
2.54	3.69	526.89	526.88		6.9
2.62	3.22	526.80	526.73		48.1
3.17	4.81	526.73	526.47		39.6

Scenario: Base

Outlet Report

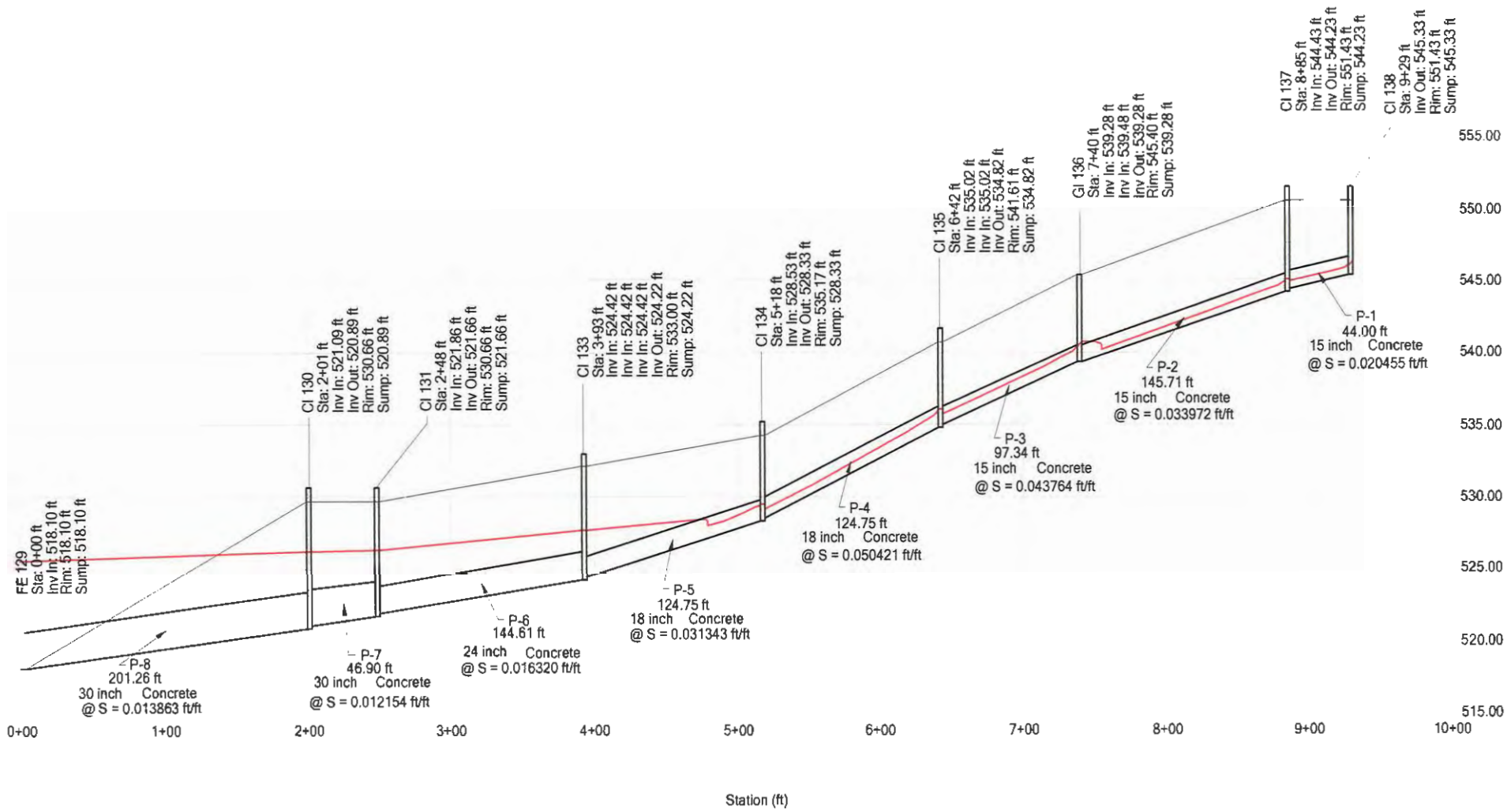
Label	Station (ft)	Ground Elevation (ft)	Set Rim Equal to Ground Elevation?	Rim Elevation (ft)	Sump Elevation (ft)	Tailwater Condition	Tailwater Elevation (ft)	Description
FE 102	0+00	518.10	false	518.10	518.10	User-Specifie	525.56	

Scenario: Base



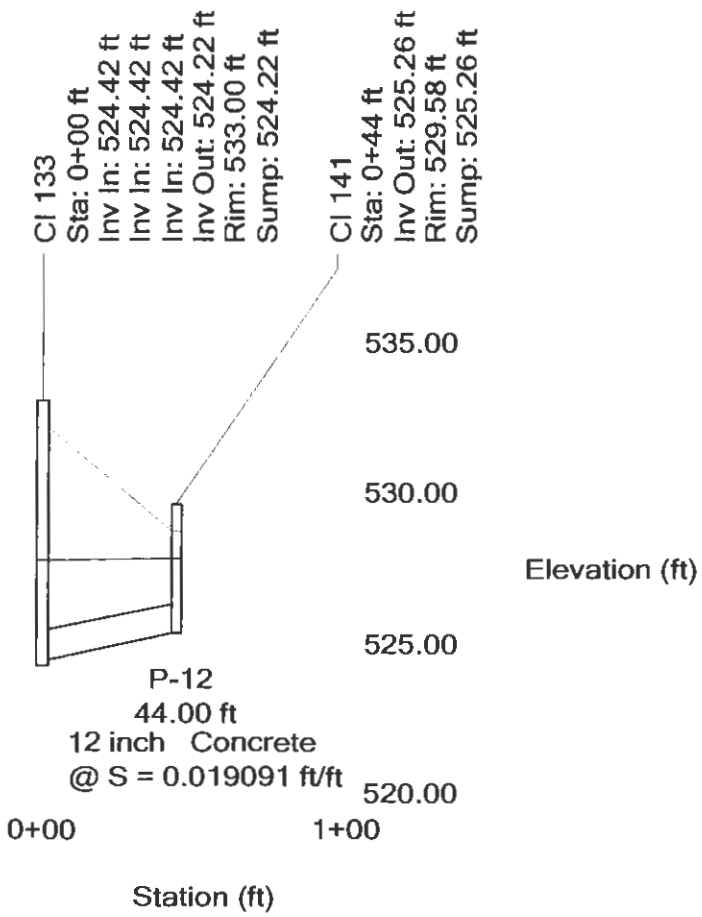
Profile: FE 129 TO CI 138

Scenario: Base



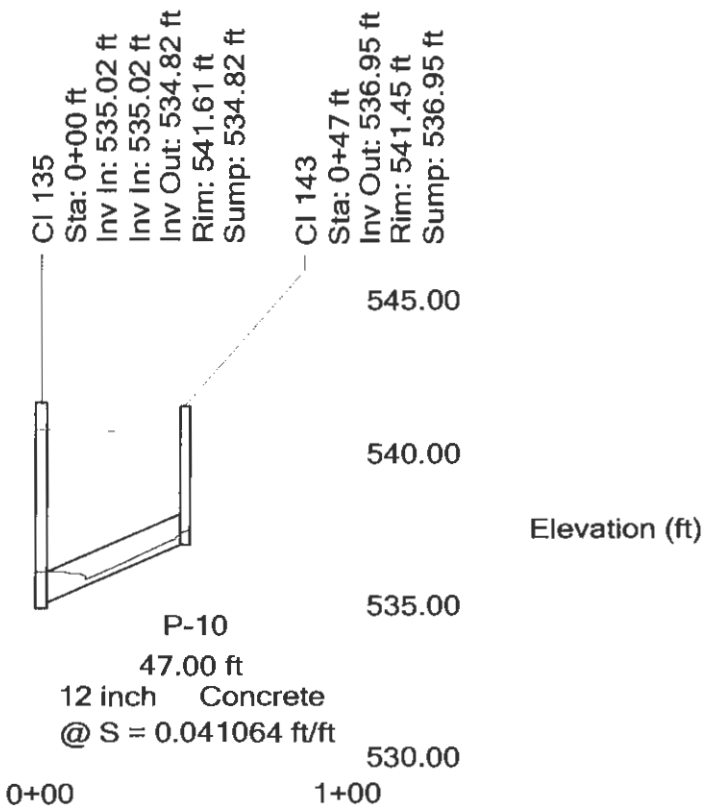
Profile: CI 133 TO CI 141

Scenario: Base



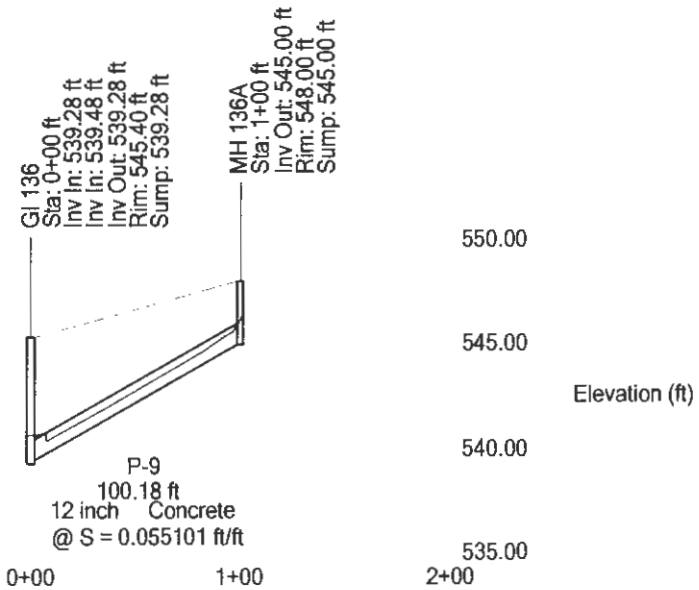
Profile: CI 135 TO CI 143

Scenario: Base



Profile: GI 136 TO MH 136A

Scenario: Base



Calculation Results Summary

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Scenario: Base

>>>> Info: Subsurface Network Rooted by: FE 129
>>>> Info: Subsurface Analysis iterations: 2
>>>> Info: Convergence was achieved.

CALCULATION SUMMARY FOR SURFACE NETWORKS

Label	Inlet Type	Inlet	Total Intercepted Flow (cfs)	Total Bypassed Flow (cfs)	Capture Efficiency (%)	Gutter Spread (ft)	Gutter Depth (ft)
CI 130	Generic Inlet	Generic Default 100%	0.47	0.00	100.0	4.50	0.09
CI 131	Generic Inlet	Generic Default 100%	0.43	0.00	100.0	4.36	0.09
CI 133	Generic Inlet	Generic Default 100%	0.27	0.00	100.0	3.68	0.07
CI 134	Generic Inlet	Generic Default 100%	0.39	0.00	100.0	4.11	0.08
CI 135	Generic Inlet	Generic Default 100%	0.66	0.00	100.0	4.09	0.08
CI 141	Generic Inlet	Generic Default 100%	0.74	0.00	100.0	5.35	0.11
CI 143	Generic Inlet	Generic Default 100%	0.66	0.00	100.0	4.09	0.08
GI 136	Generic Inlet	Generic Default 100%	0.00	0.00	100.0	0.00	0.00
CI 137	Generic Inlet	Generic Default 100%	0.66	0.00	100.0	4.48	0.09
CI 138	Generic Inlet	Generic Default 100%	0.66	0.00	100.0	4.48	0.09
CI 140	Generic Inlet	Generic Default 100%	11.14	0.00	100.0	0.00	0.00
MH 136A	Generic Inlet	Generic Default 100%	0.00	0.00	100.0	0.00	0.00

CALCULATION SUMMARY FOR SUBSURFACE NETWORK WITH ROOT: FE 129

Label	Number of Sections	Section Size	Section Shape	Length (ft)	Total System Flow (cfs)	Average Velocity (ft/s)	Hydraulic Grade Upstream (ft)	Hydraulic Grade Downstream (ft)
P-8	1	30 inch	Circular	201.26	23.04	4.69	526.19	525.56
P-7	1	30 inch	Circular	46.90	22.57	4.60	526.35	526.21
P-6	1	24 inch	Circular	144.61	22.14	7.05	527.74	526.35
P-11	1	12 inch	Circular	8.98	11.14	14.18	528.61	527.74
P-12	1	12 inch	Circular	44.00	0.74	0.94	527.76	527.74
P-5	1	18 inch	Circular	124.75	10.00	10.71	529.55	527.74
P-4	1	18 inch	Circular	124.75	9.61	12.66	536.02	529.20
P-10	1	12 inch	Circular	47.00	0.66	5.72	537.29	536.02

Scenario: Base

Combined Pipe\Node Report

Label	Upstream Node	Downstream Node	Length (ft)	Section Size	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	Upstream Inlet Rational Flow (cfs)	Full Capacity (cfs)	Average Velocity (ft/s)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Description
P-1	CI 138	CI 137	44.00	15 inch	0.17	1.00	0.17	0.17	0.66	9.24	6.75	545.33	544.43	0.020455	
P-2	CI 137	GI 136	145.71	15 inch	0.17	1.00	0.17	0.34	0.66	11.91	8.57	544.23	539.28	0.033972	
P-3	GI 136	CI 135	97.34	15 inch	0.00	0.00	0.00	0.34	0.00	13.51	11.57	539.28	535.02	0.043764	
P-4	CI 135	CI 134	124.75	18 inch	0.17	1.00	0.17	0.68	0.66	23.59	12.66	534.82	528.53	0.050421	
P-5	CI 134	CI 133	124.75	18 inch	0.10	1.00	0.10	0.78	0.39	18.60	10.71	528.33	524.42	0.031343	
P-6	CI 133	CI 131	144.61	24 inch	0.07	1.00	0.07	3.91	0.27	28.90	7.05	524.22	521.86	0.016320	
P-7	CI 131	CI 130	46.90	30 inch	0.11	1.00	0.11	4.02	0.43	45.22	4.60	521.66	521.09	0.012154	
P-8	CI 130	FE 129	201.26	30 inch	0.12	1.00	0.12	4.14	0.47	48.29	4.69	520.89	518.10	0.013863	
P-9	MH 136A	GI 136	100.18	12 inch	0.00	0.00	0.00	0.00	0.00	8.36	10.89	545.00	539.48	0.055101	
P-10	CI 143	CI 135	47.00	12 inch	0.17	1.00	0.17	0.17	0.66	7.22	5.72	536.95	535.02	0.041064	
P-11	CI 140	CI 133	8.98	12 inch	2.87	1.00	2.87	2.87	11.14	9.05	14.18	525.00	524.42	0.064588	
P-12	CI 141	CI 133	44.00	12 inch	0.19	1.00	0.19	0.19	0.74	4.92	0.94	525.26	524.42	0.019091	

Scenario: Base

DOT Report

Label	-Node- Upstream Downstream	Upstream Inlet Area (acres)	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	-Ground- Upstream Downstream (ft)	-HGL- Upstream Downstream (ft)	Section Discharge Capacity (cfs)	-Section- Shape Size	Length (ft)	Average Velocity (ft/s)	Description
P-1	CI 138	0.17	0.17	0.17	550.53	546.03	3.05	Circular	44.00	6.75	
	CI 137				550.53	544.93	9.24	15 inch			
P-2	CI 137	0.17	0.17	0.34	550.53	545.01	3.71	Circular	145.71	8.57	
	GI 136				545.40	540.67	11.91	15 inch			
P-3	GI 136	0.00	0.00	0.34	545.40	540.41	8.29	Circular	97.34	11.57	
	CI 135				540.71	535.73	13.51	15 inch			
P-4	CI 135	0.17	0.17	0.68	540.71	536.02	9.61	Circular	124.75	12.66	
	CI 134				534.27	529.20	23.59	18 inch			
P-5	CI 134	0.10	0.10	0.78	534.27	529.55	10.00	Circular	124.75	10.71	
	CI 133				532.10	527.74	18.60	18 inch			
P-6	CI 133	0.07	0.07	3.91	532.10	527.74	22.14	Circular	144.61	7.05	
	CI 131				529.76	526.35	28.90	24 inch			
P-7	CI 131	0.11	0.11	4.02	529.76	526.35	22.57	Circular	46.90	4.60	
	CI 130				529.76	526.21	45.22	30 inch			
P-8	CI 130	0.12	0.12	4.14	529.76	526.19	23.04	Circular	201.26	4.69	
	FE 129				518.10	525.56	48.29	30 inch			
P-9	MH 136A	0.00	0.00	0.00	548.00	545.89	4.58	Circular	100.18	10.89	
	GI 136				545.40	540.67	8.36	12 inch			
P-10	CI 143	0.17	0.17	0.17	540.55	537.29	0.66	Circular	47.00	5.72	
	CI 135				540.71	536.02	7.22	12 inch			
P-11	CI 140	2.87	2.87	2.87	529.10	528.61	11.14	Circular	8.98	14.18	
	CI 133				532.10	527.74	9.05	12 inch			
P-12	CI 141	0.19	0.19	0.19	528.68	527.76	0.74	Circular	44.00	0.94	
	CI 133				532.10	527.74	4.92	12 inch			

Scenario: Base

Pipe Report

Upstream Node	Label	Downstream Node	Length (ft)	Section Size	Total System Flow (cfs)	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Mannings n	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	System Intensity (in/hr)	Constructed Slope (ft/ft)	Full Capacity (cfs)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)
CI 138	P-1	CI 137	44.00	15 inch	3.05	0.17	1.00	0.013	545.33	544.43	0.17	0.17	3.85	0.020455	9.24	550.53	550.53
CI 137	P-2	GI 136	145.71	15 inch	3.71	0.17	1.00	0.013	544.23	539.28	0.17	0.34	3.85	0.033972	11.91	550.53	545.40
GI 136	P-3	CI 135	97.34	15 inch	8.29	0.00	0.00	0.013	539.28	535.02	0.00	0.34	3.85	0.043764	13.51	545.40	540.71
CI 135	P-4	CI 134	124.75	18 inch	9.61	0.17	1.00	0.013	534.82	528.53	0.17	0.68	3.85	0.050421	23.59	540.71	534.27
CI 134	P-5	CI 133	124.75	18 inch	10.00	0.10	1.00	0.013	528.33	524.42	0.10	0.78	3.85	0.031343	18.60	534.27	532.10
CI 133	P-6	CI 131	144.61	24 inch	22.14	0.07	1.00	0.013	524.22	521.86	0.07	3.91	3.85	0.016320	28.90	532.10	529.76
CI 131	P-7	CI 130	46.90	30 inch	22.57	0.11	1.00	0.013	521.66	521.09	0.11	4.02	3.85	0.012154	45.22	529.76	529.76
CI 130	P-8	FE 129	201.26	30 inch	23.04	0.12	1.00	0.013	520.89	518.10	0.12	4.14	3.85	0.013863	48.29	529.76	518.10
MH 136A	P-9	GI 136	100.18	12 inch	4.58	0.00	0.00	0.013	545.00	539.48	0.00	0.00	0.00	0.055101	8.36	548.00	545.40
CI 143	P-10	CI 135	47.00	12 inch	0.66	0.17	1.00	0.013	536.95	535.02	0.17	0.17	3.85	0.041064	7.22	540.55	540.71
CI 140	P-11	CI 133	8.98	12 inch	11.14	2.87	1.00	0.013	525.00	524.42	2.87	2.87	3.85	0.064588	9.05	529.10	532.10
CI 141	P-12	CI 133	44.00	12 inch	0.74	0.19	1.00	0.013	525.26	524.42	0.19	0.19	3.85	0.019091	4.92	528.68	532.10

Scenario: Base

Pipe Report

Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Description	Flow / Full Capacity (%)
3.95	4.85	546.03	544.93		33.0
5.05	4.87	545.01	540.67		31.2
4.87	4.44	540.41	535.73		61.3
4.39	4.24	536.02	529.20		40.7
4.44	6.18	529.55	527.74		53.8
5.88	5.90	527.74	526.35		76.6
5.60	6.17	526.35	526.21		49.9
6.37	-2.50	526.19	525.56		47.7
2.00	4.92	545.89	540.67		54.8
2.60	4.69	537.29	536.02		9.1
3.10	6.68	528.61	527.74		123.0
2.42	6.68	527.76	527.74		15.0

Scenario: Base

Node Report

Label	Area (acres)	Inlet C	Inlet CA (acres)	External CA (acres)	System CA (acres)	Time of Concentration (min)	External Time of Concentration (min)	Upstream Time Of Concentration (min)	System Flow Time (min)	System Intensity (in/hr)	System Rational Flow (cfs)	Additional Flow (cfs)	Additional Carryover (cfs)	Known Flow (cfs)	Upstream Additional Flow (cfs)	Total System Flow (cfs)	Ground Elevation (ft)	Rim Elevation (ft)	Hydraulic Grade Line In (ft)
FE 129					4.14				22.12	3.85	16.07					23.04	518.10	518.10	525.56
CI 130	0.12	1.00	0.12	0.00	4.14	20.00	0.00	21.40	21.40	3.85	16.07	0.00	0.00	0.00	6.97	23.04	529.76	530.66	526.21
CI 131	0.11	1.00	0.11	0.00	4.02	20.00	0.00	21.23	21.23	3.85	15.60	0.00	0.00	0.00	6.97	22.57	529.76	530.66	526.35
CI 133	0.07	1.00	0.07	0.00	3.91	20.00	0.00	20.89	20.89	3.85	15.17	0.00	0.00	0.00	6.97	22.14	532.10	533.00	527.74
CI 134	0.10	1.00	0.10	0.00	0.78	20.00	0.00	20.70	20.70	3.85	3.03	0.00	0.00	0.00	6.97	10.00	534.27	535.17	529.55
CI 135	0.17	1.00	0.17	0.00	0.68	20.00	0.00	20.53	20.53	3.85	2.64	0.00	0.00	0.00	6.97	9.61	540.71	541.61	536.02
GI 136	0.00	0.00	0.00	0.00	0.34	20.00	0.00	20.39	20.39	3.85	1.32	0.00	0.00	0.00	6.97	8.29	545.40	545.40	540.67
CI 137	0.17	1.00	0.17	0.00	0.34	20.00	0.00	20.11	20.11	3.85	1.32	0.00	0.00	0.00	2.39	3.71	550.53	551.43	545.01
CI 138	0.17	1.00	0.17	0.00	0.17	20.00	0.00	0.00	20.00	3.85	0.66	2.39	0.00	0.00	0.00	3.05	550.53	551.43	546.32
CI 143	0.17	1.00	0.17	0.00	0.17	20.00	0.00	0.00	20.00	3.85	0.66	0.00	0.00	0.00	0.00	0.66	540.55	541.45	537.41
CI 140	2.87	1.00	2.87	0.00	2.87	20.00	0.00	0.00	20.00	3.85	11.14	0.00	0.00	0.00	0.00	11.14	529.10	530.00	531.74
CI 141	0.19	1.00	0.19	0.00	0.19	20.00	0.00	0.00	20.00	3.85	0.74	0.00	0.00	0.00	0.00	0.74	528.68	529.58	527.77
MH 13	0.00	0.00	0.00	0.00	0.00	20.00	0.00	0.00	20.00	0.00	0.00	4.58	0.00	0.00	0.00	4.58	548.00	548.00	546.49

Scenario: Base

Node Report

Hydraulic Grade Line Out (ft)	Local Intensity (in/hr)	Local Rational Flow (cfs)	Description
525.56			
526.19	3.85	0.47	
526.35	3.85	0.43	
527.74	3.85	0.27	
529.55	3.85	0.39	
536.02	3.85	0.66	
540.41	0.00	0.00	
545.01	3.85	0.66	
546.03	3.85	0.66	
537.29	3.85	0.66	
528.61	3.85	11.14	
527.76	3.85	0.74	
545.89	0.00	0.00	

Scenario: Base

Outlet Report

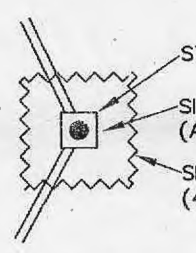
Label	Station (ft)	Ground Elevation (ft)	Set Rim Equal to Ground Elevation?	Rim Elevation (ft)	Sump Elevation (ft)	Tailwater Condition	Tailwater Elevation (ft)	Description
FE 129	0+00	518.10	true	518.10	518.10	User-Specifie	525.56	

LEGEND

	Sanitary Sewer (Proposed)	C.P.	Concrete Pipe
	Sanitary Sewer (Existing)	R.C.P.	Reinforced Concrete Pipe
	Storm Sewer (Proposed)	C.M.P.	Corregated Metal Pipe
	Storm Sewer (Existing)	P.V.C.	Polyvinyl Choride Pipe
8"W	Water Line and size	C.I.P.	Cast Iron Pipe
WV	Tee and Valve	V.C.P.	Vitrified Clay Pipe
	Fire Hydrant	E.P.	End Pipe
	Cap	F.E.	Flared End Section
	Existing Fence Line	C.O.	Clean Out
	Existing Tree Line	V.T.	Vent Trap
522	Existing Contour	M.H.	Manhole
(522)	Proposed Contour	C.I.	Curb Inlet
26	Lot or Building Number	D.C.I.	Double Curb Inlet
	Street Sign	A.I.	Area Inlet
	Power Pole	D.A.I.	Double Area Inlet
	Guy Wire	G.I.	Grate Inlet
	Light Standard	C.C.	Concrete Collar
G	Gas Line	U.I.P	Use In Place
E	Electric Line	T.B.R.	To Be Removed
T	Telephone Line	T.B.R.&R.	To Be Removed & Relocated/Replaced
GV	Gas Valve	Set I.R.	Set Iron Rod with Cap
GM	Gas Meter	C.M.	Concrete Monument
WV	Water Valve	O.I.P.	Old Iron Pipe
	Water Meter	O.S.T.	Old Stone
	Found Old Iron Pipe	O.I.R.	Old Iron Rod
	Found Old Iron Rod		

LEGEND:

- TEMPORARY SWALE
- DRAINAGE AREA
- DRAINAGE "Q's"
- TEMPORARY SILT BASIN
- SILT FENCE

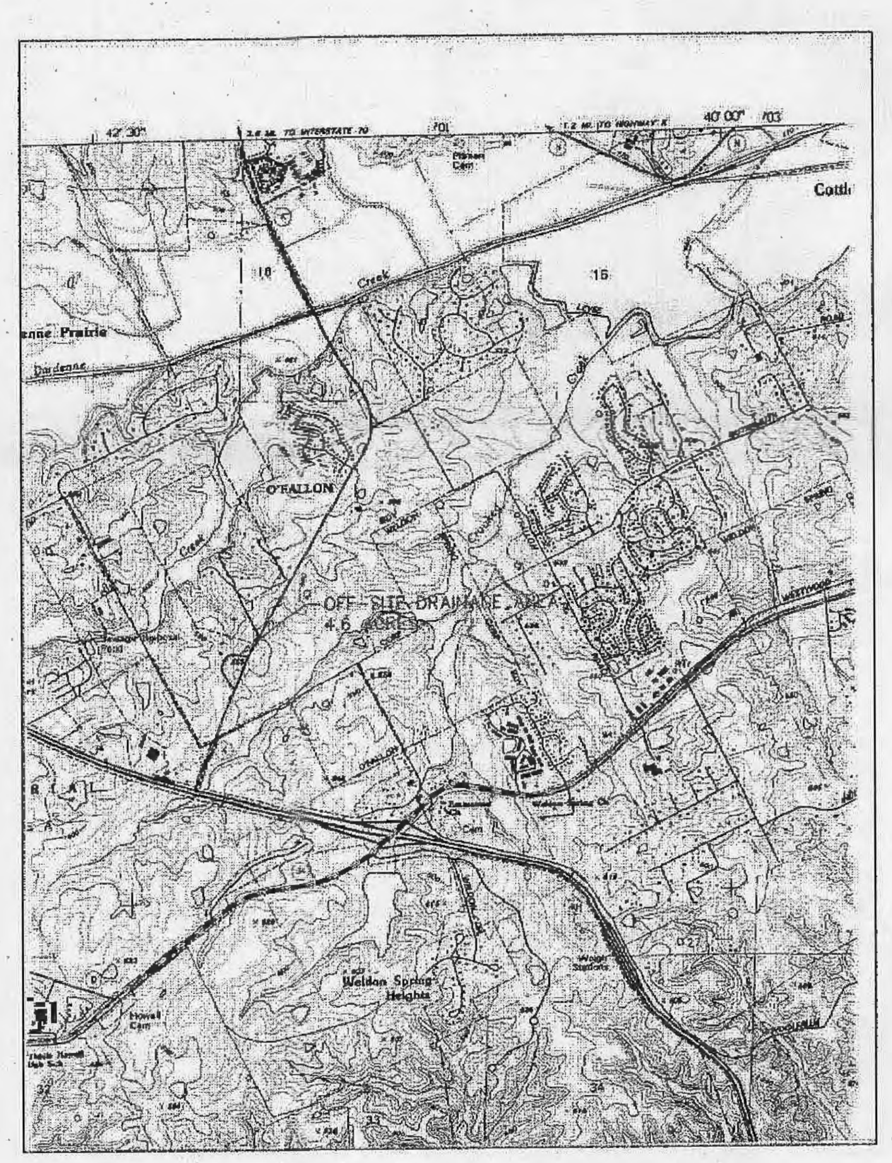


SILTATION PLACEMENT @ STRUCTURES

N.T.S.

NOTES:

1. REFER TO CONSTRUCTION DETAILS ADDITIONAL SILTATION CONTROL LAYOUT AND DETAILS.
2. TEMPORARY SWALES TO BE BUILT TO DIVERT FLOW TO ULTIMATE STORM COLLECTION POINTS.
3. EXISTING STORM BASIN TO BE MODIFIED IN SIZE. ORIGINAL STRUCTURES ARE SIZED FOR ULTIMATE FLOW AND TO BE USED IN PLACE.
4. SEE DETAIL SHEETS FOR WAS-DOWN PAD DETAILS.



OFF SITE DRAINAGE AREA

NOT TO SCALE

Missouri One Call System, Inc.
Call Before You Dig!
1-800-DIG-RITE
(1-800-344-7483)

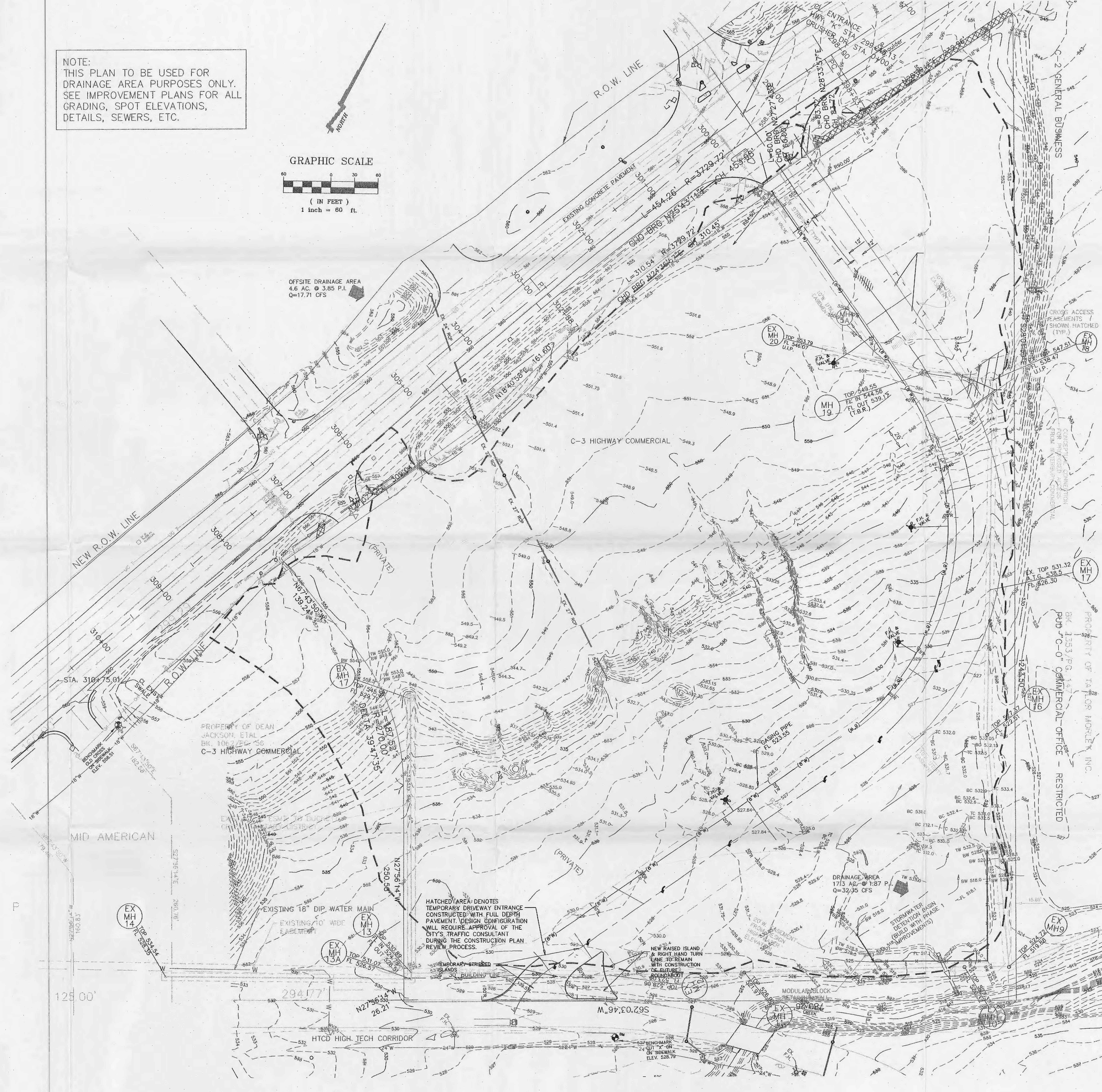
The underground utilities shown herein were plotted from available information and do not necessarily reflect the actual existence, nonexistence, size, type, number or location of these or other utilities. The General Contractor and/or owner shall be responsible for verifying the actual location of all underground utilities, shown or not shown, and said utilities shall be located in the field prior to any grading, excavation or construction of any improvements. These provisions shall in no way absolve any party from complying with the Underground Facility Safety & Damage Prevention Act, Chapter 319, RSMo

NOTE:
FOR ALL WORK WITHIN THE MISSOURI STATE RIGHT-OF-WAY FOR HIGHWAY K REFER TO THE ATTACHED KINGSMILL MoDOT ENTRANCE PLANS

NOTE:
THIS PLAN TO BE USED FOR DRAINAGE AREA PURPOSES ONLY. SEE IMPROVEMENT PLANS FOR ALL GRADING, SPOT ELEVATIONS, DETAILS, SEWERS, ETC.

GRAPHIC SCALE

(IN FEET)
1 inch = 60 ft.



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ZAVRADINOS PROFESSIONAL SERVICES, INC.

Richard G. Wischmann DATE
PE-2003015059

No.	Date	Revision/Issue

KINGSMILL CROSSING

PRE-DEVELOPED DRAINAGE AREA MAP

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CITY/COUNTY JOB NO: 9994.04 APRIL 6, 2006
MSD P- BASEMAP
Original Issue Date 6/23/06
Drawn By JBC | ZPS PM GW
Project No. 96119 | Sheet 1 OF 1